

ASIA-PACIFIC FORESTRY SECTOR OUTLOOK STUDY

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**NON-WOOD FOREST PRODUCTS OUTLOOK
STUDY FOR ASIA AND THE PACIFIC:
TOWARDS 2010**

by

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INFORMATION NOTE ON ASIA-PACIFIC FORESTRY SECTOR OUTLOOK STUDY

At its sixteenth session held in Yangon, Myanmar, in January 1996, the Asia-Pacific Forestry Commission, which has membership open to all governments in the Asia-Pacific region, decided to carry out an outlook study for forestry with horizon year 2010. The study is being coordinated by FAO through its regional office in Bangkok and its Headquarters in Rome, but is being implemented in close partnership with governments, many of which have nominated national focal points.

The scope of the study is to look at the main external and sectoral developments in policies, programmes and institutions that will affect the forestry sector and to assess from this the likely direction of its evolution and to present its likely situation in 2010. The study involves assessment of current status but also of trends from the past and the main forces which are shaping those trends and then builds on this to explore future prospects.

Working papers have been contributed or commissioned on a wide range of topics. They fall under the following categories: country profiles, selected in-depth country or sub-regional studies and thematic studies. Working papers are prepared by individual authors or groups of authors on their own professional responsibility; therefore, the opinions expressed in them do not necessarily reflect the views of their employers, the governments of the Asia-Pacific Forestry Commission or of the Food and Agriculture Organization. In preparing the substantive report to be presented at the next session of the Asia-Pacific Forestry Commission early in 1998, material from these working papers will be an important element but will be blended and interpreted alongside a lot of other material.

Working papers are being produced and issued as they arrive. Some effort at uniformity of presentation is being attempted but the contents are only minimally edited for style or clarity. FAO welcomes from readers any information which they feel would be useful to the study on the subject of any of the working papers or on any other subject that has importance for the Asia-Pacific forestry sector. Such material can be mailed to the contacts given below from whom further copies of these working papers, as well as more information on the Asia-Pacific Forestry Sector Study, can be obtained:

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EXECUTIVE SUMMARY

During the past decade, forest sector specialists and forestry institutions world-wide have increasingly recognized the ‘major importance of minor forest products’. FAO’s decision to adapt its prior terminology and refer to ‘non-wood’ as opposed to ‘minor’ forest products reflects this significant change in perspective. In the early 1990s, the FAO Forestry Department launched a programme to support national efforts to increase knowledge, develop activities, and adapt policies for more systematic and sustainable use of non-wood forest products (NWFPs). FAO’s programme aims to contribute better to sustainable management and conservation of both NWFPs and tropical forest ecosystems.

Combined with similar initiatives by other institutions, the availability of information regarding NWFPs in general—and their utilization, trade, and management in particular—has begun to increase substantially. Yet there is little question that most foresters still consider NWFPs to be of secondary importance compared to timber. An enormous amount of work remains to create broader acceptance and a more comprehensive understanding of the benefits, needs and specific approaches for sustainably managing NWFPs. Continuing compilation and dissemination of this information will enable policy makers to target support, incentives and disincentives that are more effective at impelling wise and sustainable forest use, recognizing the full potential and significance of NWFPs.

This Outlook Study provides an overview of the significance of NWFPs in the Asia-Pacific region. It examines current trends and projects their likely future impacts on NWFPs in terms of product availability and management, the importance of NWFPs to people and economy, and the effort to develop and achieve sustainable forest management in the region.

The study notes that despite considerable progress during the past decade, data regarding NWFPs are often scant, conflicting and unreliable, even for major commercial species such as rattan, bamboo and tree resin. It is nonetheless clear that NWFPs provide important sources of livelihood products and employment for tens and perhaps hundreds of millions of people in the region. Many of these products are traded commercially, but it is the residents of forest areas who are most dependent upon NWFPs to fulfil a wide assortment of subsistence uses. These uses include: food, spices, edible oils, medicines, fodder, forage, stall bedding, green manure, construction material, household utensils, fibre, ornamentation and rituals.

Access to NWFPs is vital to the livelihood strategies of millions of poor forest area people. For the poorest and most dependent people, reduced access to NWFPs—as primary or supplemental sources of food, medicine and income—can constitute a serious threat to their survival. Collection and processing of NWFP raw materials into finished products provides employment for millions of Asia-Pacific region people. For example, some 10 million people are said to be employed in collecting and processing *tendu* leaves into *bidi* cheroots. Precise data are lacking regarding the total number of people in the Asia-Pacific region who derive income from NWFPs¹. But the number of people in the region who collect, process and trade NWFPs could be well over 100 million.

¹ For an assessment of whether NWFPs are an effective source of livelihoods, see Fisher *et al* (APFSOS/WP/27) (Editor).

National revenue derived from the export of NWFP raw materials and finished products is also prodigious. The total value of rattan exports from Indonesia in 1989 alone was US\$ 17 million². The value of forest plants used as herbal medicines and as raw materials for production of modern pharmaceuticals is estimated to be several billion dollars.

Biological “prospecting” and a trend toward increasing use of natural medicines and cosmetics is likely to expand international demand and trade in these products. Several studies suggest that the value of sustainable NWFP harvest could exceed that derived from harvesting timber from a similar area of forest. This argument has begun to provide compelling economic rationale for forest management systems based on long-term sustainable utilization of NWFPs as opposed to short-cycle timber extraction.

National, regional and international demand for NWFPs is likely to grow, creating potential for increased revenue generation. But this has parallel negative implications with respect to sustainable resource management. Adverse ecological impacts on forests from over-harvesting target species could disturb species interrelationships that are vital for maintaining ecosystem integrity and stability. Intensive selective harvest of NWFPs can cause chain-reaction effects that spread from point sources to the larger forest ecosystem. The long-term effects of improper NWFP harvest—though much less readily apparent than those associated with large-scale timber extraction—can be nearly as detrimental to forest ecology.

Much of what we know about *sustainable* NWFP management comes from indigenous technical knowledge (ITK) that is the result of centuries of experimentation by traditional and indigenous peoples who are dependent on forests for livelihood. Until recently, ITK regarding NWFPs and their sustainable management have largely been overlooked. Rapid social, cultural and economic changes associated with the modernization currently sweeping the Asia-Pacific region have begun to penetrate even the deepest forest recesses. This has a profound affect on traditional forest-dwelling people, as they are exposed and gain access to modern technologies and consumer products.

Influx to forest frontiers by an increasing number of lowlanders has contributed to changing local perceptions and behaviours with respect to forest utilization and management. The overall results of these changes have been predominantly detrimental to NWFP resources, as well as on the lives of traditional forest area inhabitants. At the same time, increasing trends in the availability and use of synthetic substitutes for NWFPs, domestication and cultivation on agricultural lands, as well as alternative employment options have reduced pressures on NWFP resources in some areas.

The study notes that the overall trend is toward depletion of NWFP resources. This is due to inadequately regulated off-take and increasing market demand for commercially popular species. There is also a growing demand for endangered plants and animals purchased as trophies and medicines by the region’s growing number of affluent consumers. The vast majority of NWFP collectors and local traders receive low prices for sale of raw materials. But growing speciality markets for natural products, and for ‘socially and environmentally sound’ rainforest commodities, have created new opportunities. While outside entrepreneurs monopolize much of this business, many programmes assisted by government and non-

² The value is important in relation to other NWFPs but relatively small compared to other exports of the country, including wood products (Editor).

governmental agencies are helping the traditionally underprivileged to gain access to these emerging niche markets. Fair trade organizations, which have emerged for many agricultural commodities, may become important mechanisms in the future to ensure that NWFP collectors and processors receive a premium for products that are sustainably managed and harvested.

Some commercially valuable NWFPs can be cultivated on farms and plantations. When there is strong market demand, the trend is toward domestication and cultivation rather than collection from semi-depleted forest stocks. When this trend begins to predominate, as has already occurred in some areas, harvest pressures on remaining natural stocks are reduced. Examples of increasing cultivation of NWFPs include: rattan in Malaysia; Chinese medicinal herbs in Vietnam; and, to a lesser extent, fragrant aloewood (*Aquilaria* spp.) in Lao PDR. Potential to expand the area devoted to NWFP cultivation appears considerable for these and other forest species including ornamental plants (e.g. orchids), vegetables and mushrooms of high market value.

Forest policy is changing in many Asia-Pacific countries. Governments are grappling with the need to adapt existing policies to the economic, environmental and social changes rapidly taking place. Government spending cutbacks combined with increasing recognition of the potential for involving rural communities in sustainable forest management have become driving forces behind recent policy initiatives. This trend appears likely to increase given the need to adapt to changing mandates, and in response to growing confidence in the capacity of forest dependent rural people to manage natural resources wisely and responsibly.

There are many keys to catalyzing the vast and largely untapped potential for rural communities to play active roles in sustainable forest management. These include: provision of land and resource tenure to individuals and communities; collaborative planning by stakeholders to determine procedures, responsibilities, and benefit-sharing arrangements; and integrated conservation and development programmes that build local capacity to capitalize on forest product development and market opportunities, create economic alternatives to natural resource-based income generation, and set in place a system to organize and monitor local responsibility for sustainable landuse, sustainable forest utilization, and protected area conservation.

1. SIGNIFICANCE OF NWFPs IN ASIA-PACIFIC

A. Introduction

Purpose

This study is one of many contributions that feed into the Asia-Pacific Forestry Sector Outlook Study being prepared by FAO for consideration by ministers and senior policy makers in the region. The studies assess the status, trends and outlook for a range of issues and subsectors pertinent to forest management and policy in the region. The outlook time horizon is up to the year 2010, agreed to by the Asia-Pacific Forestry Commission at its sixteenth session in Yangon, Myanmar in January 1996. In total, the studies comprise a comprehensive package of materials, which will be distributed to the delegates and participants of the next Asia-Pacific Forestry Commission meeting, to be held in Yogyakarta, Indonesia in February 1998.

This particular working paper focuses on non-wood forest products or NWFPs. In keeping with the Terms of Reference, the study on NWFPs considers their economic, environmental and social significance in the region. Major trends in NWFP management are analyzed, including collection, processing, utilization and trade in NWFPs, and the implications of these trends for demand and supply. Considering current trends and a range of emerging management and policy scenarios, the study suggests changes that might occur during the intervening period, and the projected status of NWFPs in the Asia-Pacific region by the year 2010.

The study does not purport to be a comprehensive treatment of NWFPs in the region, replete with data on the major products. Information of this nature may be found in some of the extensive references cited. Instead, the study utilizes selected site-specific and product-specific case studies to illustrate how current trends and future scenarios may develop within the region.

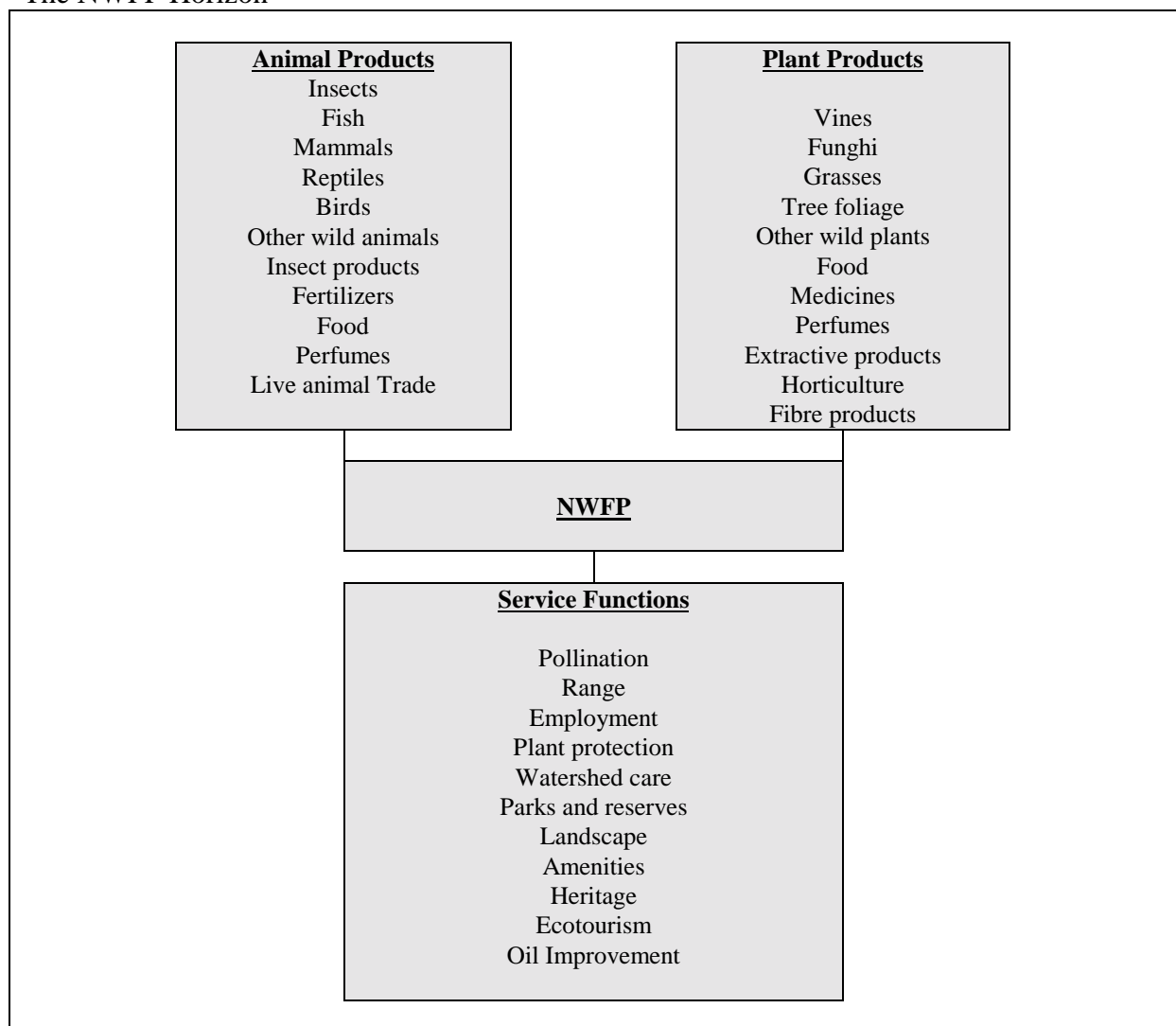
NWFPs in the Asia-Pacific context

For most of recorded history, people have valued forests as much for non-wood products as for wood. Ancient writings from China, Egypt and India recorded a wide variety of uses for forest plants, and the ancient Greeks prized botanical compilations from western Asia (Wickes 1990 cited in FAO 1995a). From the era of hunting and gathering up to the present, non-wood forest products³ (NWFPs) have provided subsistence and livelihoods for people in the Asia-Pacific region. For hundreds of millions of forest area residents, NWFPs are essential for family survival.

³The term 'non-wood forest products' (NWFPs), and also 'minor', 'secondary', and 'non-timber' forest products, are used as umbrella expressions for the vast array of both animal and plant resources other than wood (or timber in the case of 'NTFPs') that are derived from forests or forest tree species (FAO 1997).

Non-wood forest products may be classified by source (e.g., plant, animal) or by uses (e.g., food, medicines, fibres). NWFPs also provide a wide range of environmental and sociocultural functions that are important at the household as well as national level. The diagram below depicts the great diversity of non-wood forest products and services.

The NWFP Horizon



Source: *More than wood*. Forestry Topics Report No. 4, p. 10 (FAO 1993)

Complex and diverse nature of NWFPs

In a recent study from West Kalimantan, villagers identified over 800 plant species from which they derive nearly 1,800 uses to fulfil a broad range of needs (Graefen and Syafrudin 1996). NWFPs are used for food, spices, edible oils and medicines, for fodder, forage, stall bedding and green manure, as construction material and household utensils, as fibre for cloth, basket-making and rope, and for ornamentation and religious purposes.

People use NWFPs for an enormous range of purposes, including the following:

- Common subsistence products such as: medicines, staple foods, supplementary or emergency foods, protein foods, construction materials, tools and utensils, etc.
- Subsistence products that are utilized on a smaller scale or only on special occasions.
- Commercialized products that are sources of income (ranging from low to significant depending on the product and local economic conditions) to collectors. These products include primarily, rattan, resins, honey, aromatics, and bush meat.
- Other products with a range of commercialization ranging from local to national and international markets, e.g., medicines, tools and utensils, furniture, handicrafts, mats, walling and construction materials, major and minor foodstuffs.
- Products that have been long commercialized and internationally traded with high annual turnover and control of market chain by outside entrepreneurs.

A number of NWFPs, including rubber, rattan, bamboo, *gaharu* (fragrant aloewood) aromatic oils and medicinal plants have long been traded or bartered within the Asia-Pacific region, and in markets outside of the region. NWFP raw materials and processed products earn billions of US dollars per year. For rattan alone, the average value of annual world trade is more than US\$88 million. Of this, US\$50 million are generated from Asia-Pacific countries, especially Malaysia, Indonesia, Vietnam and China (Iqbal 1993).

NWFP collection and processing provide employment for millions of Asia-Pacific people. In India, about 7.5 million people are engaged part-time as collectors of *tendu* (*Diospyros melanoxylon*) leaves, and another 3 million process the leaves into *bidi* cheroots (Tewari 1982 cited in Arnold 1995). Estimated revenues from *tendu* leaves are US\$200 million/yr (FAO 1994a). In Manipur State, India, 90 percent of the population depend on forest products as a major source of income, and some 250,000 women collect forest products (FAO 1992).

The relative value of NWFPs versus wood products varies greatly with the ecology of the forest. For example, in Borneo's highly valuable dipterocarp forests, timber values could be as much as 200 times higher than NWFP values, on a per hectare basis. Conversely, in the *sal* (*Shorea robusta*) forests of eastern India, the timber and NWFP values per hectare per year could be almost equal.

A list of multipurpose Bhutanese forest plants comprising over 40 pages illustrates the extraordinary diversity and importance of NWFPs (FAO 1994b). Yet, as extensive as it is, the list under-represents the holistic value of NWFPs to Asia-Pacific forest peoples. The economic value comprises only one subset of the integral value of NWFPs, particularly in the case of forest communities for whom the sum of the tangible parts is not worth nearly as much as the presence of the whole forest ecosystem (Levin 1992).

Paucity of data

The lack of basic and reliable information on NWFPs is such an acute problem that it deserves separate mention. An immediate problem that confronts any NWFP researcher is the lack of authoritative information.

Information on production and domestic consumption is strikingly lacking for most NWFPs. This is because their value is often greatest within relatively restricted local economies where the contribution to daily subsistence is significant, but where small-quantity trading in NWFPs goes unrecorded. Local uses and small transactions are rarely treated in national statistics and have been inadequately studied. As a consequence, little knowledge exists on the actual production and harvest levels of even major NWFPs, while data on minor products are altogether lacking. The development potential of NWFPs is poorly understood. Aside from the communities that are primarily engaged in NWFP management, only few people are familiar with practices to ensure sustainable exploitation and development.

Export figures for NWFP are the only data kept on a more-or-less systematic basis. Yet most official statistics are unreliable. FAO discontinued collection and publication of NWFP statistics in 1972, but is now seriously attempting to redress the problems of availability and accuracy (Padovani 1995). Among the distortions commonly encountered in trade statistics of most exporting countries are: information for a group of products is merged; under-reporting, over-reporting or not reporting at all; no data on illegal trade; and use of unrealistic prices.

Illustrating the frequent wide discrepancies that make official statistics suspect, Lintu (1995) reported that the combined exports of rattan from Indonesia, Philippines and Malaysia in 1989 exceeded US\$250 million. Iqbal (1993) cited Indonesian Bureau of Statistics figures for rattan export in 1989 of just over US\$1 million. Yet he also found in the 1989 COMTRADE database that import of Indonesian rattan by industrialized countries exceeded US\$17 million, or about one-quarter of world-wide rattan export for that year. Because Indonesia imposed export restrictions on rattan in 1989, there may have been anomalies with inventory stockpiles, or even illegal trade. This example demonstrates again the difficulties in locating reliable, timely data.

Another example of data discrepancy was observed in Lao PDR. On an ordinary day at Luang Prabang harbour, orchid stems were loaded onto two large trucks of approximately 25-m³ capacity each. Inquiries at the Ministry of Forestry revealed that the only data recorded on export of orchid stems was delivery of four tons annually to China. In reality, the recorded annual export figure of four tons could be exceeded by the amount of orchid stems transhipped from Luang Prabang during one day (Koppelman, personal communication).

The paucity of reliable data on NWFPs constrains efforts to develop appropriate policies, regulatory mechanisms, trade arrangements, and extraction patterns aimed at ensuring sustainable NWFP and forest management, including:

- Sustainable management regimes for various NWFPs under a range of ecological conditions.
- Traditional NWFP management approaches and practices.

- How traditional approaches and practices are being impacted by increasing exploitation due to population and market demand growth.
- Impact of over-exploitation on poor forest dwelling populations, and their adaptation to increasing resource scarcity.
- Role of land and resource tenure in developing sustainable NWFP management regimes.
- How appropriate policies could support sustainable NWFP management.
- Appropriate technologies for on-farm planting and forest enrichment of NWFPs.
- Adding value to raw materials by processing or direct marketing to maintain income benefits while reducing harvest volumes.
- Role of sustainable NWFP management by local communities in galvanizing community involvement in forest and biodiversity conservation.
- Role of sustainable NWFP management in integrated conservation and development projects.
- The proportion of current NWFP production that is gathered from natural forests, compared to the quantities from tended (managed) forests, and from domesticated or cultivated trees on farms or in plantations; and the reasons and trends behind this.

B. Why are NWFPs important?

Household importance

Among forest people in the Asia-Pacific region, NWFPs make a substantial contribution to family subsistence and livelihoods. Hundreds of millions of people living in or near forests depend to some degree on NWFPs for their livelihoods. It is likely that more than 200 million people in the region gain a significant portion of their annual income from the collection, processing and marketing of NWFPs⁴. Most of this activity occurs on a small-scale and is not recorded. Therefore, the importance of NWFPs to the survival and economic strategies of Asia-Pacific peoples—particularly poor, forest-dependent folks—is often poorly appreciated by their governments.

NWFP-based activities—including collection, sale of raw materials, simple primary processing, and local handicraft production—fill seasonal food or income gaps. They can provide a buffer in times of hardship or emergency, serve as activities of last resort, and generally improve household income security (Ruiz Perez and Arnold 1996). Aside from the millions of people that benefit directly from collection, use, trade and processing activities, millions of others are NWFP consumers. For example, in Melanesia, consumption of starch from the sago palm (*Metroxylon* spp.) provides the main source of energy food for more than 300,000 people, and a normal part of the diets of 1 million people (Ulijaszek 1983 cited in FAO 1995b).

Given the marginal nature of rural family economy throughout most of the region, NWFPs can provide a critical lifeline for millions of people. In many cases, there are few, if any, alternatives available to supplement income and ensure minimal family subsistence needs.

⁴ Although Lynch (1995) gives an incredible estimate of 1 billion people, which is almost the entire rural population in Asia Pacific! Other estimates are as low as 200 million worldwide (Pimental *et al.* 1996).

The relative importance of NWFPs, and the number of poor people throughout the region who use or sell significant quantities of these products, have often been underestimated. Most development programmes have concentrated on improving agricultural production in relatively productive areas. Insufficient attention has been paid to the needs of marginalized people in remote areas for whom NWFPs are often vital to survival, given their current socio-economic conditions.

The relative importance of NWFPs to household economic strategy depends primarily on available subsistence and income options. Rural communities often are quite stratified in socio-economic terms. This diversity is due to varying access to land, resources, and income earning opportunities outside the community. Depending on the economic status of a particular household, NWFPs contribute, to a greater or lesser extent, to family self-sufficiency, food security, income generation, savings and risk minimization (Ruiz Perez and Arnold 1996). For those with a broader range of options, the importance of NWFPs as a proportion of total household income generally declines.

While nearly all forest area households use NWFPs to some extent, indigenous peoples, the landless, and the poor can be wholly dependent on these products. For the poor, access to NWFPs throughout the year can be crucial to survival. For example, the largely impoverished Sherpa and Rai cultural minorities in eastern Nepal use 34 forest plant species as staple and survival foods (Daniggelis 1992). In other cases, it is the less poor who derive their incomes from NWFP.⁵

Millions of people in the Asia-Pacific region depend on NWFPs as their principal medicinal sources. Modern medicines, even if available, are too expensive for the poor to afford. Of the 7,000 plant species in Nepal, 700 have well-known medicinal uses and are the main source of curatives for about 85 percent of all Nepalese (Dani 1986 cited in Upadhaya *et al.* 1996). In Indonesia, the estimated consumption of *jamu* herbal tonics prepared from NWFPs was nearly 8,000 tons in 1992 (Food and Drug Administration 1992 cited in Hadi 1995). The use of NWFPs in Chinese medicines is legendary, but defies quantification.

It is notable that while poor households are generally most dependent on NWFPs, local elites often sequester most of the NWFP-derived income (as is the case with most other activities including agriculture). Influential families enter into business alliances with outside NWFP entrepreneurs and serve as their local agents. The agents procure raw materials at very low prices from collectors, and, in turn, provide them with credit advances at high interest rates to buy food and commodities required for NWFP collection forays into the forest. Exploiting the economic weakness of NWFP collectors accelerates unsustainable harvest practices, as collectors struggle to earn income and repay debts (Warner 1979, Mittelman 1997a). While this situation may be common, there are some exceptions where collectors have been able to negotiate terms of mutual advantage. These latter cases are important as they provide encouraging indications of how the more general exploitative arrangements can be minimized.

⁵ In another scenario, Wickramasinghe *et al.* (1996) conclude in their study of a Sri Lankan village that the extremely poor often cannot afford to spend time collecting NWFPs. Meanwhile, middle lower income groups do not need to depend on NWFPs because they have more lucrative income earning options, including small-scale trading.

NWFPs and food security

NWFPs are linked to food security in three major ways (Durst *et al.* 1997):

- Environmental links between forests and food production, and the role of watershed forests in conserving soil and water resources.
- Household nutrition links in terms of consumption of NWFPs.
- Socio-economic links in terms of generating income and employment from NWFPs to support household food security.

In times of scarcity created by crop failure or during food deficit periods, NWFPs fill critical income and subsistence gaps. There are hundreds of millions of upland farmers in the Asia-Pacific region. Very often, upland farmers cannot produce sufficient food to satisfy their annual household nutritional requirements. Although NWFPs provide important benefits year-round, it is during periods of scarcity when collection, processing and trade of NWFPs are most critical to family survival. For these millions of families affected by annual food deficits, access to supplemental forest foods and income can mean the difference between life and death. When NWFNP access is curtailed, deficiencies of essential food nutrients become much more prevalent (Eder 1981, Chamberlain *et al.* 1996).

In Palawan, Philippines, NWFPs comprise 30-60 percent of annual food intake for the Batak tribe. When Batak access to forest survival foods has been restricted, their health status deteriorated rapidly leading to significant increases in infectious diseases, morbidity and mortality (IUCN and Haribon Palawan 1995, Mittelman and Alisuag 1995).

A major strategy for future action is to focus on enhancing local livelihood through local enterprises based on NWFNP resources. Capturing an appropriate share of a product's added value closer to the source would help to ensure a more equitable distribution of benefits through the marketing chain, as well as the proper valuation of NWFNP resources in forest management decisions (FAO 1995c).

Economic importance

The historical focus on timber in professional forestry circles has led to the consistent underestimation of the economic value of NWFPs. Recent research has brought into perspective the enormous value associated with NWFPs (de Beer and McDermott 1989, Counsell and Rice 1992). In addition to the diversity of benefits they provide the rural poor, NWFPs generate local, national and international trade revenues that are worth a total of billions of dollars annually. One estimate for the total value of world trade in NWFPs is in the region of US\$11 billion (FAO 1997, Iqbal 1995). (Again, caution is required in considering these estimates due to the absence of reliable trade data on NWFPs.)

The total economic value of plant-based medicines has been estimated at \$43 billion per year (Khan 1995), though many of the items included are no longer collected from forests but are now cultivated in gardens and farms. Trade in medicinal plants may grow rapidly as bio-prospecting becomes increasingly important to medical science and in response to expanding global demand for new pharmaceuticals and natural medicinal products. On the other hand,

successful bio-prospecting may lead to synthetic and cultivated medicines, greatly reducing the amount of forest-derived materials traded around the world. Simpson (1997) expresses scepticism about the potential *commercial* values to be generated in biodiversity prospecting. He suggests that the global demand for pharmaceuticals is a mirage when it comes to reasons for preserving forest biodiversity. As usual, the truth probably lies somewhere between these two extreme views.

A wide assortment of NWFPs contributes to the creation of economic benefits and cash income at the local and community level, e.g., forest foods and medicines sold in village markets. The number and volume of NWFPs being traded at the national level is increasing, e.g., *tendu* leaf activities in India involve more than 10 million people. NWFPs also enter international trade as end-products (e.g., rattan furniture from Indonesia, bamboo plywood from China) or as raw material for industry (e.g., essential oils, resins, rubber). Many products are marketed simultaneously at all three levels.

Enormous potential exists for community-based production and marketing of non-wood forest and agroforestry products for both domestic and export markets. This increases the diversity of food items and nutritional value available in local markets as well as the incomes and food-purchasing power of producers and traders. It has been estimated that at least 600 to 700 NWFPs are commercially important and internationally traded, including 500 to 600 medicinal plants. Based on import statistics for the period 1989-1991, annual world trade in medicinal plants averages about US\$850,000 (Iqbal 1993). These products have significant potential for economic development in Asia-Pacific, where labour costs are relatively low, and supplies of forest raw materials are still ample in some countries.

Very seldom does a single NWFP reach outstanding economic significance in trade. This is usually only the case with products that are plantation-based, like oilseeds and rubber—in which case they lose many of the attributes of NWFPs as discussed here—or important fibres such as rattan and bamboo. In many instances the economic significance stems from the cumulative contribution of diverse products in the trade of a nation. For example, in India, it was estimated that over 50 percent of forest revenues and 70 percent of forestry-sector export income are derived from NWFPs, generating about half of the income for a quarter of India's rural people (Sekhar *et al.* 1993 cited in Lintu 1995). While one should interpret such estimates cautiously, the trends they indicate are likely valid⁶.

These trends raise a compelling question: Can NWFP collection lead to economic prosperity, or is it a livelihood of last resort for collectors? The answer to this question depends on a number of conditions and variables that are explored in the remaining sections of this study.

Ecological benefits and risks

Tropical forests contain over half of all species on earth, and many of these have traditional uses (Myers 1980, Raven 1988, Reid and Miller 1989). Recently, there has been dramatic increase in awareness of the significance of NWFPs. This stems from the proposition that NWFP revenues could at least partially substitute for commercial logging revenues, and

⁶ Noteworthy for India is that it has for long not been a major trading country for wood products, hence the high proportion of NWFPs in trade value (Editor).

create strong incentives for sustainable forest management by local communities. Some NWFPs are ecologically dependent upon the complex structure of intact tropical forests to provide the diversity of niches in which they flourish (Haeruman 1995). Thus, the conservation of tropical forest biodiversity, and generating local incomes through NWFPs may be mutually supporting objectives.

Innovative community-based sustainable forest management arrangements can be leveraged by providing NWFP access rights and facilitating advantageous marketing arrangements for local communities (Fricke 1994, Mittelman 1996b, Hyman, 1996; Padoch and Pinedo-Vasquez 1996). When value is added by direct marketing, local processing of NWFPs, or both—as has been the case in a number of innovative projects within the region—the economic benefits to local people can be substantial. Improving local control over NWFPs and forest resources can contribute significantly to the success of national rural development initiatives, as well as to forest and biodiversity conservation objectives.

NWFP-based forest conservation activities can help to maintain forest food and subsistence production systems for local socio-economic development, create significant employment and income benefits within and beyond the forest boundary, and preserve the intricate linkage of NWFPs to forest bio-geo-chemical cycles (Arnold 1995). It would be naive to conclude that managing forests for their NWFP values will always attain the complex objectives of sustainable forest management or the preservation of *all* biodiversity in the forest (Peters 1994). Nonetheless, NWFP development and conservation can form an important component of a more wide-ranging integrated rural development and conservation strategy.

The difficulties in monitoring the sustainability of NWFPs are vexing. Forests exploited for latex, fruit, tree and plant parts, herbs and shrubs maintain the appearance of being undisturbed. For casual observers and even botanists, it is easy to assume that harvest of NWFPs can be sustained year-after-year. Though patently incorrect, this simplistic idea has appeared in books, scientific papers, conference proceedings, grant proposals, and even television and radio shows (Peters 1996a). The high species diversity of tropical forests, coupled with very low species densities means that regular harvest of tree or plant parts, animals, or pollinators, can disrupt the reproduction cycles and populations of both flora and fauna. This leads, though often unnoticeably, to gradual alteration of species composition over the long-term—the timeframe for which sustainability, by definition, must be measured. Considerable work remains in efforts to determine sustainable management regimes for specific NWFPs under site-specific resource and ecological conditions.

Little is known about the interrelationship between the majority of NWFP species and their surrounding environment. But since decomposition of plant parts plays a vital role in the maintenance of natural forest cycles, harvesting shoots, roots, and fruits may remove nutrients that are essential for forest health (Haeruman 1995). Particular species and plant parts have evolved to trap, concentrate and accumulate certain nutrients. Selective harvesting of plant reproductive structures can reduce intraspecific genetic diversity leading to sustainability problems (Boyle, 1995). It is important that the impact of intensive harvest of these parts or species be understood if ecosystem sustainability is to be integrated as a primary component of NWFP-based forest management. Lacking specific data, sustainable management should, at least for the short term, plan for modest harvest of a wide range of NWFP species, maximizing profitability through product processing and innovative marketing arrangements, rather than through high-volume harvest of a few species.

Social and cultural significance

The ecological basis for NWFP-based sustainable forest management is closely intertwined with the economic, social and cultural significance of NWFPs in the lives of forest area populations. The forest ecosystem comprised of people, plants and wildlife is largely defined by the relationship between the forest people and the NWFP resources on which they currently depend. This is particularly the case for indigenous minorities whose lives are so closely linked to the forest in terms of livelihood and culture (Grenand and Grenand 1996).

For many forest area populations, cultural identity, traditional knowledge systems, and social coherence are intertwined with forests as a result of local NWFPs use and attendant activities and rituals. At the same time, both the parts and the whole are closely interdependent. Without the forest and its host of diverse ecological niches, NWFPs would cease to exist, and the associated societies would be irrevocably changed. Reduction and degradation of forest cover continues throughout the region with consequent impacts on forest dwelling and forest dependent people. The trend is likely to continue, perhaps even more rapidly in coming decades.

For forest-dwelling ethnic groups in the Asia-Pacific, forests are integral to culture, and a source of physical, spiritual and psychological sustenance. NWFPs are valued as components of cultural identity. Numerous species and their forest habitats are valued and conserved for religious reasons (Fui and Noor 1995, Talosig 1995). A number of groups and tribes cherish belief systems in which the forest is considered the very source of their origin (Gurung 1995). Ongoing loss of traditional belief systems that instilled in millions of peoples an enormous respect and reverence for the forest has profound social and cultural implications.

For the Batak tribes of Palawan, Philippines, the guardian spirit of the forest is also responsible for providing sustenance for the people. But for the covenant to be upheld, the people are required to reciprocate through their respect for the forest, modestly harvesting products based on need as opposed to greed (Eder 1997). Dozens of folk stories recount episodes in which those who have taken more than their needs were smitten by the forest protectors for their transgressions (Major, personal communication).

With the rapid growth and spread of modern technology driving global economic development, methods for exploiting natural resources have become increasingly sophisticated and efficient. Nearly half of the world's tropical forests were cleared during the last 50 years. The resulting threat to society is not confined to forest dwellers alone. A number of the world's most eminent scientists share concerns that the current global development trajectory, particularly the continuing destruction of tropical forests, could ultimately have far-reaching repercussions that place the future of life on earth at jeopardy (Myers 1980, WCED 1987, Raven 1988, Vida 1988).

During the past decade, there has been an upsurge of interest in the study of indigenous technical knowledge (ITK) systems (e.g., see the *Indigenous Knowledge and Development Monitor*). Many ITK systems have evolved in relation to the dependence of remote traditional populations on forest resources to secure reliable and sustainable livelihoods. In contrast to

the kinds of modern resource management technologies that have had adverse effects on tropical forests, ITK may be adapted to help ensure sustainable forest management.

With increasing appreciation of the scientific validity of traditional knowledge regarding forest ecology and sustainable management and the urgent need to conserve biodiversity, efforts to study and document these systems are advancing rapidly. Yet ITK is a pragmatic science involving the day-to-day survival efforts of its practitioners. As forests disappear and indigenous peoples are alienated from the resources that give practical meaning to their traditional knowledge, this valuable knowledge itself is also being lost. In the interest of sustainable NWFP management and in the face of vanishing ITK systems, efforts to document and thereby conserve indigenous knowledge regarding sustainable forest resource management should be accelerated.

NWFPs in ICDP approaches

Development of local NWFP enterprises is one of the principal components of integrated conservation and development project (ICDP) approaches (Hyman 1996). By extracting and selling NWFPs, local communities become more aware of the value of their ecologically diverse and productive forests. Successful community-based sustainable forest management approaches usually involve NWFPs as a “turnkey strategy.” This is based on the premise that managing tropical forests sustainably for multiple use generates greater long-term economic value and benefits than exploiting forests solely for timber or converting forests to pastures or single-species plantations (Peters cited in Panayotou 1993). When properly managed in this way, NWFP harvests can generate considerable revenues, advance biodiversity conservation objectives, and contribute to the welfare of upland and watershed communities (Mittelman 1996a, 1996b).

Recent recognition of the implications and destructive consequences of outsiders’ control over forests has led to a growing trend to legitimize community rights throughout the region (see Republic of the Philippines 1992, Government of Vietnam 1994, Government of Lao PDR 1996). NWFP-based ICDP approaches provide a new paradigm for forest and biodiversity conservation efforts to assist the socio-economic development of marginalized people and preserve forest-based cultures, traditions, as well as the forests themselves. These efforts are based on indigenous knowledge of forest ecology, and characterized by sustainable harvest, processing and marketing of a diversity of NWFPs.

An ICDP strategy is being employed to implement the National Integrated Protected Area System in the Philippines (NIPA 1996). In West Kalimantan, Indonesia, local communities are in the process of being granted forest use rights in exchange for assuming responsibility for sustainable forest management (Fricke 1994). NWFPs also provide much of the impetus for joint forest management in India (Poffenberger and McGean 1996). In Vietnam, sustainable development of NWFPs has begun to provide alternatives to destructive shifting cultivation (Tien 1994). Indeed, throughout the Asia-Pacific region, community-based sustainable forest management is emerging as an alternative strategy for ICDP and rural development activities (AFN 1992-1996). The growing number of on-the-ground examples and experience gained should contribute to replication and more effective programme implementation elsewhere in the region.

In the vicinity of Kerinci-Seblat National Park in Sumatra, Indonesia, a major ICDP initiative has been launched with World Bank financing. NWFPs are among the alternative development options being tested. Many new lessons, both positive and negative, are being learned from these efforts. A recent review of Indonesia's ICDPs found that very few of these projects can realistically claim that biodiversity conservation has been or is likely to be significantly enhanced as a result of current or planned ICDP activities (World Bank 1997). Although relatively new, many problems faced by ICDPs in Indonesia reflect flaws in basic assumptions and planning that are inconsistent with field realities and current capacities of government and communities in remote parks, protected areas and buffer zones. ICDPs have tended to focus on the perceived threats to protected areas from local communities. However, there is ample evidence that for most parks, large public and private investment schemes were or are much greater threats to biodiversity concerns. It was also found that the linkages between conservation and development are extremely weak and confined to relatively few stakeholders in Indonesia (World Bank 1997).

While ICDPs have considerable potential as an integrative approach to resource conservation and development, they cannot be prescribed as a panacea in all situations. There are daunting problems and complexities in operationalizing the ICDP concept in remote forest areas. The emerging lessons from ICDPs in Indonesia and other countries are extremely important. These lessons must be shared, and applied judiciously to improve future ICDP activities.

2. EMERGING TRENDS IN NWFPs

A number of distinctive trends can be discerned about how the use and management of NWFPs have been developing over the past few decades—interacting with socio-economic changes affecting the users and managers, as well as external factors and changes outside of the forests. In fact, one can observe different, even opposite trends simultaneously within a given country for different types of products and markets.

Though the principal incentives and disincentives influencing NWFP off-take, supply and demand can be identified with some precision, they vary in relative importance on a site-by-site basis (Nair and Merry 1995). Each site has its own unique set of interacting factors. Some site-specific and product-specific trends and scenarios will be examined in chapter 4 of this study.

A. Increasing commercialization of NWFPs

There are some NWFPs for which increasing commercialization is likely to occur. Their main common attributes are that 1) they are products that become more sought after as consumer incomes rise, and 2) they are relatively cheap/easy to harvest in comparison to the prices that producers receive. Neither, however, guarantees long term survival of either the species from which a product is derived, or the market for the NWFP.

For the commercial off-take of NWFPs, robust market demand, adequate product availability, and advantageous pricing generally provide the strongest incentives for harvesters, buyers and processors. Identifying the key incentives and disincentives driving product off-take becomes

more complex. Price and profit margins differ from collection site to market, to manufacturer and end-user. For example, manufacturer demand for raw rattan may be high in response to robust overseas furniture sales. But monopolistic arrangements between manufacturers and local raw material buyers can depress fair market prices. To avoid paying higher prices to collectors in one country, larger manufacturers may even establish branch operations in neighbouring countries with lower raw material prices. Thus, while raw material demand may be high, market manipulations distort prices and act as disincentives to collectors (personal communication, Fricke 1995).

The ability to control NWFP raw material prices is supported by national forest laws that provide proprietary rights to outside concessionaires for resource access, as well as exclusive rights to transport and market. To maximize profits, raw material buyers and processors intervene in local economies and downstream markets to try to keep raw material prices low. This creates a disincentive to collectors, who weigh the benefits from NWFP collection with other income-generating alternatives. So while NWFP raw material prices fluctuate in response to actual supply and demand factors, they are also very sensitive to market interventions and manipulations.

While prices for NWFP raw materials must be adequately maintained to provide collectors with sufficient incentives, local buyers and concessionaires often are able to leverage low-priced supplies. One common method is to provide collectors with credit. The debts are purposely maintained by NWFP agents, who can then demand in-kind loan repayment through delivery of NWFPs. Indebtedness, ignorance of underlying market demand and fair value, and the need to maintain good relations with creditors combine to force collectors to sell raw materials at prices well below real market value.

Price fixing compels collectors to maximize NWFP off-take as they struggle to satisfy income needs. For most products, prices paid to collectors are thus maintained at low levels, while profits are concentrated at the higher end of the market chain. Certain NWFP niche markets, such as those for 'socially and environmentally sound rainforest products' in the West, are beginning to provide notable exceptions.

Availability of natural stocks compared to demand for specific NWFPs greatly influences off-take patterns. Expanding markets for both raw materials and finished products have contributed to over-exploitation of the main NWFP species throughout the region. Resource depletion has led to geographical shifts in the location of NWFP trade, both within and between countries. Increased demand for rattan over the past decade has led to significant changes as buyers and manufacturers have relocated to be closer to abundant and cheap raw material supplies. Depletion of rattan in the Philippines, once among Asia's most important suppliers, resulted from accelerated international demand for high-quality wicker furniture. During the 1980s, increased rattan furniture demand in Europe and North America led to resource depletion in the Philippines, followed by importation of rattan from Malaysia and Indonesia.

Manufacturers later realized that it was more cost effective to relocate their operations to sites where supplies were still abundant. When Indonesia banned the export of raw rattan in 1989, Filipino manufacturers established joint ventures in Kalimantan (Peluso 1992). The decision to prohibit raw rattan export helped locally powerful furniture manufacturers gain greater control over the rattan industry. This has dampened efforts to mobilize local communities in

sustainable forest management due to disincentives related to loss of local control over NWFP resources (Dove 1994a). Though the raw material export ban was designed to increase local incomes, employment and value-added, it had deleterious effects on NWFP resources as well as rural income (Safran and Godoy 1993, Nair and Merry 1995).

Short-term NWFP business strategies are ultimately self-limiting because resource depletion will eventually erode enterprise viability. Many businesses may even switch to other industries. Indeed the prime role of NWFPs in the eyes of many collectors and small-scale traders is to accumulate enough capital to be able to switch or escape from the status quo. Families may see more attractive long-term options— not only in terms of incomes but also lifestyle, healthcare and education for their children—but need to generate capital to start the new venture. In these cases, short-term exploitative harvesting of NWFPs, especially from an open-access resource, may be the easiest and quickest way to accumulate the needed capital. Any type of product or activity could suffice for any type of market, so long as it pays well!

In the case of the Saliga tribal people living in the Biligirirangan Hills World Heritage area of Karnataka, India, there is strong evidence that their biologically unsustainable exploitation of NWFPs is deliberate. It appears that they have already planned to utilize short-term NWFP income to invest in alternative livelihoods when the NWFP option becomes unattractive or infeasible.

B. Declining importance of subsistence NWFPs

Subsistence harvest of NWFPs is based on local dependence on these products for a wide array of uses. When income-generating alternatives become available and more attractive, NWFP collection is often at least partially abandoned. NWFPs still play important roles in local culture and religion, but the monetization of rural society throughout the region favours substitution of purchased synthetic products for some NWFPs. In areas where purchasing power and availability of consumer products are increasing, the exploitation of NWFP subsistence products tends to decline. This is a major trend occurring throughout the region.

One common trend is that plastic has replaced wooden utensils and woven baskets in many Asia Pacific region villages. In India, many rural people whose incomes are rising are switching from bidi cheroots to factory-made cigarettes, and eventually even to imported brands (as luxury/status products). The demise of certain NWFPs in response to consumer preference for and ability to afford substitutes is potentially important since it will have a significant influence on who will manage forests for what purposes. For example, will the sal forests in India still be managed by local people for sal leaf plates and/or tendu if market demand for these products collapses? The ‘disintegration of traditional systems’ is further examined under trend ‘C’ below.

The growing appetite for consumer products by forest area populations is altering NWFP harvest patterns. Some NWFP initiatives are favouring income over subsistence use. Rare products, many derived from endangered species, command very high market prices. Demand for these products is increasing in response to higher income levels throughout much of the region. Aware of the potential financial benefits and seeing outsiders prosper from their exploitation, many local collectors have begun to focus on high-value NWFPs that were

formerly only harvested on a small-scale, if at all. This trend is particularly intense in Lao PDR, Vietnam, and Cambodia. Illegally collected products are exported to Vietnam and Thailand, where most of them are re-exported to China, Korea and Taiwan (Chamberlain et al. 1996, Mittelman 1997c). Examples of NWFPs that fit this pattern include: tiger parts and parts of other rare animals used as medicinal ingredients; birds and animals prized as food or collectors' specimens; and export of orchids.

C. Disintegration of traditional systems

Customary law and traditional management arrangements predominated long before forest resources came under the ownership, administration and/or regulation of governments. Unfortunately, many traditional arrangements and systems are under pressure and breaking down as a result of: 1) increasing commercialization of NWFPs in response to growing market demand; 2) penetration of outsiders into remote forest areas; and 3) the spread of market economy and materialism throughout the region.

In practice, the difficulty of administering remote forest areas often creates an ambiguous mix of customary and state control. Increasingly, this ambiguity has opened opportunities for influential outsiders to secure control over state forest resources, including NWFPs, using both legal and extralegal means. The nationalization of forests in nearly all countries in the region has often accelerated forest destruction by undermining effective community management arrangements, alienating local populations from their resources, and failing to put in place viable alternative systems of control. The result has often been uncontrolled open-access (Bromley and Cernea 1989, Gilmour and Fisher 1991, McNeely 1991, Lynch and Talbot 1995).

In retrospect, since the 1950s, forests have been managed for timber rather than for NWFPs, considered until quite recently to be of relatively minor importance (Falconer 1990). Forest area communities, previously unaffected, have increasingly suffered from this short-sighted though overwhelming emphasis on timber harvesting.

National laws governing NWFP harvesting are supposedly put in place to foster sustainable resource management. In many cases, NWFP access and concession rights are given to outside entrepreneurs who are less concerned than local people with sustainable forest management. Outsiders are better equipped than most villagers to comply with government bidding procedures and other formalities required to obtain and operate concessions. This works against local collectors who, under NWFP concession laws, cannot directly market their raw materials, but must sell instead to local agents of concession holders, generally at disadvantageous rates (Mittelman 1996a, Saxena 1997). In the past, patron-client relationships between concessionaires and collectors have often degenerated into 'debt slavery' (Warner 1979).

Where government regulations and controls are less stringent, villagers sometimes extract NWFPs under open-access conditions, but more often under customary rules that allocate use rights according to traditional arrangements. While local communities derive benefits from NWFP collection, use, processing and trade, middlemen, larger-scale processors and traders usually capture most of the benefits further down the marketing chain. Where local communities have been able to obtain rights to NWFP resources, increased profitability has

brought considerable benefits both in terms of rural development as well as heightened local concern for sustainable forest resource management (Fricke 1994).

As already noted, it would be naive to assume that all local collectors apply sustainable NWFP harvesting techniques. An increasing number do not. Decline in product availability and growing material aspirations have led to many traditional sustainable harvest practices being abandoned in favour of more destructive methods, even among some indigenous forest groups. At the same time, increasing scarcity of farm land has driven many people without prior NWFP experience to rely on these products for income. These types of recent NWFP collectors, mostly outsiders, have generally caused negative impacts on forest resources, fuelled escalating social tensions, and prompted local collectors to ‘get what they can, while they can’ (Mittelman and Alisuag 1995, Mittelman 1996c, Rambo and Cuc 1996).

D. Devolution to community-based management

One of the most important general trends of the 1980s and 1990s has been the move toward less government intervention, privatization, and the delegation of many social service/welfare functions from the State to ‘civil society’ and NGOs. The trend has begun to have an influence on forestry policy and practice. For local communities to become meaningfully involved in sustainable resource management, it is extremely important that their inhabitancy of forest areas and use of forest resources be legally recognized (Fisher 1995, Lynch 1995, Borini-Feyerabend 1996). Despite widespread recognition of the importance of involving local people in sustainable forest management, local communities still possess few recognized legal rights to forest resources, or other incentives for sustainable management (Khan 1995, Lynch 1995).

In an effort to ensure forest conservation and sustainable use, forest policies in nearly all countries in the region tend to be restrictive (FAO 1993, Dewees and Scherr 1996). Governments have considered forest area populations—including indigenous people—to be squatters, regardless of the length of their occupancy (Byron 1992, Lynch 1995). Such policies tend to alienate local people from forest resources, create incentives for over-exploiting NWFPs, and can provide a rationalization for the abuse of forest resources.

Meanwhile, though governments assert legal ownership over forests, they generally lack the financial or administrative capacity to manage them effectively. Exclusive rights to exploit forest resources are often provided to commercial concessionaires, but there are few associated incentives for concessionaires to manage either timber or NWFPs sustainably. In contrast to restrictive policies that limit NWFP production and sale, policies that facilitate acquisition of benefits from proper management of NWFPs can create strong incentives for local people to actively implement sustainable forest management (Ruiz Perez and Arnold 1996).

In the Pacific Island countries, however, the situation with respect to control over forest resources is reversed as almost all forests are held in customary ownership by indigenous people (Byron 1985). In Papua New Guinea, for example, local communities own more than 90 percent of terrestrial resources pursuant to undocumented, private, community-based rights (Lynch 1995). Anomaly or paradigm, the Pacific region offers valuable insights about local people being key decision-makers and beneficiaries in the management and exploitation of

their local resources. While in some cases, community control has been the basis for sustainable management, in others, it has led to serious degradation when communities have opted to sell their timber rights to outside commercial forestry concerns, or to hunt or exploit flora and fauna to the point of extinction. Clearly, secure communal ownership, while encouraging sustainable forest management, is not a sufficient condition to guarantee it.

These experiences point to the need for a balanced set of policies, incentives, regulations and disincentives, which help generate income for local people based on their rights to forest resources, and thus create incentives and leverage agreements to manage forests and their resources on a sustainable basis. Creating the potential for such scenarios to contribute to accomplishing national rural development and forest conservation objectives also points to the need for capacity building at the local and community levels.

In light of all these trends, an emerging concept is to devolve the management of NWFP resources to local communities in exchange for their commitment to design and implement sustainable forest management plans. Communities would retain a greater share of NWFP profits through local value-added processing and links between local enterprises and established markets. This would provide substantial incentive to catalyze community involvement in forest management. After a decade of experience with ICDP implementation, the challenge remains to ensure that in addition to being economically viable, such arrangements are also ecologically sustainable (Wells and Brandon 1990, World Bank 1997).

Shifting the locus of resource control to forest area communities is one strategy for grafting on other incentives and disincentives required to stimulate community-based management and conservation efforts. Such a strategy would require the close collaboration of other well-equipped and interested actors such as government agencies, non-government organizations, NWFP traders, processors and manufacturers. It would signal a major shift in the way that economic benefits from the forest are shared, delivering a much higher portion of those benefits to forest area residents, particularly to those engaged in NWFP collection.

Land and resource titling for forest area communities can help increase the flow of NWFP benefits back to the communities. This would create incentives for community-based sustainable management, while removing many of the disincentives to local participation. Yet achieving sustainable management through the empowerment and mobilization of local responsibility is considerably more complex than simply addressing the issue of NWFPs. It requires a more holistic perspective with respect to forest land and resource stewardship, rather than an exclusive focus on NWFPs (Wells 1995, Graefin and Syafrudin 1996, Mittelman 1996a). Holistic community-based management approaches are emerging in the context of ICDPs, forest and buffer zone conservation, and other rural development initiatives in the region. Lessons from experience with these programmes will provide valuable insights informing future refinements, improving the prospects for new initiatives to accomplish forest conservation and development goals.

NWFPs comprise one component of the diverse and multifaceted subsistence and survival strategies pursued by forest area people throughout the Asia-Pacific region. Policies will be effective in supporting sustainable NWFP management when they provide the proper incentives and disincentives to discourage opportunistic and unsustainable use. Land titling to households creates strong incentives for more intensive and, perhaps, more sustainable agricultural land use. Fostering more productive use of agricultural lands and increasing

household income might help to reduce pressures on NWFPs. But when privatization is applied to forests, the same policies can cause resource fragmentation and subvert the goal of sustainable forest management. Forest privatization and consequent fragmentation contradict traditional community-based sustainable management arrangements. It is also likely to lead to inequitable resource access and the favouring of short-term household economic interests over long-term community-wide concerns related to conservation and sustainable use.

Recent land tenure reforms in China provide many salutary lessons. In some cases where forest lands were allocated to individual households, areas that might better have been retained as forests were cleared for temporary, unprofitable agriculture (Sun 1992). In other cases, similar land tenure reforms led to increased agricultural profits *and* improved conservation of forests considered important for both NWFPs and ecological stability. Therefore, a mix of alternative titling principles is advisable so that agricultural lands can be privatized, and common-use and conservation areas can be placed under community governance, in accordance with specific local conditions (Fisher 1995, Borrini-Feyerabend 1996, Mittelman 1997b).

Policy reforms often aim to transform the role of government from that of an agent of authority and control to a partner and facilitator for local communities undertaking sustainable management of forests. Communities may require assistance from resource management and rural development specialists to jointly formulate management plans. This is an area where the government, NGOs and academic institutions can play a valuable role. In some countries, responsibility is gradually being devolved to the local level. With respect to NWFPs, the supports required are likely to include:

- Legitimizing customary ownership and traditional management approaches for NWFP resource areas.
- Providing community proprietary rights to harvest, trade, and market NWFPs.
- Delivering extension services to upgrade the quality of local resource management and its contribution to livelihoods and conservation.
- Developing appropriate income generating alternatives to balance resource use among complementary enterprises including primary and secondary NWFP processing.
- Providing support for local product development and marketing.
- Granting preferential tax privileges and price supports for poor rural communities involved in the protection of critical ecosystems and lands.

Many such activities could be integrated into the context of local development efforts, thus enabling small local 'corporations' to borrow from conventional credit sources. Ability to purchase staple commodities and agricultural inputs at advantageous prices may seem unrelated to sustainable NWFP management. But examined from a more holistic perspective, all components of village and household livelihood systems are closely interlinked. Alternative sources of savings or income facilitated by cooperatives help reduce dependence on a limited range of activities and alleviate pressures on both agricultural and forest lands.

The devolution of joint management of forests among communities, other local stakeholders and government should employ a gradual step-by-step process in which adherence to sustainable management agreements is certified as a condition to renewing tenure and usufruct rights. Over a period of 3-5 years, forest areas could be effectively devolved to co-

management committees, with their diverse stakeholder membership (Mittelman 1996c, Neumann 1996).

The continuing role of government enables a regular and participatory process of assessment to improve system performance (Gunderson *et al.* 1995). Government is provided with the confidence needed to continually approve re-certification based on regular evaluations of adherence to agreed management guidelines (Mittelman 1996c). The two-fold underlying objectives of such policies are: 1) achieving equitable and sustainable rural development, and 2) creating a direct stake and role for rural communities in sustainably managing forests that are vital to national ecological integrity. A comprehensive review of the successes and deficiencies of joint forest management in India has recently been completed (Saxena 1997).

E. New policy initiatives

Experiments in Nepal, Indonesia, and the Philippines, among others, are attempting to revise forestry policies to support national sustainable management and conservation goals. Recently enacted laws and newly revisited legal interpretations in these countries now support providing resource rights to local forest area communities (Gilmour and Fisher 1991, Republic of Philippines 1992).

Elsewhere in the region, for example, in Laos and Vietnam, forest policies have also begun to enable local residents to obtain more secure land and resource tenure (Government of Vietnam 1994, Government of Lao PDR 1996, Lecup 1996, Mittelman 1997b). In these latter cases, however, tenure or usufruct rights are being extended primarily to households rather than communities. This may lead to further fragmentation of the forest resource base instead of revitalizing traditional community-based arrangements (Ruiz Perez and Arnold 1996, Mittelman 1997b, Neumann 1996).

Three general categories of policy mechanisms and arrangements for managing state forest lands through community participation are emerging in the Asia-Pacific region: forest protection committees, community agreements, and individual stewardship agreements (Fox *et al.* 1991, Lai 1993). Various programmes and legal mechanisms are being initiated for vesting rights to individuals and communities in various countries (examples are presented in the table 1, see next 2 pages).

Table 1. Recent policy initiatives and mechanisms to support community-based management and conservation.

Country/ Since When	Programme/ Implementor	Scope	Mechanism	Duration/User Rights
Bangladesh (since early 1980s)	Thana Reforestation & Nursery Project (agroforestry component); Forest Department (FD)	nation-wide in remnant and degraded sal forests	individual contract between FD and participating farmer in agroforestry; usually 0.4-1.2 ha/plot/family	1 year, renewable contract; farmer entitled to all agricultural crops, intermediate tree products and 50% of final tree harvest; FD makes major decisions
Indonesia (since late 1970s)	Java Social Forestry Programme; State Forest Corporation (SFC)	Java-wide on social forestry sites; usually on "critical" production forests	individual contract between SFC and farmer participating in social forestry, usually 0.25 ha/farmer	2-year, renewable contract; farmer gets all agriculture crops, fruit trees, fuelwood trees; timber species belong to SFC
India (since 1970s in states such as West Bengal)	Joint Forest Management (JFM) Programme; State Governments and Forest Departments (FDs)	15 states have issued JFM guidelines in response to Govt. of India June 1990 circular	JFM contractual or lease agreement between State FD and user groups (e.g., 2,000 Forest Protection Committees in West Bengal State)	duration of agreement variable, sometimes indefinite (June 1990 circular prescribed 10-year, renewable Working Scheme); beneficiaries given usufruct rights to grasses, branches, "minor" forest produce, and share of timber (usually 25%)
Thailand (since 1980s)	National Forest Land Allocation/ Reserved Forest Improvement Projects; HMG of Thailand and Royal Forest Department	primarily in occupied forest areas of north and north-east	<ul style="list-style-type: none"> • individual STK land certificate to forest land occupant based on 1982 occupancy survey • in north-east, allocation of non-productive reserved forest land to landless families 	<ul style="list-style-type: none"> • "temporary" land-use permit; gives farmer usufruct rights; >7 million rai allocated since 1982 • provides usufruct rights; target is >14 million rai in 5 years

<i>Country/ Since When</i>	<i>Programme/Implement or</i>	<i>Scope</i>	<i>Mechanism</i>	<i>Duration/User Rights</i>
Philippines (since 1980s)	Integrated Social Forestry Programme, now evolved to Community-Based Forest Management Programme; Department of Environment and Natural Resources (DENR)	nation-wide in upland areas	<ul style="list-style-type: none"> • individual Certificate of Stewardship Contract (CSC) between upland farmer and DENR (3-7 ha/family); • individual or communal Forest Lease Management Agreement (FLMA) given to family, community or incorporated group • Community Stewardship Agreement (CSA) given to registered groups • Certificate of Ancestral Land Claim (CALC) given to communities or individual members 	<ul style="list-style-type: none"> • 25-year, renewable CSC (also for FLMA and CSA); can be inherited by offspring; provides usufruct rights to farmer • gives rights to harvest, process, sell or use products grown on forest land • only for "cultural communities" registered with Securities & Exchange Commission, Manila; provides leasing of land on communal basis • task forces survey and delineate ancestral domains to recognize rights of specific indigenous cultural communities
Vietnam (since late 1970s)	National Land Allocation Programme; State Forest Enterprises/ District AF Services	nation-wide, mostly in uplands; over 5 million ha allocated to families	long-term production contract between government and private household or cooperative	15-60 year renewable contract based on type of land and crop rotation; benefit-sharing defined for tree species
Nepal (since 1970s)	Community Forestry Programme; Forest Department (FD)	first developed in hill forests; later in Terai plains	operational plan developed by user group and sanctioned by FD	gives secure usufruct rights and legal control to user group; users protect and manage forests, receive all income

Source: Lai 1993

Governments have only just begun considering the legal frameworks for the kinds of policy formulation and implementation required to ensure that such activities evolve and can be managed effectively (personal communications: Wilbur Dee, NIPA Philippines; Tran Ngoc Huong, Forests and Biodiversity Programme, Netherlands Embassy, Vietnam). At the same time, it is essential to appreciate the wide variation in the capacity of rural communities and institutions to manage natural resources equitably and sustainably (Ruiz Perez and Arnold 1996, Neumann 1996). Policies must be designed to support the kinds of local institutions required for community-based sustainable management, and be flexible enough to deal with variations in local institutional capacity, augmenting that capacity where necessary (Fisher 1995, Wells 1995, Borrini-Feyerabend 1996).

3. FUTURE SCENARIOS

Based on the above analysis of the major significance and trends of NWFPs in the Asia-Pacific region, several scenarios have been formulated on the prospective outlook of NWFPs towards the year 2010. This scenario setting process admittedly involves perhaps more speculation than science. However, the scenarios presented below will hopefully stimulate more ideas on how the NWFP situation could unfold within the region over the next decade or two, and on the types of policy measures and on-the-ground actions that can help support the favourable scenarios and mitigate the unfavourable ones.

The next and final chapter also attempts to examine these general trends and scenarios within the context of specific sites—such as in Palawan, Philippines and Bulungan, East Kalimantan, Indonesia—and for specific NWFPs such as rattan, camphor and *damar* resin.

A. Scenario 1: Demise of NWFP supplies

Current trends suggest that the increasing monopolization of NWFP resources by outsiders is associated with large-scale commercial exploitation—although the direction and nature of causality is still unclear—and the reduction of access and income for many traditionally NWFP-dependent people in the region. Moreover, sustainable harvest limits are being frequently exceeded, and over an increasingly wider area (Haribon Palawan and IUCN 1994, Callo 1995, Mittelman and Alisuag 1995, Chamberlain et al. 1996).

The reduced availability of products that many people depend on for survival is causing extreme hardship, especially among the poorest for whom NWFPs generate a substantial proportion of annual income (Federation of Batak Tribes 1995).

At present, preferred species are becoming increasingly scarce due to forest degradation and over-harvesting. As scarcity leads to higher value, these products tend to attract greater outside attention and investment. This, in turn, reinforces the trend toward the alienation of local populations from their traditional resources. Many NWFPs in the Asia-Pacific region are becoming scarce, or are being harvested destructively due to increasing commercialization. These products include rattan, damar resin, gaharu trees (*Aquilaria malaccensis*) containing fragrant heartwood, an assortment of barks, roots, stems and leaves used as medicines (Giano 1990 cited in Peters 1996a, Callo 1995), and a large number of rare and endangered fauna.

Where NWFP supplies are limited, increasing demand can quickly result in depletion of the resource. Subsequent scarcity causes prices to rise. Sustained demand for rare products result in their being eliminated from local forests. This problem is particularly pronounced in Lao PDR and Vietnam, where rare animal and plant species favoured as traditional medicines are being harvested to near extinction to satisfy growing market demand, particularly in China, Taiwan and Korea (Chamberlain et al. 1996, Rambo and Cuc 1996, Mittelman 1997b).

While the most ecologically disruptive uses of forests are conversion to agriculture and timber removal, improper NWFP management can cause significant adverse impacts (Jordan 1987, Uhl et al. 1988, Peters 1996a). If NWFP harvest is inadequately controlled, the forest ecosystem may be jeopardized as the NWFP resources are rapidly depleted. At present, funding for implementing NWFP-based sustainable forest management initiatives remains limited, and the required supporting policies are mostly lacking. Examples of how to successfully develop such initiatives are few, and the approaches required remain poorly understood. Nonetheless, it is extremely important to take stock of lessons generated from the ample number of ICDPs and collaborative forest management projects being implemented throughout the region.

Few attempts have been made to evaluate how the integration of forest communities into regional and world markets is likely to affect household income, investment, sales and consumption, and the effect of these decisions on local use of forest resources (Ros-Tonen et al. 1995 cited in Wilkie and Godoy 1996). Lacking this understanding, it is difficult to predict how increasing marketization will alter forest resource use, or how trade liberalization will affect forest biodiversity. When market demand and profit margins spur specialized, intensive harvest, the diversity of products harvested by collectors is likely to decline, in the absence of adequate management control. Thus, extraction rates for target species could exceed sustainable limits. Rare species could be harvested to extinction, and selective harvest of high-quality individuals could result in deterioration of species genetic composition (Wilkie and Godoy 1996).

Unabated, these trends will lead to the demise of natural NWFP supplies, to the loss of critical livelihoods to forest-dependent people, and to the further degradation of forest resources and ecosystems.

B. Scenario 2: Domestication and cultivation of NWFPs

Declining supplies of natural NWFP stocks will create strong incentives for domestication and cultivation of NWFP species on degraded forest land and in agroforestry systems (Iqbal 1993, Nair and Merry 1995). NWFP cultivation poses definite advantages as opposed to collecting from natural forest stocks. Harvest is facilitated by the proximity of planted stocks to settlements, product quality can be improved by using genetically superior planting material, and higher returns to labour from cultivated NWFPs would tend to discourage forest collection, therefore possibly allowing natural stocks to regenerate.

Income-earning alternatives are increasing for forest area populations as a result of improved communication and transport between remote areas and markets. This tends to reduce pressures on NWFP collection as growing market crops or obtaining wage labour at district townships or in urban areas provide more profitable livelihood alternatives. In some cases, the

development of cheaper, synthetic substitutes for NWFPs has also created disincentives for the harvest and trade of certain natural products (Iqbal 1993).

The domestication and cultivation of NWFPs in plantations and on farms may increase tree cover and the area of 'forest' landscape. For example, in Indonesia, there has been a large expansion in the area of rubber "forests" that are planted and cultivated by smallholder farmers. Nevertheless it is crucial to recognize that this trend is only likely to develop for those products that are in strong demand in the market-place, and where demand expands as consumers incomes rise. It is the potential to earn higher incomes (per unit of effort) that encourages the switch from collection to cultivation. For inferior products, where demand is likely to decline with economic prosperity, domestication and cultivation is unlikely to occur.

However, caution must be exercised so that domestication and commercialization of NWFPs do not create a 'poverty trap' that will be harmful to farmers, producers and workers linked with large-scale monocultural plantations for export markets. One way to spring this trap is by facilitating smallholder farmers to produce commercially important natural products in their agroforestry systems, building upon the rich species diversification in those systems (FAO 1996).

Possible scenarios for the evolution from 'extraction' of NWFPs to 'production' through cultivating and domesticating wild species are treated in the next chapter.

C. Scenario 3: Promoting fair trade in NWFPs

Small-scale producers of internationally traded cash crops, such as coffee, cocoa and tea, are far more vulnerable to price fluctuations in the world markets than large producers. Fair trade organizations have proven to be effective mechanisms for ensuring fair prices and protecting small-scale producers from excessive risks. The first fair trade organization that dealt directly with producers in developing countries was established in 1959. There are now about 50 such organizations world-wide, and the movement is growing rapidly across Europe, North America and Australasia (CTA 1997). In the future, these organizations may play an important role in NWFP trade and marketing.

Generally, fair trade organizations purchase directly from producers in developing countries and sell their produce, through a minimum of middlemen, to consumers in developed countries who are concerned and willing to pay a premium to support more ethical transactions. The premium is passed back to the growers. For example, over the past 10 years, the use of the Max Havelaar Quality Mark for coffee and cocoa transactions has generated US\$20 million in fair trade surcharges, which have been paid back directly to the producers (CTA 1997).

Fair trade brands and organizations are committed to the following principles:

- Providing a guaranteed minimum price to producers; (which may involve a surcharge or premium above global market price).
- Improving social and working conditions of producers.
- Avoiding trade of food products that compete for land with essential subsistence farming.

- Assisting producers in product development, education, training, and improving organization and marketing.
- Supporting democratically organized producer cooperatives that follow ecologically sustainable development and equitable human resources development objectives.

With the current and projected trends of increasing demand and trade for NWFPs, fair trade organizations could play a vital role as honest brokers who can help ensure fair prices to NWFP collectors and cultivators, and assist in the empowerment process of these people.

Initiatives throughout the Asia-Pacific region have been launched to devolve resource control, improve management and decision-making, and generate more processing and value-adding opportunities at the community and forest sub-district levels (Iqbal 1993, Ruiz Perez and Arnold 1996).

Emergence of niche markets

NWFP-based strategies are enhanced by the rising trend in consumer demand for sustainably managed, natural rainforest products (Iqbal 1993). This bodes well for the development of community-based enterprises to fill emerging NWFP niche markets for natural food, medicinal, cosmetic and other products. Fair trade organizations can also serve as effective intermediaries between community producer and processing groups and emerging niche markets in developed as well as developing countries.

Despite declining natural stocks, NWFP markets are often flooded, which also contributes to downward price trends. Programmes aiming to capitalize on NWFPs to generate local interest in community-based conservation have attempted to help local collectors gain control over NWFP resources, as well as to educate them about NWFP markets, demand conditions, and fair market prices. Intervening to break long-standing control over NWFP markets, such programmes have begun to provide alternative credit sources to collectors, assisting them to assess market potential, to process raw materials locally, meet international product standards, and to develop effective market linkages (Fricke 1995).

This has helped extricate collectors from dependence on unscrupulous business people, and enabled collectors to take a more proactive role in marketing their products, and obtaining fair prices and profit margins. This may help to promote sustainable resource management, as higher local profits make reducing raw material harvest an economically feasible option.

D. Scenario 4: Enabling policy environment

To work towards the development of sound, sustainable, community-based NWFP enterprises, an enabling policy environment is essential. From the foregoing discussions, one can already discern many policy initiatives and innovative approaches to NWFP management and conservation that devolve both rights and responsibilities to local stakeholders.

Though a general realization about the significance of NWFPs has clearly emerged, a great deal more remains to be done. Clear-cut policies and a much stronger commitment and support for the conservation and development of NWFPs are required (Iqbal 1993).

Governments can take an active role by establishing rural land and forest resource use policies that promote integrated forest conservation and rural development by encouraging local control as well as equitable and mutually beneficial links between local communities and private entrepreneurs, (FAO 1994c, FAO 1995b).

When formulating landuse plans, national forestry master plans and forestry project documents, or in evaluation of forestry projects, the impacts of NWFP resources and their potential role in the rural and national economy should be duly considered. Potential adverse effects of development activities on NWFPs must be considered and addressed before project implementation. In short, the goal should be to achieve social and environmental gains by means of reinforcing the status of NWFPs in landuse and forestry activities (Iqbal 1993).

During the next 5 to 15 years in the Asia-Pacific region, one is likely to witness near or total demise of the natural stocks of many currently commercially important NWFPs. Among the most obvious of these are rattan, tree resins and bamboo. An alternative is the emergence of viable NWFP policies and strategies that successfully incorporate elements of community-based management, niche market development, domestication and cultivation of NWFPs, and promotion of fair trade in world markets. Both trends will probably develop simultaneously within a given country—for different types of products and markets. In this regard, the fate of NWFPs is very much dependent on an enabling policy environment designed to promote and support the attainment of favourable scenarios. Formulating and subsequently implementing these policies present great challenges, as well as opportunities, to the wise policy makers and planners in the Asia-Pacific region.

4. SCENARIO SETTING: SPECIFIC SITES & NWFPs

This final chapter attempts to provide some site-specific outlook profiles for selected NWFPs in the Asia-Pacific region. It is in the field, at sites like these, where the trends and scenarios discussed in the preceding chapters will unfold in the coming years.

The use of future scenarios has been suggested as a method for enhancing the policy-making process in local forest management. Such a method is intended to enable diverse stakeholders to collectively identify their future needs and to articulate appropriate policy responses. The importance of the *process* of generating future scenarios through stakeholder consultations—more than the *product* of the scenarios or the models used to produce them—is emphasized (Wollenberg 1997). This scenario setting process may be a very useful means of bringing together local NWFP stakeholders to jointly discuss problems and identify future management and policy options.

A. Rattan, almaciga and honey in Palawan, Philippines⁷

Palawan contains some of the Philippines best preserved primary and secondary natural forests. Due to extensive deforestation elsewhere in the Philippines during the past several decades, Palawan's forests are one of the most important reservoirs for several of the

⁷Contributed by Andrew J. Mittelman, Consultant, Chiang Mai, Thailand, based on his work with IUCN in Palawan, Philippines.

country's most significantly traded and commercially valuable NWFPs including rattan, almaciga (resin from the dipterocarp *Agathis philippinensis*) and honey. The comparative abundance of these products in Palawan compared to elsewhere in the Philippines has resulted in their coming under increasingly intense exploitation pressure.

Under the Philippines' Minor Forest Products Act, the Department of Environment and Natural Resources (DENR) lease areas containing key commercial NWFP species to commercial contractors. Concessionaires obtain sole legal rights to extract and transport NWFPs from these areas. In rare cases, concessions have been granted to local communities. Local communities, however, are at a distinct disadvantage in bidding for sites. This is because, compared to commercial contractors, they lack capital to post the required guarantee bonds and have considerable difficulty complying with complex concession application procedures.

The number of communities gaining rights to local NWFP resources has begun to increase, however, with the recent advent of DENR forest land tenure and usufruct related Administrative Orders. Threats to Filipino NWFP concessionaires resulting from apparent intent to devolve forests under a system of community-based forest management has resulted in increasing volume of NWFP harvest as current concessionaires anticipate possible loss of long-standing resource rights.

Under the NWFP concession system, maximum allowable harvest is being frequently exceeded due to corrupt practices among some of those responsible for monitoring and enforcement, as well as a general lack of effective monitoring controls. Local forest authorities are commonly unable to ensure that product collection is limited in extent to within concession area boundaries. Resource depletion within concessions is leading to expanded collection from gazetted protected areas. Raw material prices paid to local collectors are maintained at very low levels because concessionaires exercise monopoly control over NWFP resources. This impels collectors to maximize product off-take in an effort to meet their minimum income needs.

The Batak of Palawan

The Batak of Palawan are one of the few remaining unacculturated, indigenous forest-dwelling tribes in the Asia-Pacific region. They inhabit the deep recesses and upper elevations of river valleys west of St. Paul's National Park in Palawan. The contrast between the pristine forests surrounding Batak settlements and the denuded hillsides below—where ethnic Filipinos practice slash-and-burn agriculture—is stark. According to Eder (1997), 50 years ago, all forests in this area were managed by Batak and Tagbanua hunter-gatherers. Since the influx of Filipino refugees from islands despoiled by unsustainable agriculture, Palawan's lower-elevation landscapes have taken on a ravaged character now familiar in most Philippine watersheds.

The Batak consider themselves 'servants of the forest guardians'. Forest spirits, whose nature it is to jealously protect their natural abode, have assigned the Batak the obligation to live in harmony with and preserve their forests in return for the right to 'harvest its fruits'. Now, with St. Paul's Park being considered for World Heritage designation, the Batak have been threatened with expulsion. It is ironic that having been effective in sustaining the forests, their lives and culture through a complex system of religious beliefs, behavioural strictures and dependence on a diversity of NWFPs, the Batak are now at jeopardy because of policies being promoted by agencies who were primarily responsible for ravaging the Philippine forests during the past few decades.

In collaboration with local NGOs, the International Union for the Conservation of Nature (IUCN) and the Biodiversity Conservation Network (BCN) have been working with forest-based tribal communities around the Park. The work focuses on demonstrating that, with rights to sustainably harvest and trade a range of NWFPs, tribal communities can constitute a vital component of a sustainable forest management system, which will ensure the long-term survival of one of the best preserved and most biodiverse forests in the Philippines. The activities implemented under the NIPAS Act represents a major reorientation of forest policy. This also reflect a growing trend throughout the region to provide tenure to forest area populations in return for their active involvement in sustainable forest management.

Unsustainable harvest levels for rattan, almaciga and honey is leading to significant resource degradation and a significant increase in the extraction and degradation of resources within primary forests and National Park boundaries. Increasing influx of migrant collectors unfamiliar with sustainable management techniques is exacerbating the rate and extent of resource depletion. Unsustainable harvest practices are also being increasingly applied by local and indigenous collectors competing with outsiders for the same set of limited resources. Intensifying competition for NWFP resources is exacerbating inter-group and ethnic social tensions.

Local communities have begun to organize in response to opportunities created by a number of Department Administrative Orders and Presidential Decrees (such as the National Integrated Protected Areas System Act or NIPAS) that legitimize local people's rights to local forest lands and NWFP resources. However, the implementation of these alternatives has been extremely slow. Meanwhile, lobbying efforts have resulted in controversial legal interpretations that support continuing concession rights to NWFPs by outside entrepreneurs.

Rattan

Rattan is being clear-cut at an increasing number of sites, and the competition between migrant labourers (brought in as work crews by concessionaires) and local collectors has intensified dramatically. Smaller canes previously maintained by local collector-managers to ensure regeneration and sustainable supply are being removed with increasing frequency. Intense pressure being placed on the resources by outsiders, as well as by local people, has led indigenous collectors to abandon sustainable management practices. With resources being depleted nationally, some finished product businesses (wicker furniture) have shut down or relocated elsewhere in the region—namely Malaysia and Indonesia—where raw material supplies are more abundant and readily available.

Degradation scenario

Continuation of the present situation will result in ongoing degradation of rattan resources. If permitted to continue during the next 5-10 years, commercial supplies could be completely harvested from some concession areas. This would encourage more intensive exploitation of rattan outside of concession area boundaries: within parks and other protected areas and watersheds. Principle causal factors predicating such a scenario include:

- Continued slow pace of resource transfer to local communities comprising traditional collectors and forest user groups.
- Continued interpretation of laws and regulations that permit current commercial contractors to maintain control over NWFP resources.
- Prolonged anticipation by NWFP contractors of their impending loss of resource rights, encouraging maximum harvest prior to transition to local community control.
- Continued inability to ensure compliance with DENR sustainable resource management regulations.
- No or inadequate steps taken to intervene in regenerating damaged resources.

Sustainable management scenario

Legal guidelines for sustainable management associated with the current concession law are mostly adequate to ensure sustainable resource management. These guidelines specify the maximum allowable harvest within sustainable levels and also require replanting. While the process for determining sustainable management guidelines should be modified to enable greater site-specificity, the principle problem now is that existing guidelines are not enforced. To some extent, this is the result of the prevailing patronage system between concessionaire and government officials who are responsible for monitoring the concessions. Moreover, DENR lacks adequate staff and budget to enforce the regulations effectively. Were existing regulations enforced as written, the future sustainable management scenario would improve significantly.

Many local collectors have long depended on rattan to provide a substantial portion of their annual income. The new legislation enabling local communities to obtain rights to manage and market rattan would, if applied, provide strong incentives for sustainable management. Communities, however, require assistance in formulating sustainable management plans. There are few staff currently responsible for providing such assistance in the field. At the same time, existing field staff generally lack the skills required to facilitate local level sustainable resource management planning. Appropriate technical expertise is also needed to

assist local communities in determining what management arrangements are required, under a diverse range of site conditions, to ensure that rattan resources are sustainably managed.

Policies and interventions that would support sustainable management of rattan in Palawan include:

- Devolve rights to harvest and transport rattan to local communities.
- Assist local communities to develop sustainable management plans and apply for concessions for local rattan resources.
- Remove requirements for up-front payment of guarantees and simplify application procedures.
- Strengthen capacity to monitor compliance with sustainable resource management agreements and re-certify harvest privileges as reward for proven compliance.
- Provide technical support and subsidies for local production of rattan seedlings, rattan plantation development and enrichment planting.
- Provide assistance to local rattan collector guilds to obtain higher prices for raw materials through direct marketing.
- Assist development of local small-scale rattan crafts and finished product manufacture.
- Explore potential to increase local agricultural production and alternative income generation to reduce dependence on income from forest products.

Almaciga

Agathis philippinensis is among a number of forest tree species protected under Philippines law. It grows to a very large diameter, sometimes in excess of 2 meters, and is a source of valuable timber. The tree continues to be cut illegally despite its national protection status and a total logging ban in Palawan enacted 5 years ago. Illegal logging is a significant threat to the species, which has nearly disappeared in some areas.

Historically, traditional almaciga harvest by indigenous collectors was largely non-invasive. Resin trees could be exploited indefinitely by collecting only natural exudate. Low intensity tapping appears to have originated with in-migration by ethnic lowland Filipinos. Infrequent tapping by shallow incision, when properly managed, is also a potentially sustainable management practice. The reduction of the number of trees, intensified competition for fewer resources, increasing material expectations among collectors, and depression of raw material prices by concessionaires have combined to increase invasive and destructive almaciga tapping practices. Inadequate monitoring by DENR staff has enabled the trend to persist so long that the almaciga resource throughout most of Palawan appears to be in serious jeopardy today.

Degradation scenario

Almaciga tappers—usually ethnic as opposed to tribal Filipinos—are widely engaged in unsustainable management practices characterized by deep circumferential tapping, which frequently provides a conduit for fungal infection leading to tree mortality. Incision followed by burning to increase resin flow is becoming increasingly common, and is hastening the demise of many trees. If unsustainable NWFP management and illegal logging are permitted

to persist, it appears that *Agathis philippinensis* could be nearly depleted from most of Palawan's forests during the course of the next decade.

Sustainable management scenario

Almaciga trees can be propagated in nurseries and replanted in natural forest areas where ecological niche conditions are suitable. It is essential that greater controls be placed on the exploitation of remaining trees. There is not much hope for this at present, given the current lack of capacity by DENR to control illegal logging and tapping. If properly enforced, the existing regulations regarding the logging ban and almaciga concessionaires would be adequate for ensuring sustainable resource management. The exception is in areas where the resource has been nearly depleted, in which case, a moratorium or at least strict limitations on tapping are required to ensure almaciga survival.

Indigenous cultural minorities, especially the Batak tribe, some remote Tagbanua forest-dwelling enclaves, and remaining *traditional* Pala'wano tribes, should be given exclusive responsibility for managing Palawan's remaining almaciga resources. Improved enforcement of the logging ban by responsible DENR staff is also vital.

The following policies and interventions would support the sustainable management scenario for almaciga:

- Improve surveillance and interdiction to significantly reduce illegal logging.
- Survey current status of *Agathis philippinensis* and design sustainable management and rehabilitation plans based on site-specific conditions.
- Devolve responsibility for managing almaciga extraction to local (mostly indigenous cultural) communities.
- Set aside a system of intact almaciga stands for strict conservation and natural seed production.
- Provide sustainable management training prior to tapper certification and dedicate specific trees and stands to user groups—holding them responsible for employing sustainable management practices prior to periodic re-certification.
- Assist local collectors to improve the quality class of resin extracted by using simple low-cost appropriate technologies to increase product value and, hopefully, thereby reduce harvest levels.
- Undertake a programme of *Agathis* reforestation in areas where natural stands have been depleted.
- Support development of alternative income to reduce dependence on forest resources.
- Promote market linkages between local communities and 'natural paint and varnish' producers willing to pay a premium for high quality almaciga resin.

Forest honey

As throughout the Asia-Pacific region, forest honey has long been valued in the Philippines for its medicinal properties. However, with massive deforestation during the past two decades, the availability of pure forest honey has been significantly reduced. As with rattan and almaciga, forest honey is among the products listed for concessions in the Minor Forest

Products Act. Collectors are paid only a small portion of the actual market value of their forest honey, with the majority of profits accruing to concessionaires.

Forest honey is of two main types depending on the bee species. *Potiokan* hives are found in the forest canopy. Collection of this honey requires both skill and courage because hives are often located more than 50 meters above the ground. *Potiokan* is collected almost exclusively by tribespeople. Recent assessment of collection methods indicated that, overall, collection is proceeding on a sustainable basis. However, ongoing tribal deculturation—associated with reduced fears about retribution by forest spirits in response to destructive behaviours—is also leading to more unsustainable harvest practices.

For *nigoan* honey, hives are located in decomposing logs on the forest floor. Lowland honey collectors (ethnic Filipinos and acculturated tribes) are less aware and concerned with sustainable harvest techniques for *nigoan*. Consequently, its availability appears to be decreasing at a rapid rate, particularly during the past decade.

For both types of honey, there is no monitoring of harvest methods applied, and monitoring of the shipment volume from forest concession to market distribution points is similarly lax.

The significant reduction in raw material availability has led honey wholesalers to mix small amounts of forest honey with other additives. These products continue to be sold as 100 percent pure honey, however, since the Philippines Food and Drug Administration does not appear to check their content. Consumers appear to recognize that the available products are not pure honey. A recent survey of Manila shoppers indicated that available forest honey products are considered inferior in quality. Consumers recognize that retail prices are well below what would be possible were the packaged products actually 100 percent pure. Pilot marketing of 100 percent pure honey at a much higher price (4 or more times that of other products available) also demonstrated strong demand for the pure product. While the pilot marketing provided much higher profits to tribal collectors, and was linked with efforts to negotiate forest protection agreements, such direct marketing schemes are technically illegal under current Philippines forestry laws.

Degradation scenario

The current forest honey harvest in Palawan is not nearly as threatening to the resource base as compared to rattan and almaciga. There is, however, the threat that if NWFP-dependent people will be placed under increasing financial stress due to continuing degradation and reduced income from rattan and almaciga. Under this scenario, greater pressure will then be placed on honey resources, leading to their degradation as well. Household economic strategies among poor NWFP dependent families are integrated. Reduction of income from one source tends to create greater pressure on other income sources as families seek to compensate for deficits. Many NWFP collectors in Palawan depend on the entire range of commercial NWFPs for income. The ability or inability to ensure sustainable management and income from rattan and almaciga will bear directly on sustainable honey management.

It is also important to note that the negative impacts would not be confined to honey production. Decline in honey bees would also impact a wide range of forest and agricultural plant species that depend on the bees for pollination. Unsustainable honey harvest generally

involves destruction (as opposed to smoking) of hives. Were this practice to continue increasing, it could significantly impair the important role of honey bees as plant pollinators.

Sustainable management scenario

Lowland (ethnic) Filipinos in Palawan have only recently become involved in commercial-scale honey harvest. They do so with little regard for sustainable harvest practices or management of the resources. This group generally enjoys much greater access to agricultural land and income than their indigenous neighbours do. Therefore, it seems logical to provide the more impoverished indigenous communities—who are also the more responsible honey managers—with exclusive rights to the honey resources.

Existing regulations concerning honey harvest are not very clear as to what is and what is not permissible. Modified regulations should specify techniques that are relatively non-invasive, and which do not result in the destruction of honey bees. Traditional usufruct rights among tribal groups appear adequate for ensuring equitable access as well as sustainable management. Direct marketing arrangements could significantly increase the collectors' profits per unit of honey sold. This would help to facilitate agreements to develop and implement sustainable resource management plans, as well as set up prohibitions on collecting honey from protection and strict conservation areas. Professional ecologists should be involved in helping to determine the location and extent of strictly protected areas.

Policies and interventions to support sustainable management of forest honey include the following options:

- Devolve rights of access, harvest and transport for honey to indigenous cultural communities (leaving open the possibility of exceptions in cases where other groups can demonstrate long-term involvement in honey resource management).
- Provide support for forest user groups, especially those resident at protected area boundaries, to develop a range of income-generating options to reduce the environmental impact of any one activity.
- Establish and monitor compliance with maximum honey harvest levels, on a site-specific basis. (These should be re-calculated annually based on rapid assessment of the number of available hives.)
- Provide collectors with management guidelines using sustainable indigenous management practices as a basis for their design.
- Provide opportunities for skilled indigenous managers to train others in sustainable forest honey harvest techniques.
- Encourage the Food and Drug Administration to establish and implement a grading system for honey, and prohibit false product labelling.
- Assist honey collectors with simple methods to reduce honey product moisture and improve shelf life. Facilitate arrangements with marketing agents for national (and international) distribution of premium-quality, high-priced product, using this as one incentive to leverage the development and implementation of community-based sustainable resource management and biodiversity conservation in Palawan.

B. NWFPs in Bulungan, E. Kalimantan, Indonesia⁸

This subchapter examines the NWFP trends in the area designed as the Bulungan Research Forest, which has been allocated by the Indonesian government to the Centre for International Forestry Research (CIFOR) for research purposes. The research forest covers 303,000 hectares in Bulungan district, East Kalimantan, between the Malinau and Bahau rivers, adjacent to the Kayan-Mentarang National Park. It includes the watersheds of the Tubu and part of the Mentarang. Malinau is the main town of the area. Tarakan is the closest coastal city.

Historical perspective

From the forests of Borneo within Malaysia, Brunei and Indonesia, various NWFPs, especially very valuable ones, have been traded for many centuries. The island has been suffering an intense process of deforestation for the last 30 years, but where forest remains, as in the Bulungan district, NWFPs are still a main source of income for local inhabitants. They extract many products from the forest, but only a few are or have been significant for external market trade. Actors of different ethnic backgrounds have been involved in this trade.

Borneo has been in contact with China and India for about 2,000 years. Since at least the 11th century, and more intensively since the 15th century, the Chinese have been the main international traders of NWFPs in Borneo. From the 19th century, they have settled in remote inland locations. Europeans probably became involved in the trade after the 17th century, but few of the products were exported to Europe. Arab traders became more active in the 19th century (Peluso 1983, King 1993).

The main intermediaries have been the Malays—who had established sultanates on the coast since the 15th century—and the Bugis, sailors and traders from South Sulawesi who settled in the coastal harbours. Malays and Bugis continue to play a role in this trade which is still dominated by ethnic Chinese. The inland inhabitants, collectively called ‘Dayak’, a term that includes numerous ethnic groups, have been involved in different ways in collecting and trading NWFPs in exchange for valuable external goods (Peluso 1983, King 1993). The Punan and Penan, who have a traditional economy based on hunting and gathering, are major NWFP collectors (Sellato 1989, Puri 1997).

In Bulungan, as in the rest of Borneo, people of different ethnic groups live close to each other, sometimes in the same villages, and are continually interacting with each other. Punan, Putuk (Lun Dayeh), Abai, Merap, Kenyah, Murut and Berusu people all collect NWFPs and sometimes compete for the same resources. Their staple food is rice. In some villages, they also grow commercial crops such as coffee and cocoa, but most groups claim that forest products are their main source of cash income. The Punan, moreover, claim that they would still be able to subsist entirely from the forest, if necessary, by collecting fruit, wild tubers and processing starch from the sago palm. It is among the Punan that NWFP collection is most important. The majority of data presented here come from Punan Tubu informants living near Malinau and in the upper Tubu.

⁸ Contributed by Esther Katz, Anthropologist, ORSTOM-CIFOR, Bogor, Indonesia

Animals and birds

The Punan have heard from their parents or grandparents that one of the most valuable forest products was rhinoceros horn. But the rhinoceros (*Rhinoceros* spp.) is now extinct in that area. They say that ‘it was fairly easy to follow, as it does not run very fast, and often goes along the rivers; but it only bears one child at a time, so it disappeared’. Rhinoceros horn has been sought by the Chinese for over 1,000 years, and was imported from Asia and Africa. It is supposed to be an aphrodisiac and have medicinal properties (Wheatley 1959). It was still traded in the 1930s, at least in Sarawak (Beavitt 1992).

Bezoars (gall stones) from monkeys (*Presbytis hosei*) and porcupines (*Hystrix brachyura*) are another highly priced animal product. They are also used in Chinese medicine (Beavitt 1992). Both are now rarely found in the areas near Malinau that have been logged, but Punan people living upriver still look for them. Logging is reported to destroy porcupine holes. Moreover, bezoars are only found in one porcupine out of ten. According to Punan people, bezoars are presently sold in Malinau for the price of gold. Upstream Punan prefer to exchange them for valuable items such as gongs or Chinese jars.

The edible nests of the cave swiftlet (*Collocalia* spp.) are a common ingredient in Chinese medicine. They are also served as birds’ nest soup. Difficult and dangerous to collect, they are found in caves located along the Malinau River, in the territory of different ethnic groups. They are traded in Malinau or Tarakan and also fetch very high prices. In several cases, the caves used to be guarded by local villagers but, in recent years, concessions have been given for use of the caves. This measure, which was meant to protect the resource, is in fact causing its depletion. Short-term concessions, given only for one year, promote holders to harvest as much as they can. Moreover, noise or the presence of people disturbs the local birds—logging, for instance, disturbs their habitat. This is not the case with the species found in Java, that can nest close to houses. According to a Tarakan trader, a high proportion of the Indonesian production presently comes from ‘domestic’ birds.

Puri (1992) mentions for Kayan-Mentarang National Park the trade of song birds of at least three species; live hornbills, monkeys and bears; hornbill feathers and bills; antlers; bear gall stones, teeth and claws. It is very likely that these animals or animal parts are traded the same way in Bulungan.

Camphor

Camphor trees (*Dryobalanops aromatica*)—*kapur* in Bahasa Indonesia—are found on Borneo, in Peninsular Malaysia and on the north-west coast of Sumatra (around the harbour of Barus). The white camphor crystals, called ‘Barus camphor’ or ‘Borneo camphor’—*kapur barus* in Bahasa Indonesia—are found inside some old trees, whereas other trees produce only oil. The crystals result from the oxidation and solidification of camphor oil (Janse 1909). Camphor has been traded as a luxury product since the 6th century to China, India and the Middle-East (Burkill 1966). It has been used as a medicine, incense and as protection from moths.

As the formation of camphor only occurs in some trees, it is quite hard to find. Moreover, it is difficult to know before cutting the tree whether there are camphor crystals inside or not.

Punan people over the age of 50 were able to give some precise information about how to look for camphor, although it seems that they did not look for it themselves, as the trade is over. They say that to find camphor crystals, some external signs can be seen, but luck is an important factor in finding these trees, and it can be revealed in premonitory dreams. Accounts from the beginning of the century mention that, in Malaysia, shamans were in charge of finding camphor-containing trees through divination; only a secret language could be used when cutting the tree (Skeat 1900).

Since the 6th century, *Dryobalanops* camphor has been exploited and traded, but probably in very small quantities. Only some old trees were cut, so enough time was probably allowed for younger trees to regenerate. By the 16th century, the Chinese found other sources of camphor in *Cinnamomum camphora* and *Blumea balsamifera*, which have been cultivated in China and Japan (Wheatley 1959). 'Chinese camphor' is extracted from chips of *Cinnamomum* and from leaves of *Blumea*. It can be produced in a more sustainable way, in bigger quantities and at a much lower cost than *Dryobalanops* (Baillon 1884). Nevertheless it does not have the same chemical properties and medicinal uses; Borneo camphor, used as a tonic and aphrodisiac, was more highly valued (*ibid.*).

At the end of the 19th century, there was a high demand for camphor in China as in Europe, for medicine and to make celluloid. As Borneo camphor was ten times more expensive than Chinese camphor (*ibid.*), its use was probably restricted to medicine. But the pressure was increasing on *Dryobalanops* trees. Dutch foresters became concerned about the sustainability of camphor production and experimented with cultivation of the tree (Oever 1911) and improving of the extraction techniques (Van Breda *et al.* 1906).

However, consumers turned towards Chinese camphor and, after World War II, towards synthetic products (Howes 1949). The reason why Borneo camphor was almost totally abandoned is not clear. It could be linked with the tree's use as timber. Burkill (1966) noted that, in the thirties, the demand for camphor timber and its growing value 'restrict the amount of camphor available, and while the price remains high, that price is partly maintained by the very small output. There is no chance of larger trade in it, and a greater output would destroy the partly fictitious value that it has.'

Punan people of Bulungan say they used to sell camphor in the Dutch colonial time (until 1945) for a price equivalent to that of bezoar stones. A Malinau trader also associated camphor trade with the colonial period. Nevertheless it might have lasted a little longer. A Tarakan trader exported camphor to Hong Kong until 1980, but then the demand stopped because the buyers preferred to get cheaper supplies from China. The amount he was exporting then was 100 kg per month, or 1.2 tons per year. This amount is actually very high, because in the years 1918-1925, when there was still a high demand for camphor, the amount exported from Bulungan did not exceed 50 kg per year and 1 ton per year was the most exported from the west coast of North Sumatra (Heyne 1927). At the end of the 19th century, only 500 kg per year were exported from the whole island of Borneo (Baillon 1884). In the 1930s, *Dryobalanops* had already become more important for timber than for camphor (Burkill 1966), and presently in Borneo, it is one of the most logged species, along with *meranti* (*Shorea* spp.), ironwood (*Eusyderoxylon zwageri*) and *Agathis*. It is quite likely that the camphor still traded in 1980 came from loggers, and no longer from local collectors.

Camphor seems to have been produced in a sustainable way at least over 10 centuries because only the very old trees were cut and small quantities were traded at a very high price. Nevertheless when the demand increased, its sustainability was questioned. Before any solution was found, Borneo camphor was partly replaced by Chinese camphor, then its demand decreased significantly after the production of synthetic camphor became much cheaper. Its exploitation as a timber might be expected to be even less sustainable, as trees of a smaller diameter are also cut.

Gaharu

Eaglewood, aloewood or agarwood (*Aquilaria* spp.)—*gaharu* in Bahasa Indonesia—is similar to camphor in that the tree must be cut to be exploited, and not all eaglewood trees contain the fragrant substance, probably produced by a fungal infection. Finding it also depends on luck, and the process is surrounded with mystery and adventure. As Momberg *et al.* (in press) point out, the collectors actually seem to be attracted to this situation. In the same way that a special language was required when cutting camphor, Punan collectors avoid talking in a coarse manner or about women when looking for *gaharu*, and must be silent when cutting it. They believe that the eaglewood tree is inhabited by a spirit. They foreshadow the finding of *gaharu* by the sound of a forest cicada or by premonitory dreams, as for camphor. If it takes too long to find *gaharu*, they make an offering to a spirit of the earth. This type of offering was possibly performed for camphor, and is also performed for hunting.

Like camphor, *gaharu* has also been exported for many centuries. By the 12th century, it was already one of the most important aromatics to be exported from Southeast Asia to China, where it was also used for medicine. During that era, it apparently came from other parts of Indonesia (Wheatley 1959), but it is also possible that it came from Borneo without the Chinese traders knowing (Peluso 1983). Arab traders became more involved in the 19th century. The product was never really of interest in the European markets (*ibid.*).

In Bulungan, it seems that *gaharu* has always been collected, but its importance increased in the mid-1960s. Punan people suggest that it had always been widely traded in the coastal areas, but as it became progressively less available in those areas, traders looked for it in the interior. The demand increased very significantly at the end of the 1970s, when the supply of high-quality *gaharu* from Vietnam and Cambodia was cut because of the political situation (Peluso 1983). At the same time, Saudi Arabia and the Gulf Emirates experienced the oil boom, which generated high incomes and an increase in the demand for *gaharu* (Puri 1997, personal communication). Immigrant workers from neighbouring Middle Eastern countries (Yemen, for instance) also benefited from the oil boom, and started spending more money on luxury products such as *gaharu* (Lambert 1995, personal communication).

In the interior of East Kalimantan, there was a so called ‘*gaharu* rush’ in the late 1980s and early 1990s. Not only were local people involved, but full expeditions of sponsored professional collectors – usually groups of 15 to 30 men, sometimes dropped by helicopters and sponsored by big ethnic Chinese and Bugis traders – participated in this *gaharu* hunt. At that time, about 70 per cent was exported to the Middle East, and 30 per cent to China, Hong Kong, Taiwan and Japan (Yamada 1995), with a slight decrease following the Gulf War (Momberg *et al.* in press).

As a result of the '*gaharu* rush', this product became much harder to find at the beginning of the 1990s in the Kayan Mentarang National Park as well as in the Bulungan area. Before 1990, the Punan living close to Malinau could find *gaharu* in about a week, while it now takes them about a month. *Gaharu* extraction presents problems of sustainability and conflicts over appropriation of resources. Punan and Putuk from Bulungan, as well as the inhabitants of Kayan Mentarang have been complaining about outsiders seeking *gaharu* on their traditional lands and demand re-establishment of traditional land tenure. They claim to exploit their own resources in a sustainable way. In the case of *gaharu*, they observe different signs that can indicate whether the tree contains the fragrant product. They cut small pieces of the tree, and fell it only if they are sure there is *gaharu* inside. Outsiders tend to cut all trees, even if they may not contain the fragrant resin (Momberg *et al.* in press).

The World Wildlife Fund team that has been working in Kayan Mentarang thinks that re-establishment of traditional land tenure would be the best solution to protect local resources. Conflicts over appropriation of *gaharu* have occurred between local people and professional collectors, as well as between neighbouring villages. In May 1997, an Abai man from Lumbis district was killed by Putuk people on their territory and a peace ceremony had to be performed in August 1997 in order to defuse the situation. Threats of murder in the forest have occurred as well in Kayan Mentarang during the *gaharu* rush (Momberg *et al.* in press).

By 1995, traders stopped funding high-cost expeditions in Kalimantan (Soehartono 1997, personal communication). They turned instead to Irian Jaya. Supposedly, Irian species are less fragrant, but, according to Singapore traders, the highest qualities, now very rare in Kalimantan, are still found there. At the same time, some traders started establishing eaglewood plantations in different parts of Indonesia. They have not yet mastered the process of tree infection to obtain the fragrant substance, but they hope to succeed in the near future (Soehartono 1997).

Several scenarios could occur for eaglewood: its depletion in natural forests, caused by deforestation or by excessive extraction (but if it stops being extracted in an area, it might also regenerate); its replacement by a cultivated product with no more benefit for local people; or its semi-domestication by local smallholders.

Gutta percha

Gutta percha is the latex from *Palaquium* spp. and *Payena leeri*. It went through an amazing boom between 1840 and 1915, as it became an essential product for European industry, in particular for the coating of submarine cables. It was close to being depleted when it was replaced by synthetic products. Cultivation experiments conducted by Dutch foresters started producing results after the boom (Potter 1996). Gutta percha is also similar to camphor and *gaharu* because the tree must be felled to collect the latex if large quantities are needed. It was also high adventure to find it, requiring long and dangerous expeditions and many people put themselves in conflict and competition in its search. But as it was a newly discovered product and as all the trees contain latex, it was not surrounded by the same mystery and beliefs as camphor and *gaharu* (*ibid.*).

Punan people still remember that it was very valuable and very hard to find at one time, but now it is found fairly easily. If only a small quantity is needed, it is not necessary to fell the

tree, it can just be tapped. Local people use the latex to glue machete handles or make gong hammers. They call it *getah merah* ('red latex') or *getah parang* ('machete latex') in Bahasa Indonesia. There is still a very small local market based on one trader in Malinau. Small quantities of gutta percha are still exported from Indonesia to make golf balls, with no indication of its provenance (Coppen 1995). It possibly comes from a 300-hectare plantation located in West Java (Michon, personal communication).

Illipe nuts

Illipe nuts, fatty nuts from various species of *Shorea* (cf. Michon *infra*), called *tengkawang* in Bahasa Indonesia, were collected around the Malinau area until 1975. They were never cultivated as in West Kalimantan (Peters 1996b), the main production centre, and did not have a local use. They were sold in Malinau to ethnic Chinese traders and exported to Holland. As the price has declined, people no longer collect them in Bulungan. The trees are used as timber.

Damar

Damar was a major NWFP in the area until the 1960s. There was *damar batu* from a red *meranti* (probably a *Shorea*), *damar mata kucing* (probably from *Shorea*), and, above all, *damar daging* from *Agathis* trees (which is called *copal* in the Philippines). Punan people say that it was their most constant source of income at that time. They did not tap the trees, just collected the resin at different heights of the trunk. As many people looked for it, they often had to go far and to climb high to gather it, and then to carry it in baskets over long distances. However they could barter a full basket of *damar* for a canoe full of manufactured goods. As its price is now very low, nobody is interested in collecting it anymore. Many trees full of resin can be found in the upstream forests, but as *Agathis* and *Shorea* are good timber trees, they have been logged all around Malinau.

Rattan

In Borneo, rattan has always been used by local people, who are very skilful in making mats and baskets. Rattan is also used to for binding purposes. For instance, houses were made out of boards tied together with rattan. It is still used in this way where nails are not easily accessible. Hunted animals are often carried on the back with the help of rattan cords.

Punan people eat the bitter-tasting young rattan shoots as a vegetable. The upstream Punan still commonly go on family expeditions into the forest for several days or weeks. The women collect rattan while the men hunt for animals or look for *gaharu*. They occasionally sell or barter mats and baskets for manufactured goods with downstream people and traders. These products are less commonly made in villages around Malinau. In Malinau itself, one small artisan makes rattan furniture for the local market, and buys it from villagers in very small quantities.

Rattan has always been traded in the area, but it became more important in the late 1970s. When rattan started reaching a higher price, many outsiders also went into the forests to

collect it. It became more and more difficult to find, as happened with *gaharu*. Since the prices collapsed in 1989 as a result of an export ban, rattan collection declined, and it is growing abundantly again.

Future questions

From the foregoing descriptions, it is clear that NWFPs have been playing very crucial and diverse roles in the lives of people in Bulungan Research Forest, East Kalimantan, as well as for people in other forest communities in Indonesia and throughout the region. But more has to be understood about indigenous practices, contribution of NWFPs to local people's income, as well as the frequently observed boom-and-bust nature of NWFP-based local economies. Moreover there are great uncertainties about the future as 'development' penetrates into these remote areas. Local inhabitants have good abilities for adaptation (Kaskija 1995), but how much choice will be left to them?

How will the NWFP trends and scenarios unfold in areas such as Bulungan in the future? Many questions arise. Will highly valuable NWFP resources be completely depleted with growing demand and commercialization or with heavy logging and replacement of the forest by plantations? Will the resources that are almost depleted be abandoned, and therefore be allowed to regenerate naturally? Can indigenous knowledge about sustainable practices for NWFP management, harvest and regeneration—if they really are sustainable—be used to improve future activities? Will certain NWFPs be domesticated and cultivated outside the natural forest? Will government enact policies that will enable and stimulate community-based management of NWFPs? Will there be re-establishment of traditional land tenure? How will conflicts about land and NWFP resources be managed? Or will local people have to totally change their living strategies?

Some of these questions will form the basis for research by Indonesian and CIFOR colleagues in the years to come. Hopefully, some answers will be found to these pressing questions.

C. From extraction to production: the way ahead for NWFPs?

Harvesting from plantations: a common scenario?

A very likely future scenario for managing NWFPs for which commercial demand is strong is the evolution from '**extraction**'—tapping natural stocks—towards '**production**', controlling natural production processes, usually through cultivating and domesticating wild species.

Domestication and cultivation of NWFPs is not a new perspective. Some authors recognize that, at least in the tropics, agriculture itself developed through the transfer of forest trees producing essential materials—such as tannins for fishing nets or bark fibres for clothes—to domesticated environments nearby dwellings (Sauer 1952, Barrau 1967).

⁹ Contributed by Genevieve Michon, Ecologist, ORSTOM-ICRAF, Bogor, Indonesia

However, NWFP production really expanded during the colonial period. Products such as oil palm, rubber, cinchona and cocoa left their forest homes to enter plantation agriculture. The model chosen for this transfer was that of open-field production. Colonial estates created huge areas of specialized, highly artificial and high-yielding fields of trees. One of the results of that process was that it assigned little, if any, value to the wild relatives scattered in the forest, and deprived local collectors of some of their main economic activities.

After a period when there was relatively little economic attention on NWFPs, evolution towards large-scale production is again re-emerging for some commercially valuable products. In Southeast Asia, spurred by multi-million dollar trade revenues, rattan plantations are multiplying in Sabah, Java and Kalimantan. In this production process, the rattan resource escapes not only from the forest, but also from the hands of indigenous collectors, to the benefit of either private firms or government enterprises.

Experimental production is also emerging for high-value resources such as bird's nests from artificial caves in Java and eaglewood (*gharu*) from controlled planted-and-infected populations. These enterprises involve more wealthy outsiders than local farmers and, indirectly but surely, threaten the profitability of indigenous harvesting practices.

These examples of commercial NWFP production raise several important questions:

- Does NWFP **production** through **domestication** and **cultivation** have to be exclusively done outside of a forest environment? In specialized, monocultural, highly artificial open fields borrowed from modern agricultural models?
- Can forest collectors and smallholder farmers retain the main role as managers as well as beneficiaries in NWFP production? Or will NWFP collectors and farmers be increasingly marginalized in the transfer towards plantation production of commodities that they managed in the wild or natural state?
- The main question can be formulated in a more simple and direct way: Is there only one “good” model available for the production of NWFP resources?

Throughout history, smallholder farmers in Southeast Asia have proved to be skilled managers of forests and forest resources in the wild. But it is not often acknowledged that they have also been major actors in the production and domestication of these forest resources. And that they have, in this field, shown a fertile imagination.

Farmers: the original domesticators

Among the commercial products produced through various forms of ‘domestication’ and ‘cultivation’ by indigenous people in Southeast Asia, spices and stimulants might be the oldest. Tea, a small tree of forest undergrowth, leaves of which were traded in China as early as 3 millennia ago, was brought into cultivation by local farmers from northern Burma towards south-eastern China. Spurred by trade with China, cultivation of clove—a medium-sized tree in the forest sub-canopy in the Moluccas—developed locally between the third and first centuries, BC Nutmeg was also domesticated in the Moluccas long before the Portuguese merchants reached the area.

Most examples of cultivated commercial forest resources occurred within the last two to three centuries, and remain very localized. Cinnamon production through planted gardens was established two centuries ago in the central highlands of Sumatra (Michon & Bompard 1987, Aumeeruddy 1993). Benzoin is one of the oldest traded NWFPs in the region. A fragrant resin used for incense and

perfume preparations, benzoin comes from *Styrax* spp., which was developed as a fallow crop in Lao PDR (Kashio 1994), and in more complex and permanent agroforestry systems in North Sumatra about two centuries ago (Yoshida 1971, Simanullang 1988, Watanabe 1990).

For at least 150 years in western Borneo, swidden farmers have established highly diversified tree gardens that integrate oil-producing dipterocarps. *Tengkawang*, or illipe nut, is a fatty nut produced by roughly 15 species of *Shorea*, which is used as a substitute for cocoa butter in the manufacture of chocolates, margarine and cosmetics (Momberg 1992, Sundawati 1993, de Jong 1994). In Central and East Kalimantan, rattan have been incorporated into shifting cultivation systems for more than 100 years (Weinstock 1983, Godoy and Feaw 1989, Fried 1995). A century ago, in the south of Sumatra, swidden farmers started cultivating *damar* trees—resin-producing dipterocarps from the genus *Shorea*—in complex forest-like gardens (Michon *et al.* 1987). There, native rubber trees were also planted by local rubber tappers, but rubber production really developed with the replacement of local rubber species by *Hevea brasiliensis* from the Amazon, and its incorporation in local swidden systems at the beginning of this century (Pelzer 1945, Dove 1994b, Gouyon *et al.* 1993).

Evolution from extraction to production

What are these indigenous systems conceived for NWFP production? How can they be translated into more systematic models for improved NWFP production, adapted to smallholder scale, and contributing to the development of forest lands?

A close look at local practices for NWFP production in the region reveals four main tendencies of evolution from extraction to production.

Integrated production: forest species cultivated in the forest

The first set of examples consists of *in-situ* replacement of wild individuals by planted ones, coupled with practices that locally modify the forest to the benefit of the planted tree—e.g., selective slashing of competing vegetation, slight opening of the canopy. This enrichment planting integrates into existing forest structures without destroying or replacing them. The forest is altered in spots, to varying degrees, but without any essential biological, structural, ecological or functional change.

This type of enrichment planting is well-documented in the Amazon, with the management of cultivated stands of *Euterpe* palms for palm heart and juice production in swamp forests (Anderson 1990), or with the production of Brazil nuts (Lescure 1995). However, such integrated forest domestication practices do exist in Southeast Asia.

Integrating tea and rattan in forests

Tea production under the forest canopy is found from northern Thailand to southern China. Patterns and practices of traditional tea production remain highly variable. The less intensive way is to clear some of the forest vegetation around tea trees growing wild in order to reduce competition and slightly increase the amount of light the tea trees receive, thus increasing their natural production. These tea gardens usually have a very low density of tea. More intensive practices involve planting of seedlings raised in nurseries, or transplanting of wild saplings, to special places prepared in the forest where only a remaining canopy of high forest trees is kept, which creates regular shade. These wild tea gardens can be maintained for well over a century, with regular regeneration of decaying trees if needed. Tea trees are only slightly pruned, as compared to present estate practices. A current

evolution seems to be towards more opened tea gardens, so that the most 'intensive' tea gardens have very few forest trees left.

In some areas of Central Kalimantan (Godoy *et al.* 1989) and East Kalimantan (Michon, personal observation), rattan is planted in old secondary forests. After slashing of the undergrowth vegetation, rattan seeds are planted at the base of the remaining canopy trees, which will serve as support for the developing rattan vines. The plot is then abandoned until the rattan canes can be harvested, starting 6 to 8 years after planting. As the cultivated rattan grow in clumps, the harvest may be gradual and repeated every three years if needed. Replanting will occur only after all the rattan clumps have been harvested.

In-situ cultivation of NWFPs is a promising technique that could improve and increase natural production without disrupting the ecosystem. This technique, being presently tested for Brazil nut production in the Amazon, could be implemented in large extractive reserves, as well as in special use areas or buffer zones in and around protected areas.

Cultivated forests in farm lands: agroforests

Other indigenous practices constitute examples of true 'forest culture', best models of which can still be found in Indonesia (Torquebiau 1984; Michon and Bompard 1987, Sardjono 1992, Aumeeruddy 1993, Dove 1993b, Gouyon 1993, Momberg 1993, Padoch 1993, Sundawati 1993, de Jong 1994, Salafsky 1994, Fried 1995). In this case, the selected species are planted in forest clearings that are managed as small-scale plantations. This practice destroys pre-existing forest structures in order to create a new system. However, technical choices in the plantation management and composition result in the restoration of forest structures that appear more or less equivalent to the original ones. The global ecological qualities and socio-economic functions of the original environment are restored.

Agroforests can be defined as permanent forest structures established (i.e., planted) by farmers in the middle of agricultural lands for a specific forest production, but that integrate diversified production functions and play an active role in the conservation of forest biodiversity. They would greatly benefit from the incorporation of 'improved' genotypes generated by adapted domestication research, as well as from the systematic incorporation of timber as a major secondary production. The implementation area covers both buffer zones around protected areas and degraded forest margins.

Damar agroforests in Lampung, Sumatra

This process of forest reconstruction can be illustrated by the establishment of *damar* agroforests in Sumatra (Michon and Bompard 1987, de Foresta and Michon 1993, Michon *et al.* 1995). The plantation starts with the traditional slash-and-burn practice of rice cultivation on forest lands. *Damar* seedlings are then planted in young coffee plantations established after the first paddy harvest. This coffee-*damar* association is maintained up to 8 years, after which the *damar* trees are left to develop along with natural pioneers. During this period of relative abandonment, the young plantation gradually acquires an appearance typical of any secondary forest. However, this planted fallow becomes more complex over the years due to a combination of natural silvigenetic mechanisms and farmers' practices of selective cutting and enrichment planting. After 40-50 years, the *damar* plantation reaches its full production period.

From a socio-economic point of view, it is not fundamentally different from any specialized commercial plantation. It provides the majority of household income (Mary, 1987; Levang, 1992) and

constitutes an essential element of a farming system that complements rice fields. However, from a biological point of view, the mature phase finally resembles more the forest it replaced than a conventional tree plantation. After several decades, with the establishment of more climactic forest species among the cultivated ones, the *damar* garden exhibits a complex structure with a high canopy and several under-canopy layers, a dense undergrowth; and fairly high biodiversity. The garden includes economic trees, either planted or protected, as well as non-useful species like epiphytes, lianas and undergrowth herbs and shrubs, usually not considered as ‘weeds’ by the farmer.

And, unlike plantations that evolve through repetitive cycles leading from plantation to total harvest and back to plantation, the *damar* agroforest, once established, usually reproduces without any further major disruption, as decaying trees are replaced whenever needed. This lack of disruption favours the re-establishment of rare or late successional plant species and animals.

Temporary production in swidden cultivation systems

A third indigenous model for NWFP production consists of rotational systems where the forest production phase is only temporary, and is integrated into the traditional shifting cultivation cycle. The best Indonesian examples are rattan gardens in East Kalimantan (Weinstock 1983, Fried 1995), and rubber gardens in the lowlands of Sumatra and Kalimantan (Pelzer 1945, Dove 1993b, Gouyon *et al.* 1993). These systems rely on common practices. Forest seedlings are usually co-planted with rice in the swidden, and start developing with the fallow vegetation. The farmer performs occasional selective slashing of competing vegetation around the planted trees. Variations in the different systems concern the harvesting strategy—either total, one-shot, or gradual, repetitive harvest—and the length of the forest production period.

Rubber gardens in the lowlands of Sumatra and Kalimantan

Smallholder rubber gardens represent an important example of indigenous rotational production system for NWFPs as they hold the largest share—80 percent—in Indonesian rubber production since 1945, and cover roughly 2.5 to 3 million hectares in the lowlands of Sumatra and Kalimantan. Though the cultivated rubber tree is not a native species, swidden cultivators in Sumatra and Borneo soon adopted it in their production system (Pelzer 1945, Dove 1993b, Gouyon *et al.* 1993, Dove 1994b). Rubber trees, sown in a rice swidden and growing among classic fallow vegetation, can be tapped after 6 to 8 years. The ‘normal’ cycle for rubber production is from 35 to 40 years, but some rubber gardens happen to be more permanent, with gradual replacement of decaying trees by self-established rubber seedlings. However, after a maximum of 80 years, the vegetation is totally slashed for a new cycle.

Due to this relative ‘perennial’ state, combined with minimal tending practices, indigenous rubber gardens harbour a considerable number of plant species. A good management of market risks and the provision of secondary products through self-established biodiversity—plant foods and material, timber, game meat—compensate for the relative low productivity in rubber. Besides their economic importance for farmers, for whom they represent the main source of cash, the role of indigenous rubber gardens in the conservation of plant and animal biodiversity in the lowlands is dramatically increasing, with the depletion of the last unlogged dipterocarps forest of this ecozone.

Improved fallows seem to have a bright future in areas where permanent food cropping is too difficult. Some fallows could be conceived around short- to medium-cycle forest crops that

could be either actively integrated in the successional vegetation—like rattan—or completely replace it.

Cinnamon, nuts and spices in Indonesia

Cinnamon, a medium-sized tree in western Indonesian forests, is mainly produced in specialized gardens in the highlands of Kerinci, Central Sumatra. However, farmers in West Sumatra have developed an original example of cinnamon production below a high canopy of cultivated trees. Cinnamon trees are established in cleared undergrowth beneath planted durian trees mixed with large timber-producing trees. The cinnamon stand is usually totally harvested after 8 to 10 years and then replanted. However, some gradual harvesting can occur if needed. Cinnamon can also be mixed in the undergrowth with coffee and/or nutmeg, plus scattered fruit trees. Self established vegetation is usually conserved, but due to the high density of the cinnamon stand, biodiversity consists mostly of epiphytes on the canopy trees, small lianas, and undergrowth herbs.

Such multi-layered agroforestry systems can also be found in several islands in the Moluccas, eastern Indonesia, with an association between forest trees and horticultural species. Coconut trees and tall *Canarium* (canary nut) form a canopy under which *Inocarpus*, and nutmeg or clove, or a mixture of both, plus banana groves are cultivated (Michon 1990, personal observation)

NWFP production integrated in multipurpose tree gardens

The last set of examples consists of more ‘ordered’ permanent agroforestry gardens that might not be as diverse as the above-mentioned forest gardens, and in which the production of selected NWFPs are integrated with other targeted productions such as timber and/or fruits.

Multistrata agroforestry systems combine different tree and eventually crop production that are designed to make the best use of vertical space —superimposed layers from the ground to top of canopy. They are less diverse and more controlled than agroforests. The best implementation area lies in the restoration of degraded lands far from any forest source.

D. Prospects for future NWFP production

The conventional production model of NWFPs through specialized plantation inspired by commercial agriculture has obvious advantages over extraction from natural forests. These include: rationalization and homogenization of commodity production; geographical concentration of production; and increased yields per unit of land. But some of the characteristics of the plantation model may represent burdens, risks, or even major impediments for smallholder forest farmers. Possible negative effects on farmers are: increased ecological as well as economic fragility linked to specialization; high production costs for planting material, field preparation and maintenance, weeds and pest control; and increased specificity of technical knowledge.

Future development of NWFPs needs, above all, a fair dose of fresh imagination and inspiration that allows one to escape from the present bipolar situation of extraction versus specialized plantation. How can the production strategies developed in the above-mentioned examples inspire new thinking?

One main principle is to take advantage of and maintain the pre-existing resource and knowledge bases of indigenous management systems. The colonial model of forest resources development through production has concentrated on the transfer of a few selected forest species to agricultural fields through cropping patterns designed for grain production (Michon 1997). This has resulted in a total partition between the concerned forest species—and the related forest commodity production—and the forest itself.

Here, control over natural mechanisms and maximization of yields are the key words. Indigenous models do start from the transfer of selected forest species to agricultural lands, but they rely on a process that replicates forest patterns and structures in those systems. Integrated use of natural processes and optimization of production patterns are essential. These systems do not provide high yields of a given forest commodity, but they combine specialized forest production with the maintenance of a wide forest resource base. They synthesize agricultural and forest qualities in an economic as well as ecological perspective.

The technical and sociocultural model of colonial plantation remained uniform and static throughout the tropics and through history—from the old Dutch rubber estates to the modern industrial timber or rattan plantations. Conversely, indigenous systems have built on, and maintained, diversity. The advent of industrial plantation models in forest areas often erased this diversity.

These models and systems should be systematically re-examined under the new perspective of forest production, in general, and especially within the framework of agroforestry research (Michon 1996). Two key questions emerge: Do indigenous forest gardens in the tropics merely represent an intermediate stage in a uniform ‘domestication and cultivation process’, as commonly acknowledged? Or do they open new pathways toward the design of alternative forest production systems? As one ponders the future of NWFPs in Asia-Pacific, it is certainly worth digging into these questions.

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