TECHNICAL SERIES
32

GIFTS FROM THE FOREST

Report of the international conference on the sustainable development of non-timber forest products and services. Beijing, China 26–28 September 2007

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ITTO

INTERNATIONAL TROPICAL TIMBER ORGANIZATION

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REPORT OF THE INTERNATIONAL CONFERENCE ON THE SUSTAINABLE DEVELOPMENT OF NON-TIMBER FOREST PRODUCTS AND SERVICES BEIJING, CHINA 26–28 SEPTEMBER 2007

ITTO TECHNICAL SERIES #32

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Report of the International Conference on the Sustainable Development of Non-Timber Forest Products and Services

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ITTO Technical Series #32

The International Tropical Timber Organization (ITTO) is an intergovernmental organization promoting the conservation and sustainable management, use and trade of tropical forest resources. Its 60 members represent about 80% of the world's tropical forests and 90% of the global tropical timber trade. ITTO develops internationally agreed policy documents to promote sustainable forest management and forest conservation and assists tropical member countries to adapt such policies to local circumstances and to implement them in the field through projects. In addition, ITTO collects, analyzes and disseminates data on the production and trade of tropical timber and funds projects and other actions aimed at developing industries at both community and industrial scales. All projects are funded by voluntary contributions, mostly from consumer member countries. Since it became operational in 1987, ITTO has funded more than 750 projects, pre-projects and activities valued at more than US$300 million. The major donors are the governments of Japan, Switzerland and the USA. ITTO contact details are given on the back cover.

Front cover photo: Food from the forest in Congo (CIB)
Rear cover photo: Forest fodder and bamboo housing in Indonesia (E. Muller)

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FOREWORD

Forests produce much more than timber. Around the world, communities use literally thousands of non-timber forest products (NTFPs), and the ecosystem services provided by forests help sustain the planet. Yet despite their importance, forests continue to be cleared or degraded, sometimes at an alarming rate.

This apparent paradox is easy to explain: short-term economic factors, such as the high monetary value of alternative land uses, prevail over longer-term social, cultural or environmental considerations. A way to resolve the paradox is to increase the short-term economic gains that can be made from forests. Adding value to NTFPs, and attracting payments for ecosystem services, are practical ways of doing this.

In September 2007, ITTO joined with the Chinese Academy of Forestry, the International Network for Bamboo and Rattan, the International Centre for Bamboo and Rattan (ICBR), and the Food and Agriculture Organization of the United Nations to convene an international conference on NTFPs in Beijing, China. Among other things it aimed to promote the development of NTFPs and forest services that can improve the economic attractiveness of maintaining the forest resource base.

The conference, which was immediately preceded by a field trip to Anji County in China's eastern coastal province of Zhejiang, found that more value-adding at the local level could provide forest-based communities with significant economic benefits. It also found that a lack of clear resource tenure, access and rights inhibits the development of small-scale and community-based forest enterprises, which could be important actors in NTFP value-adding and marketing.

ITTO and its member countries are keenly interested in the development of markets for NTFPs and ecosystem services. We are working on many fronts – including with communities and the investment community – to improve the management, processing and marketing of these forests goods and services. I hope that the conference, and this report of it, serves to improve our understanding of the challenges ahead and the best ways of meeting them.

Emmanuel Ze Meka
Executive Director
International Tropical Timber Organization

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INTRODUCTION

For decades, policy-makers and forestry practitioners have recognized the valuable role that non-timber forest products (NTFPs) and services can and do play in boosting local incomes. In many parts of the world, efforts are under way to increase this role by improving the management, conservation, value-adding and marketing of NTFPs and forest ecosystem services, but progress has often been less than hoped for and expected.

In September 2007, the International Tropical Timber Organization joined with the Chinese Academy of Forestry, the International Network for Bamboo and Rattan (INBAR), the International Centre for Bamboo and Rattan (ICBR), and the Food and Agriculture Organization of the United Nations (FAO) to convene an international conference on NTFPs in Beijing, China. It aimed to:

- bring producers, traders and consumers together to share experiences in promoting NTFPs in domestic and international trade;
- study opportunities to promote the development of NTFPs and forest services that can improve the economic attractiveness of maintaining the forest resource base; and
- make recommendations on policy and other measures to promote the sustainable production of NTFPs and the sustainable provision of forest services.

One hundred and twenty people from 42 developed and developing countries attended the conference, including officials from forestry agencies in tropical countries, representatives of national and international non-governmental and development assistance organizations, and researchers and project managers. They met at a time when some NTFPs were emerging rapidly in the global market place and as markets for the environmental services of forests were being increasingly promoted. Many countries and organizations see a great deal of potential for these forest products and services to assist the process of sustainable development and to help alleviate poverty in some of the world's poorest places. The conference was held in China, a country that is at the forefront of many of the most dramatic developments in the utilization of NTFPs. A pre-conference visit to Anji County in the eastern coastal province of Zhejiang, China, showed how a huge bamboo resource there is being used in a wide range of industrial processes, from reconstituted boards to rugs and curtains, aiding the province's rapid development process.

The papers presented at the conference and the discussions they provoked were wide-ranging. The conference received an overview of the global NTFP and services sector, considered the growing significance of community forest enterprises in the production of forest products and services, and discussed policy and practical issues related to the development of markets for carbon and other forest services. Participants also learned of experiences in a number of ITTO-funded projects and canvassed issues related to NTFPs and environmental services in Brazil, Cameroon, the Central African Republic, China, Colombia, Republic of Congo, Germany, India, Indonesia, Liberia, Malaysia, Mexico, Myanmar, Peru and the Philippines.

During the conference, participants formed five break-out groups to reflect on shared experiences and to further develop the ideas raised during plenary sessions. This report summarizes the presentations made at the conference and the discussions that ensued. It also summarizes the issues raised and sets out the recommendations made by conference participants. It constitutes the proceedings of the conference.

Key messages

- NTFPs are important to many communities, particularly the rural poor and among women.
- Forests provide many ecosystem services, payments for which can help reduce both poverty and deforestation.
- For many NTFPs, the value chain is not well developed. More value-adding at the local level could provide forest-based communities with significant benefits.
- A lack of clear resource tenure, access and rights inhibits the development of small-scale and community-based forest enterprises, which could be important actors in NTFP value-adding and marketing.
- Governments and the international community should encourage the production and marketing of NTFPs and forest services by communities and the private sector.

OPENING AND WELCOMING REMARKS

Moderator: Professor Zhang Shougong, Chinese Academy of Forestry

Yi Xiaozhun
Vice Minister of Commerce,
People's Republic of China
Beijing, China

The Government of the People's Republic of China recognizes the importance of sustainably managing tropical forests and, as part of its approach, has cooperated internationally through ITTO for many years. China is one of the world's largest exporters and importers of timber and NTFPs and an important member of ITTO. Since China joined ITTO in 1986 it has maintained good relations with the Organization; some US$10.2 million have been spent in 22 ITTO projects. Through this cooperation, many advanced ideas and technologies have been introduced to China and we have improved our approach to tropical forest management. Many of our experts have learned their trade through this cooperation. The new International Tropical Timber Agreement, which will come into effect soon, has several new features, including direct references to NTFPs and environmental services.

In many developing countries, forest products play an important role in terms of poverty alleviation and environmental improvement and they need to be further developed in rural areas as a way of improving the incomes and living standards of rural people. Therefore, China has a very important contribution to make to this meeting. China has made great efforts to add value to forest products; we have achieved a lot in this regard and we hope to share our experiences with you. We hope to make progress together. China needs the world to develop and the world's future also depends on China's development. There is huge potential for the import and export of forest products and we would like to increase cooperation with ITTO member countries. We would like to make our contribution towards the world's sustainable development.

Lei Jiafu
Vice Administrator, State Forestry Administration
Beijing, China

The State Forestry Administration is an important institution in the management of China's forests. We, the Chinese Government, attach great importance to cooperation with ITTO. ITTO projects have introduced many advanced technologies and experiences, greatly improving our human and technical capacity in many provincial agencies. Tropical forestry is an important component of China's forestry development; ITTO has been a window to the world forest sector and helped in our cooperation with the whole world. We would like to continue cooperation and to make a contribution to global sustainable development.

China has a long history of NTFP utilization. We have the largest resource of bamboo in the world and are rich in palms, rattans, and traditional herbal, medicinal and edible plants and fungi. China has accumulated a lot of experiences in the utilization of these resources and is willing to share its experiences today.

Jiang Zehui
Former President, Chinese Academy of Forestry
Beijing, China

I express my gratitude to the ITTO secretariat and the Chinese Academy of Forestry for vigorously supporting this conference. This conference was initiated in August 2005 when I headed a Chinese forestry delegation to Japan. We met ITTO's Executive Director, Dr Sobral, and we had a very good discussion on this matter. Later, the initiative was approved by the International Tropical Timber Council. In 2006, Dr Sobral wrote to the Ministry of Commerce here and invited its involvement in the conference. The Ministry replied formally on behalf of the Chinese Government, indicating its strong support. I am grateful that high-level officials of the Ministry of Commerce and the State Administration of Forestry are here today. We have also received huge backing from INBAR, ICBR and FAO.

Forests provide many benefits – biodiversity, climate regulation, disaster and pollution reduction – and also support many cultural, aesthetic, social and economic values. They play an irreplaceable role in improving the quality of life. Forests provide timber and services but also many NTFPs. In recent years, China's NTFP industry has developed rapidly. There has been a comprehensive change in the way that forests are perceived and used – now we see tree-planting, economic forest cultivation, flower-growing, timber and bamboo processing, wood-based processing, paper manufacture, tourism, and the captive breeding of

wild animals. The gross output of the forestry sector is growing by more than 10% per year. The bamboo and rattan industries are booming. The non-timber biomass industry is also rising.

NTFPs are playing an important role in rural development. They are helping to increase farmer income, solve the problems of agriculture, and in the construction of infrastructure in the countryside. China is fostering greater interest in NTFPs. INBAR is one of the first international organizations established in China, aiming to promote the transfer of technologies through an expanding network of members. INBAR now has 34 member countries; in November it will celebrate its 10-year anniversary. China has also established a non-profit research institute – ICBR – of which I am president.

The in-depth discussions we will have during this conference and the experiences we will share will surely help us to make progress jointly towards sustainable development throughout the world.

Manoel Sobral Filho
Executive Director, ITTO
Yokohama, Japan

I congratulate and thank the Government of the People's Republic of China for hosting this conference through the Ministry of Commerce and the State Forestry Administration. I extend my deep appreciation to China for its continued support and long-term commitment towards the sustainable development and conservation of tropical forests. This is at the heart of ITTO's work and China is a highly valued member of our Organization. I also thank our partners, the Chinese Academy of Forestry, INBAR, ICBR and FAO for their contributions. And I would especially like to thank my good friend, Madam Jiang Zehui, for her thoughtful contributions and her leadership in making this conference a reality.

In the tropics it has become increasingly clear that payments for ecosystem services, as well as better remuneration for timber and non-timber forest products, are desperately needed. Tropical forests continue to be cleared at a great rate; at ITTO we believe that increasing the economic value of natural forests will help to both reduce this rate and improve forest management.

Who will harness the economic potential of NTFPs and ecosystem services? In many tropical countries, small, community-based forest enterprises, or CFEs, are springing up to meet a need for local-level investment, employment and business opportunities; they are selling wood and non-wood forest products and, increasingly, forest-based services, to local, national and international markets. It is an exciting trend. In July, ITTO co-organized an international conference on community forest management and enterprises in Rio Branco, Brazil. The conference convinced me that governments and markets must do their utmost to encourage the development of CFEs. I hope that this conference will draw a similar conclusion.

We also need more investment. ITTO is working with its partners to promote private investments in natural tropical forests. We are hosting a series of forums among policy makers and potential investors to debate the constraints as well as the opportunities for investments in tropical forests. Convincing people to put money into sustainable forest management and forest production in the tropics is not easy. Without clearly defined property rights and national legal frameworks, neither industries based on NTFPs, nor CFEs, nor markets for forest ecosystem services, will flourish. Therefore, it is important to establish clear land tenure systems and property rights as the first step towards realizing the potential of the forest. The role of policy makers in local and central governments is critical in this regard.

Consumers must pay a fair price for the products and services they receive. Many people seem to want, for example, the biodiversity conservation service that tropical forests perform so well; many fewer seem willing or able to pay for it. Who will pay? This question can be posed for many of the services rendered by tropical forests, but rarely answered. Many things are changing in this world, but our willingness to put our hands in our pockets for tropical forest conservation is perhaps changing less than we might hope.

Nevertheless, I am optimistic about the future. ITTO and its member countries are keenly interested in the development of markets for NTFPs and ecosystem services. During this conference we will hear many success stories. I am confident that our deliberations will give rise to creative and realistic ideas by which we can move forward together.

SESSION 1: GLOBAL AND REGIONAL OVERVIEW

Chair: Chu Fuxiang, Chinese Academy of Forestry

Global trends in NTFP trade and prospects for income generation

Paul Vantomme
Forest Products and Industry Division, FAO
Rome, Italy

Many terms are used to describe the vast range of forest products (other than timber or wood) and services. The scope and content of any term should be clearly defined for the purpose of its use, be it in awareness-raising, statistics, policy or legislation. The importance of NTFPs is mainly at the household and village levels, for subsistence use or trade. Data from the 2005 Forest Resources Assessment show a global annual removal of NTFPs of approximately 7 million tonnes (plants only, no fuelwood), valued at US$5 billion. Trends in total world annual production and trade in NTFPs increased only slightly from 1990 to 2005, with food products showing the highest annual growth rates among all categories. Key drivers of these (flat) production and trade trends are mainly: domestication (shifting production from forest to farm); the use of new, substitute materials (making NTFPs obsolete); and mixed impacts of social, economic and environmental factors. Although there are many important opportunities for developing NTFPs, such as social programmes for poverty alleviation and the Millennium Development Goals, major challenge persist, including the lack of secure resource supply, poor product and market development, and the lack of institutional and policy support for the sector.

Global issues and opportunities in promoting community forest management and enterprises

Alastair Sarre
ITTO consultant
Adelaide, Australia

Community-based forest enterprises (CFEs) are forest industries managed by Indigenous and other local communities for livelihoods and profit; they are engaged in the production, processing and trade of timber and wood products and commercial NTFPs and, increasingly, in markets for environmental services. In most forest-rich countries, CFEs probably make up the bulk of forest industry, yet they are often ignored in forest policies. However, in countries where there has been significant recognition of historic tenure rights and the transfer of responsibilities to local levels, the rise of CFEs has been dramatic. CFEs have unique advantages for the rural economy and can be very profitable. They can also be important agents of forest conservation. Nevertheless, the expansion of their role in most countries faces a number of internal and external constraints. Internally, a lack of organization and capacity can lead to social conflicts and mismanagement. Externally, CFEs commonly face huge regulatory and policy barriers, of which insecure tenure and use rights are possibly the most universal. A lack of access to credit is another, as is excessive bureaucracy. Nevertheless, the potential for CFEs to increase in importance and in their contribution to development is huge in tropical countries. A recent conference held in Rio Branco, Acre, Brazil, brought together 300 participants from forest communities, non-governmental organizations, and governments worldwide. Among other things, this event sought to raise global awareness of the contributions of and challenges faced by community forest management and associated CFEs. Conference participants issued a statement calling on governments to recognize the rights of local communities and to introduce legal mechanisms that guarantee land tenure and the sustainable management of forests.

Current situation and future perspective of NTFP development in China

Zhang Shougong
Chinese Academy of Forestry
Beijing, China

The harvesting of NTFPs causes less environmental damage than timber cutting. NTFPs also provide poor people with subsistence and income-generation opportunities. China has many important NTFPs, including bamboo and rattan, medicinal plants, mushrooms, woody plants for food and oil, resins, perfumes and spice, beverages, plants for fodder, animal products, nuts and ornamental plants.

China has 500 species of bamboo in 39 genera. We harvest 8–9 million tons of bamboo culms each year. The area of bamboo plantations increased by 1.9 million hectares between 1976 and 2005, to about 5 million hectares. The industrial production of bamboo grew from US$0.6 billion in 1990 to US$7.2 billion in 2006. China has 40 species of rattan in 39 genera. We have 6,000 hectares of planted rattan and produce 5,000 tons of rattan per year. China produces significant quantities of pine oleoresin, pine rosin, turpentine, tannin and essential oils. Some 625 species of fungi have been identified, 570 of which are from forests Ornamental plants are also important: the area of land devoted to these increased from 147,000 hectares in 2000 to 636,000 hectares in 2004; 2.78 million people and 800,000 households were involved in the production of ornamental plants.

To foster NTFP development, China will continue to upgrade industrial processing based on science and technology, protect wild species and genetic resources, domesticate, cultivate and market potential species, develop standards for cultivation, production and processing, and expand the total area of forests. Sustainable resource management will underpin these efforts, as will support for rural enterprises and farmers' professional cooperation organizations.

Non-timber production and sustainable development in the Amazon

Floriano Pastore Jr
University of Brasilia
Brasilia, Brazil

In our ITTO project we developed databases on the production, trade and exports of Amazonian NTFPs and analysed data by species. We produced six videos on the production of the main NTFPs and an encyclopaedia of useful Amazonian species.

Rubber is still one of the most important NTFPs in the Amazon: 6,000 tonnes are harvested per year, supporting 10,000 families. Amazonian history is interlinked with the extraction of natural rubber. The rubber market crash in the 1920s had such a big impact it hasn't been forgotten, even today. Brazil nuts are also a significant NTFP: 17,000 tonnes are harvested per year (13,000 more are available but waiting for markets). Seven per cent of the Amazonian population is still living an extractivist lifestyle.

NTFP extractivist production is characterized by low productivity, low added value, low management capacity, poor and irregular quality, uncertain prices and irregular markets. Production is not profitable and does not allow capital accumulation. NTFP extractivism is not, of itself, sustainable in the Amazon; it is declining and being replaced by deforestation, agriculture and urban development. But the Amazonian NTFP producer plays an important social role. He is the guardian of a piece of forest; he expands our general and ethnobotanical knowledge. He is the keeper of his own cultural treasure. For that, we have to protect this man and this community. But this bucolic image is not always true – without rent and employment he can be as damaging to the forest as anyone else. We need new ways to boost the income of extractivists.

What are the possibilities? We have an example in the company Natura, which produces natural oils; it dilutes the non-profitable part of the process downstream. Perhaps policies to subsidize rubber could be considered: $1 per kg = 1 hectare protected. Then there is babassu, a palm, which provides many products that are eaten by people, as well as feedstocks and other products. In some parts of the Amazon it is present in great abundance; perhaps it is abundant enough to be profitable.

Sustainable management of NTFPs in Cameroon, Congo, Gabon and Central African Republic

Cleto Ndikumagenge
IUCN
Yaounde, Cameroon

In spite of the abundance of forests in Central Africa, the people there face increasing poverty. The exploitation of NTFPs should be able to provide local people with sufficient food as well as fodder for their animals, contribute to the eradication of certain illnesses and generate income. In contrast to timber or agricultural products, very little information is available on the socioeconomic importance of NTFPs, especially their contribution to gross domestic product, the ecological impact of their exploitation and the monitoring of these resources.

IUCN conducted an ITTO pre-project (with funding from the Common Fund for Commodities) to study the sustainable management of NTFPs – the aim was to assess the potential benefits arising from the sustainable use of NTFPs in countries in the Congo Basin. Some of the key constraints to the sustainable management of NTFPs are: their poor

mainstreaming in sectoral development policies and existing forestry legislation; inadequate regulations applying to NTFPs; a lack of information on the production, processing, marketing, statistics, ecology and use of NTFPs; and a lack of synergy between support structures and actors involved in the management of NTFPs at the local, national and sub-regional levels.

The pre-project developed proposals geared towards the valuation of NTFPs, capacity building for various actors, and the domestication of flagship NTFP species. Synergy between the pre-project and FAO's project 'Building food security in Central Africa through the sustainable management and use of NTFPs' has helped boost the profile for NTFPs in COMIFAC's (Commission in Charge of Forests in Central Africa) Convergence Plan.

Discussion

Question to Zhang: You say that forest cover in China will continue to expand. How is this expansion to be integrated with the management of NTFPs? **Zhang's response:** Forest cover in China will be 19% by 2010, according to the current rate. This increase will be in non-forested areas and will be mostly achieved through the establishment of plantations. For NTFPs, the harvesting of the resource should be incorporated in the national conservation plan.

Question to Pastore: The certification of NTFPs has been done well in Brazil. An important component is the standardization of harvesting methodology. But on the contrary, you say that extractivism is not sustainable. How do you reconcile these two contradictory aspects. **Pastore's response:** I consider that it is difficult to achieve *economic* sustainability in extractivist production. It may be sustainable in some times or with help from the government, but in general it is not economically sustainable. Certification can add value by increasing the price of the product, but it is not easy to compete with domesticated products. Certification helps fill part of the gap.

Question to Vantomme: You mentioned the importance of terminology. The term NTFP is so broad and fuzzy that it is hard to even think about it in a collective way. How can the role of NTFPs be properly assessed when it is unclear what they are? **Vantomme's response**: I agree that this is still a big question. The classification of timber products started 50 years ago, a process among countries that has gradually improved both the classification systems and the data collection. Assessments done on timber now are not bad, although not perfect. Assessments of the removals of NTFPs, however, are still in the early stages. They started internationally with forest assessments in the 1990s; we hope with the cooperation of countries to improve both data and classifications. Of course, countries can have their own systems but it is important to harmonize these at the international level.

Question to Pastore: What did you mean by diluting the profitable part downstream? Regarding babassu, you said that some portion is feedstock. What do you mean? **Pastore's response**: The extraction of natural oils in the forest is not profitable, but the company that buys them pays more to the producer and then recovers the difference in the further processing of the product. They dilute the small part of the non-profitable part of the process. Regarding babassu as a feedstock: after extracting the edible oil from the seeds, the kernels can be used for animal feed.

Question to Pastore: Liberia is also a producer of rubber. We have the single largest rubber plantation in the world. Why is it that natural rubber has not been protected up to this point? You suggest that the government should spend 1 dollar per hectare to protect the species. How has your research impacted the policy of the Brazilian government? **Pastore's response**: If we want to continue to produce rubber in natural forests, it is not for the rubber itself but because the rubber collector protects the forest and maintains a culture. We therefore ask the government to subsidise rubber production by $1 per hectare. Yes, the results of our project are starting to permeate government bodies. We have had good meetings with government and we are providing the results to them.

Question to Ndikumagenge: NTFP from animals: are these wildlife species protected? If so, how do you make production sustainable? **Ndikumagenge's response**: The sustainable management of wildlife is big challenge in Central Africa because there is a gap between talk and practice. Even if you give villagers the meat from a cow, they prefer wild meat. We could start in forest concessions, developing strategies with the private sector such as guidelines for the preservation of wildlife in forest concessions. Another, complementary approach would be to increase the value of live animals through ecotourism or other mechanisms. We could also domesticate some species of wildlife that are favoured for their meat. It is not an easy issue. There are few roads in Central Africa; no governments can really control what happens in remote areas.

SESSION 2: PRODUCTION AND MARKETING: PRODUCT-SPECIFIC TRENDS AND SCIENTIFIC FINDINGS

Chair: Coosje Hoogendoorn, INBAR

Development and application of new engineered materials from bamboo resources

Chen Xuhe
ICBR
Beijing, China

Bamboo is environmentally friendly. Propagation is easy, it has a short production cycle, it is energy-efficient (requiring relatively low energy for processing, even compared to wood), and it has good strength and flexibility. Bamboo has long been used for various applications. Worldwide, more than 1 billion people are estimated to live in bamboo houses. Chinese people love bamboo and China is the country with the longest history of bamboo research, cultivation and use. The famous scholar Su Dongpo once said: "we eat bamboo shoots, live in bamboo house, transport food with bamboo rafters …we cannot survive without bamboo, even for a single day."

However, solid bamboo has difficulties in processing because of its tapered culms, nodes, non-standard sizes, low durability and variable properties. China has invested a lot of effort in recent years in engineering a new generation of bamboo products to achieve standard sizes and stable properties. Three categories of product have been created: structural, decorative and charcoal. There are six Chinese patents on bamboo products. We have built in features such as resistance to insects and fungi, and we can meet requirements for strength, stiffness, and so on. New bamboo structural materials include panels like laminated lumber, bamboo plywood and particleboard. We can achieve mechanical properties in structural-grade bamboo laminated lumber that are higher than those required by markets for laminated veneer lumber for structural uses. Performance properties for bamboo plywood and particleboard meet United States' and European Union standards for oriented strandboard. Bamboo laminated beams are being used for roof trusses, sheathing boards and wall panels. Bamboo can also be combined with wood in bamboo-wood ply and in composite products. For decorative uses, we have developed large-format rollable non-woven cloth-backed bamboo decorative veneer (thickness 0.3–0.8 mm), helping to improve bamboo utilization efficiency.

Environmentally friendly preservatives and glues mean that international environmental standards can be met, as can standards for sound insulation, thermal transmission, and fire resistance. Bamboo is a fast-growing, renewable resource that can be easily managed on a sustainable basis. Bamboo-based engineered products will promote an environmentally friendly economy and harmony between man and nature.

Potential rural communities' sustainable development through bamboo forest management and utilization in Peru

Josefina Takahashi
PERUBAMBU
Lima, Peru

I represent the company 'Peru Bamboo'. In Latin America, Brazil has the highest diversity of bamboo species, followed by Colombia and Venezuela. In Peru, 4 million hectares of forests contain bamboo at densities ranging from 30 to 70% of the forest; there are 11 million hectares of bamboo-dominated forest in Latin America. There are eight genera of native bamboos in Latin America and approximately 54 species – we don't know all the species. The dominant genus is *Guadua*, a sympodial bamboo. Almost half the diversity is in the *Chusquea* genus. *Alounemia* is also very common; its internodes are very large.

Guadua angustifolia is the most important bamboo species in South America. It can grow up to 30 metres in height, with a diameter of up to 0.25 metres. Its mechanical properties have been studied in various places, especially the Netherlands and Colombia.

Peru is just beginning to make use of its bamboo resource. It is not like China, where they are doing amazing things technologically. We know that the pre-Inca people, the "Caral', were using bamboo

and clay technology 5,000 years ago. They made many things with bamboo. The tomb of the Lord of Sipan in 2,000 BC was made of bamboo. Bamboo featured prominently in Machu Picchu. It is used today by rural people for handicrafts, charcoal and furniture. Large-scale possibilities include as a construction material, flooring etc. Bamboo also performs many forest environmental services, such as soil and water management, biodiversity conservation, ecotourism and carbon sequestration.

We want to improve and increase the use of bamboo in homes, agriculture and industry. Peru is on the ring of fire; one month ago we had an earthquake and a city disappeared. We have initiated a bamboo seismic-resistant housing program. We have also just commenced an ITTO-funded project to promote the rehabilitation, sustainable management and use of tropical bamboo forest in the northwest region of the country.

Promoting the sustainable utilization of bamboo through community participation in sustainable forest management in Myanmar

Ohn Winn
Forest Research Institute
Yezin, Myanmar

I will present some of the results of ITTO project PD 156/02. Bamboo is very important in Myanmar. There are more than 90 species of bamboo in 17 genera; 16 species are important commercially. In the Bago Yoma region, bamboos occur in mixtures with trees and there are pure stands of *Melocanna bambusoides* in about 8,000 km^2 in Rakhine State in the west. Pure bamboo stands also occur in Tanintharyi Division in the south.

Bamboo consumption is increasing, but there are also many problems. Bamboo is felled and marketed illegally, the rural population is exploited by affluent bamboo plantation owners, and there is a lack of awareness about bamboo management and an absence of cooperation and partnerships.

Myanmar forest policy recognizes the need to management forest resources sustainably. It requires that states develop the potential of NTFPs to help meet local needs. In line with this policy, the main objective of the ITTO project was to enhance the socioeconomic benefits of bamboo to rural communities through their participation in its management and use. There were four project sites: Paukkaung – the famous teak-bearing forests; Pyinmana – close to the new capital; Kawhmu – close to Rangoon; and Tatkone – in the dry zone.

The project carried out three activities: bamboo forest management; bamboo product development and processing; and bamboo products extension and marketing. Demonstration plots were established, and there were many training workshops and other capacity-building and experience-sharing exercises, and market surveys. Processing technologies to produce quality bamboo projects were introduced. One of the important lessons learned was that projects of this nature should focus on those people who are keen and willing to participate. We also identified three research needs; resource growth and yield dynamics; livelihood strategies for primary users; and market dynamics. Public awareness is also important: even I, working in the Forestry Department for 30 years, did not know the potential of bamboo. Now, the project communities see many opportunities for bamboo.

Updates on strengthening ASEAN collaboration to promote sustainable development of rattan resources

Marcial Amaro (presented by Nestor Aguilan Bambalan)

Ecosystem Research and Development Bureau
Laguna, Philippines

We are undertaking an ITTO-funded project aimed at strengthening Association of South East Asian Nations (ASEAN) collaboration in promoting the sustainable use of rattan resources through demonstration and the application of production and utilization technologies. We have established a total of 220 hectares of demonstration plantations in seven ASEAN member countries. We have published five technology handbooks (on nursery and planting stock production; plantation establishment and management; control methods against insect and fungi; kiln drying; and bleaching and finishing) and convened several training workshops in the Philippines, Vietnam, Laos and Cambodia. A rattan museum has also been created, as well as a website (www.aseanrattan.org).

Rattan cultivation for edible shoots production in southern China

Huang Shineng
Chinese Academy of Forestry
Guangzhou, China

Very few wild rattan resources remain in China and we are now encouraging people to plant rattan. Small rattan-processing factories are still active, but China's biggest rattan factory went broke in 2006. Local people in Yunnan, Hainan and Guangxi traditionally eat rattan shoots. With funding from ITTO, an initiative has commenced to cultivate rattan on a commercial scale for their edible shoots. It was inspired partly by experiences in Thailand, where 1 shoot is worth 1 kg of rice, and Laos, where 1 kg of dried shoots is worth US$5 in Vientiane (and US$50 or more when exported to the United States and France). The species *Daemonorops margaritae*, which occurs naturally in China, was selected for trial because of its high productivity: at eleven years of age, one plant can produce 56 shoots.

Field trials were established in southern China to test the effects of spacing, fertilization and irrigation. After nine months, all seedlings had survived under full sunlight with irrigation; after 1 year, we achieved an 86–93% survival rate, with insect larvae and mice causing some mortality. We found that closer spacing produced greater height and stem length and fewer leaves. After 20 months, we found that 41.5% of the stem length was edible, although this was only 8% by weight. We can conclude that rattan shoots are a low-fat, high-protein forest vegetable. More research is needed, however, on cultivation techniques, and also on potential markets.

Discussion

Question to Takahashi: Can Peru's bamboo resource be managed sustainably? **Takahashi's response:** For many years, people were extracting bamboo without any management. The lack of knowledge of the biology of many species makes sustainable management very difficult. Communities are looking for information, for technical support. I have been contacted several times by community people who want more support. Many want to be part of the project because if they don't learn how to manage the resource they will lose it. The demand for assistance is very high. The market is also increasing, which is another reason for the demand.

Question to Winn: By how much has the income of the target communities increased? How are forest activities monitored? **Winn's response:** In two of the groups, a share in the business was originally selling for three cents; now it is worth US$2.80, so there's a big difference. Income has increased very much. How to monitor activities? Given the economic importance of bamboo, all activities are monitored by villagers, who want to protect their new income sources.

Question to all panelists: A company I know tried to start a rattan plantation but had problems with borers and harvesting. Does anyone have experience of this? **Bambalan's response:** I have no knowledge on harvesting techniques. There has been research into insect treatments, but I don't have the details.

Question to Chen: Please share your experience of bamboo bioenergy in rural China. **Chen's response:** I am not an expert on the use of bamboo for energy but bamboo has traditionally been used in the manufacture of charcoal. Also, bamboo processing waste can be compressed into barbeque fuel. In Germany, bamboo is gasified using high-temperature treatment. There is great potential for bamboo as a biofuel.

Question to all panelists: Do you agree that there may be a need for some form of certification to ensure the sustainability of bamboo production? **Chen's response:** Certification is needed for NTFPs like bamboo. However, compared to wood processing, most bamboo processing enterprises are small-scale and are not ready to pay the cost of assessment. They may already be sustainable but the assessment will increase the cost of the product, so in the short term I don't think it's feasible. Maybe some research is needed. **Takahashi's response:** Certification is going to be important but only for native forest, you can't talk about certification in a bamboo plantation. **Winn's response:** Certification is important but difficult to carry out. Timber certification is still under development; certifying NTFPs is very complicated in our case. It is necessary, but many things need to be considered. **Chair's response:** We can learn from other sectors– certification of organic agriculture is moving forward, even if they are small producers.

Comment from the floor: I agree with Dr Takahashi. It can't be stressed strongly enough that when you talk about certifying plantations in humid tropical forest ecosystems you are on very slippery ground. Certifying tropical plantations is leading to perverse results.

Question to Chen: Regarding the preservation of bamboo: what about existing experiences regarding product recycling? What is the experience in China?
Chen's response: Bamboo preservation is similar to wood preservation. In practice, when we use solid bamboo culms for construction we should avoid direct contact with the soil. Also, research has led to smoke treatments for bamboo. Not much attention has so far been paid to environmental issues. Treatments have to be environmentally friendly. Recently we invited various experts to prepare a book, including a chapter on preservation. That will be published in October.

Comment from the floor: I feel discouraged that the bamboos we have in Liberia exists in clusters or clumps (sympodial) rather than as runners (monopodial). We don't know too much about their properties. Do we have a chance of sustainably managing that type of bamboo, or should we be looking at other species?

Takahashi's response: A lot of research is being done on particular species. What I recommend you do is to characterize each species; perhaps the information is already available from other parts of the world. The other important thing is that you have to identify what you are going to do with the material, how you are going to use it. Not every species can be used for everything. China has one species that has very many good properties. *Guadua* is very hard, so not very good for making handicrafts. You must know what you are going to use it for, and maybe you can get good results depending also on the age of the bamboo culm.

Question to Huang: You described the growing of rattan in agricultural conditions. Are you aware of rattan plantings in natural forests, also called forest enrichment? Would this be a good strategy for combating the depletion of the rattan resource?
Huang's response: Plantings of rattan in China date back to the 1960s. By 1980, about 30,000 hectares of Hainan Island forest were planted with rattans. Those plantations were not properly managed, however, and no evidence has been found of their success. During the 1980s and 1990s there were no plantation programs for planting rattan in China. A large-scale rattan enrichment program began in 2001, initiated by INBAR and GTZ. Now rattan planting on Hainan Island is increasing at about 800–1,000 hectares per year. Not all those newly planted rattans are receiving post-planting care and, in some areas, farmers have converted them to rubber and other plantations. Given that they are not high-quality rattan, the cost of harvesting is almost equal to the price that can be obtained for them, so I am not sure about encouraging locals to plant secondary forests. I believe that many rattan plantations in Malaysia have been converted to oil palm because oil palm can be harvested within two years of planting and, thereafter, each year for the next 30 years.

Promotion of NTFPs in transboundary biodiversity conservation: lessons learned from the Lanjak Entimau Wildlife Sanctuary and the Pulong Tau National Park, Sarawak, Malaysia

Paul Chai
Sarawak, Malaysia

Borneo was a centre of trade in the 18th and 19th centuries for spices, herbs and other materials. But by the early 20th century NTFPs had decreased in economic importance. Now, interest in NTFPs is growing again. In our project in the buffer zone of the Lanjak-Entimau Wildlife Sanctuary we placed a lot of importance on community cooperation and good management practices; it is important that communities are able to manage the money they earn from the sale of their projects. We provided training and incentives to help kick-start community-based activities. One of these was fish culture. People have started to make money out of fish – many others have come forward wanting to do these things in their villages as well, so that is encouraging. People are very happy that we are producing positive results and they want to expand their operations.

There are obstacles, however. Some people are slow to change from their traditional lifestyles. In some communities there is a lack of internal cooperation as well as business, management and leadership capacity.

Land for community use is also sometimes in short supply: individuals are not willing to give up their land to the community in order to carry out the project. Out-migration to urban areas is another issue: people are beginning to move out of their longhouses for employment and education. The children are starting school and the entire family moves out to be near the children. This leaves many longhouses nearly empty. And there are other issues as well.

We have learned many lessons that can be applied elsewhere, such as in the Pulong Tau National Park, where a new project is getting under way. The promotion of NTFPs has provided communities with opportunities for additional cash income. This helps people to fulfil their wish to continue their traditional lifestyles and helps counter the view that the project wants to prevent them from making use of the forest. People are now more aware of the benefits of conservation, which helps strengthen law enforcement. For example, participants voluntarily stop poachers from entering the Sanctuary. If they were not there, illegal hunters would come in very freely. The Sanctuary is now valuable to local communities for reasons other than conservation. The success and sustainability of project activities is due to the dedication of the project team; without them, the whole endeavour it is very difficult to sustain. The promotion of NTFPs has helped change the mind-set of the management authority as well as that of local communities; it is less about how much money people are making from NTFPs as how NTFPs are helping to bridge the gap between local communities and park management.

Sustainable use and conservation of NTFPs in Colombia

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Colombia is one of the most biodiverse countries in the world. We therefore need a systematic approach to knowledge on our biodiversity and particularly on species of economic use. Using databases on NTFPs in the Andes and Amazonia kept by the Alexander von Humboldt Institute and also those amassed in NTFP floristic studies, we developed the following analytical categories: food, handicrafts, construction, firewood, medicines, ornamental, honey, and toxic and industrial.

Traditionally, NTFPs have been used mostly for subsistence purposes. An important botanist, Jose Celestino Mutis, the father of botany in Colombia, promoted the commercialization of sarsaparilla and quina. NTFPs that have been commercialized more recently include latex, fibres, and fruits such as camu-camu. We found 1,509 useful plants in Colombia, including some used for timber. Of those, 656 are found in the Andes and 1,159 in the Amazon (some are found in both regions so the overall total is lower than the sum of the two).

The objective of the National Strategic Plan for Green Marketing is to consolidate the production of environmentally sustainable goods and increase the supply of competitive ecological services in national and international markets in order to contribute to environmental quality and social improvement.

A goal of research is to develop scientifically based specifications to guarantee careful resource management without overexploitation and to provide economical benefits to local populations. The lack of information on the ecology of NTFPs is one of the biggest drawbacks when managing them for productive uses. It is necessary to support research into the ecological, social, cultural, political and institutional contexts. We need urgently to strengthen community enterprises and initiatives and to analyse the impacts of NTFPs on livelihoods. We should involve actors in monitoring. And we need programs to raise consumer awareness. New market strategies and technological innovations are needed and can be encouraged through a process of international cooperation with other Amazonian countries.

Discussion

Question to Chai: How many people have benefited from the scheme? **Chai's response:** Around Lanjak-Entimau there are 112 longhouses with a total population of 12,000 directly or indirectly dependent on the forest. We are dealing with those living closest to the forest: we have extended the community activities to 11 villages, benefiting at least a thousand members, and we are receiving requests from another community, which wants us to come in and help them and we

will expand our activities to include them. The work will also be extended to communities in the vicinity of Pulong Tau: there, three communities are involved, totalling several thousand people.

Question to Chai: What mechanisms have been put in place to make the project sustainable? **Chai's response:** The work started as a pilot project with help of ITTO. An important concept is co-management. It is important to get the local people involved and to get the executing agencies to work together. We have to recognize the role of local communities in management and when it comes to implementation we have to be selective and go with those who are most interested. The communities must also be able to organize themselves because, ultimately, they must be able to manage the enterprise on their own and to manage the cash they receive. We have had successes in this respect. Once a community has started to collect cash they will reinvest in the project. Those that are enterprising will be able to continue once the ITTO money has gone. We can also strengthen management on the ground.

Question to Lopez: What criteria for sustainable use would you use? What is the method for the conservation of NTFP? **Lopez's response:** The criteria of sustainability are not very clear, but it is important to identify some indicators. I think that it is important to have an indicator for firewood use, for example, so that the activity doesn't change the structure of the forest. It is important to work in the ecological context and at different levels. What are the dynamics of the population and their use of NTFPs? Do the dynamics of the ecosystem change when people use NTFPs? It is necessary to join ecological with economic, cultural and social criteria.

SESSION 3: FOREST SERVICES: OPPORTUNITIES FOR ALTERNATIVE INVESTMENTS

Chair: Emmanuel Ze Meka, ITTO

Potential and challenges of carbon markets for the tropical forestry sector: market developments related to avoided tropical deforestation

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The four methods for mitigating greenhouse are: afforestation; the restoration of degraded lands; changing forest management practices; and reducing deforestation. The last two are voluntary markets. In the Chicago Climate Exchange, for example, prices vary from US$1 to US$4.5 per tonne of carbon dioxide (1 tonne of carbon = 3.67 tonnes of carbon dioxide). In the retail market, prices of US$1 to US$78 have been observed. This market comprises corporations interested \in developing a socially responsible image or anticipating future regulation, as well as non-profits and individuals that want to offset emissions caused by their activities. There are companies that facilitate those transactions.

Deforestation in developing countries is responsible for about 20% of global greenhouse gas emissions. In some countries, it can be a high proportion of total emissions – 70% of emissions in Brazil, for example, and 80% in Indonesia. Currently, the United Nations Framework Convention on Climate Change is considering activities aimed at reducing emissions from deforestation and forest degradation (REDD). The World Bank thinks there is a large potential market in saved carbon from deforestation. It has established the Forest Carbon Partnership Facility to prepare for a system of positive incentives post-2012 that includes REDD through capacity- and pilot performance-based payments. The Facility aims to have US$100 million in readiness by 2010, to initiate pilots worth $200 million, and to encourage a post-2012 incentives market in the order of US$1 billion or more per year. The readiness phase will be funded with public money and the pilot phase by a combination of public and private funds. Success will depend on the price of carbon and whether it s higher than the opportunity cost of the land. Low-hanging fruit might include: fire control, resolving land tenure, and improving law enforcement in protected areas. Studies are needed to better identify the actual opportunity costs.

What is needed to facilitate markets in REDD? We need a robust and transparent monitoring system to quantify reference cases and to monitor emission reductions with confidence. We need reliable data on change in forest area and carbon stocks in forests undergoing change. Emissions = gross deforestation rate x change in carbon stock. A system might involve a benchmark map of forest in a country and then a monitoring system to measure changes in that forest. Remote sensing data are available for many developing countries for the 1990s and later and new technology is being developed that will address many of the measurement challenges, such as persistent cloud cover. Estimates of carbon stocks can be obtained from forest inventories and other sources, but are not always available or are old. Nevertheless, it should be possible to derive reasonably good estimates of change in carbon over time, maybe on a 5-year cycle.

Estimates of emissions from deforestation tend to focus on the change in area, which can be done with increasingly high accuracy, but knowing carbon stocks well is equally important to minimize overall uncertainty. For example, if uncertainty on deforestation rates is 5% but on carbon stocks is 50% then total uncertainty = 21%. Even if uncertainty on estimates of carbon stocks is only 15% then total uncertainty or total error is still 11%, so it is important to improve carbon stock estimates.

Payment of environmental services provided by tropical forests: experiences from Mexico

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In the 1990s, Mexico had a very high rate of deforestation. The rate has declined since then, but not by enough. We realised that a reduction of forest cover reduces environmental services, such as

water quality, and that if we wanted such services we would need to pay for them. In Mexico we watched with interest the approaches to harnessing forest services being taken in Costa Rica and by the World Bank and we started our own pilot project, FIDECOAGUA.

What did we need to do? First, we needed to produce a planning tool, which we did, a strategic forestry program covering 25 years, including objectives to develop market for environmental services. At another level of planning we had the National Forestry Program 2001–2006, an objective of which was to create trade in environmental services. It was important to also create legal tools: we have a new General Law on Sustainable Forest Development, which defines environmental services. It also created the Mexican Forest Fund specifically to support the trade of environmental services. Another important key was to modify the Federal Tax Act, which we did; an article in the revised law allocates part of the income collected from the use, development and operation of federal waters to the Mexican Forest Fund for the development and operation of environmental service payment programs. We also created very strong operating rules for the program.

A geographic information system was used to identify and select eligible areas. By 2007, the total surface area for which ecosystem service payments were being made under the program was about 1 million hectares. Some critical states, like Oaxaca and Dorango, receive more payments than others. Forty per cent of payments are helping to alleviate poverty. They are also focusing on critical groundwater recharge areas and those areas at a high risk of deforestation. Other private initiatives are also being developed; there are now 40 mainly private schemes in Mexico.

When we started, everyone talked about the need for a high level of research, but if you wait until knowledge is perfect then you never start. We are very practical. The payment program has been useful in adding value to the forest. We are in a transitional process, which will eventually reduce reliance on government.

Creating and sustaining a market for environmental services from China's tropical forests

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The purpose of our ITTO-funded project is to explore the functions, patterns and risks of markets for forest environmental services and to start the marketization process. The main outputs will include a background report on China's forest services, a website on China's forest ecosystem services, the establishment of a trading agent for forest services, and two case studies of traded forest ecosystem services. Prior to this project, another ITTO project laid the foundation of ideas, methods and personnel on value accounting of forest resources in China. It identified seven types of services: water conservation, soil conservation, carbon sequestration and oxygen generation, climate buffering and environmental purification; biodiversity conservation; agricultural protection; and landscape and recreation.

In 2007, China announced its National Plan to Counteract Climate Change. As part of this, the national goal is to increase forest cover by nearly 47 million hectares by 2050, to over 26% of the land area. In addition, a further 13 million hectares can be rehabilitated, providing another carbon sink. China's Clean Development Mechanism (CDM) Fund started in March 2007, managed by the Ministry of Finance. Also in 2007, the China Green Carbon Fund was established, with a contribution of RMB 300 million from the China Petroleum and Natural Gas Group, which will be dedicated to reforestation for carbon fixation. China also has two CDM carbon sequestration reforestation projects and is developing markets for other services, such as watershed protection. There are four types of scheme: where the national government is the buyer; where local government is the buyer; trading among local governments; and private. Biodiversity conservation includes three payment types: purchases of conservation; wildlife trading; and biodiversity utilization, such as hunting.

Discussion

Question to Brown: When can Liberia access the World Bank facility and does it qualify? **Brown's response:** The facility's website should be able to provide information on how countries can apply. The last I saw, 14 countries had expressed interest.

Question to Brown: You spoke of remote sensing with 5% accuracy – does this depend on image resolution? Are there sufficient methodologies to control leakage and permanency issues? What is the cost of monitoring likely to be? How would you propose that low-hanging fruits are plucked in the pilot phase? There is a great deal of debate about how to meet these objectives and costs vary enormously by country depending on governance. **Brown's**

response: The accuracy of forest cover measurement using remote sensing is plus or minus 5%. On leakage: if you do a national emissions inventory you can capture all change in a country. Leakage is only an issue when you're talking about projects. I don't have a real answer on permanence; you could argue that once a country signs on, then as long as every five years you can see what change there is against the benchmark then permanence is not really an issue. Cost of monitoring? At what scale? We are working on a source book, a capacity-building tool to address many of these issues. Money received is likely to more than offset the cost of monitoring. On low-hanging fruit, an example would be a fire in Kalimantan: what would be the cost of stopping the fire from getting into the peat swamps and other forests? In protected areas, there would be no opportunity cost because the land use is already designated, all you need to do is increase enforcement, presumably at a marginal cost. You have raised good questions.

Question to Gonzales: What is the definition of environmental services? **Gonzales's response:** The legislation established the term 'environmental services" – hydrological, carbon capture, protection of biodiversity, scenic beauty and 'others'.

Question to Gonzales: Why the focus on water? Recreation is also a service, particularly surrounding big cities. Do you also value such services and, if so, how do you pay for them? **Gonzales's response:** Water is one of the most appreciated environmental services. We tried to start with a concept that was easily understood by everyone; people can readily understand that this kind of service can and should be paid for.

Question to Gonzales: What opportunities can you provide for the transfer of these experiences? **Gonzales's response:** We are very open to share this experience – if you send someone for a month, no problem. We need a curriculum vitae, we need people with a good technical background who understand technical systems, geographic information systems, etc.

Question to Gonzales: What is the land ownership – community or private? Who can benefit? **Gonzales's response:** Kafka designed the land tenure system in Mexico; it is very complicated. But the program is open to all people, communities and private.

Question to Hou: How are payments getting to local people? **Hou's response:** Sometimes government is the buyer, and compensation is paid to the farmer. For example, a farmer will receive an annual payment from government for returning land to forest.

Question to Hou: Regarding the market for biodiversity conservation, do you include investment in forest production, including plantations? **Hou's response:** Hunting sites can occur in any forests, including plantations. Payment for hunting is one way of increasing the benefit to forest owners.

Question to Hou: How much do middle-class families pay for their water and how much of that is returned to the service provider? **Hou's response:** The cost of water varies. There is a simple rule: the more you use the higher price you pay. The price is very low for poor people, but it increases steeply the more you use.

Economic policy and financial innovation for investment in forest environmental services

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There have been many missed opportunities for greener growth. The monitoring that Sandra Brown talked about is very important, but probably more important in Asia is how the money will be used. Asia is still home to two-thirds of the world's poor. There are still many un-met needs from forests, hydrological services in particular: 600 million people in the region have to use unsafe drinking water. Official development assistance for pure environmental protection is declining at the same time as ecosystem pressures are increasing. Climate change will affect tropical countries disproportionately, and there is a risk of reduced supply of ecosystem services.

An official from one country's ministry of finance, speaking at a recent forum in Bangkok, stated: "An increase in forest cover is not a satisfactory indicator of return on investment – we need to know what services are increased as a result." It is easy to identify where the demand for environmental services lies, while the

supply comes from mainly rural communities, private landowners, and local governments. However, actual investment in environmental services is extremely rare. The concept of payments is not readily accepted in Asia; a concept of 'rewards' has better acceptance. Granting formal land use rights is one kind of reward.

Payments for environmental services are being made in some countries, including Costa Rica, Mexico and China, and there is increasing interest for an institutionalized approach in Vietnam, Indonesia, the Philippines and Nepal. It is clear that action to secure environmental services must support national development plans.

Facilitating reforestation for Guangxi watershed management in the Pearl River Basin in China under the Clean Development Mechanism of the Kyoto Protocol

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I will report a reforestation project being developed under the CDM. The project in the Guangxi watershed was listed as one of 13 projects in the World Bank's portfolio in 2004. Its objectives are to sequester carbon, enhance biodiversity conservation, improve erosion control and increase income opportunities for local people. It was established on 2,000 hectares of multiple-use forest located in the buffer zone of the Mulun National Nature Reserve. Using a range of tree species, it will sequester 700,000 tonnes of carbon dioxide equivalent and income will be generated by the sale of certified emission reduction (CER) carbon credits to the World Bank.

For it to work, the project must adopt a methodology for measuring its impact, and it must meet many conditions. The project will provide significant benefits to the communities, especially in Huangjiang county – mean net annual income will go up by 200%. Being located in the buffer zone of a nature reserve, it will also contribute to biodiversity conservation. The project has collected stakeholder comments and distributed a leaflet describing the CDM concept and its benefits. Seminars have been held in 27 villages and questionnaires used to survey a random collection of families.

Community-based ecotourism in the Betung Kerihun National Park: a promising conservation enterprise

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ITTO has been funding two projects in Indonesian Borneo to protect national parks: the Kayan Mentarang National Park, which is 1.4 million hectares in size, and the 600,000-hectare Betung Kerihun National Park. In the latter, the first phase of the project commenced in 1995; achievements included changing the reserve's status from nature reserve to national park and the development of databases on biodiversity and the local socio-economy. In the second phase, the project began encouraging community-based activities, including ecotourism.

As expressed in its ecotourism position statement, the Worldwide Fund for Nature believes that ecotourism should: be part of a wider sustainable development strategy; be compatible with the effective conservation of natural ecosystems; and involve local people and cultures to ensure they receive an equitable share of the benefits.

How can communities benefit? There are at least four mechanisms: 1) private tourism companies can employ community members; 2) communities can create and sell products to tourists; 3) local individuals can run tourism companies and support services; and 4) communities can sell foodstuffs to visitors directly or through tourism companies.

In its management plan, Betung Kerihun will be divided into several zones. The Embaloh watershed is designated for nature and educational tourism, the Apalin, Sibau and Mendalam watersheds will be allocated to cultural tourism, and the Kapuas watershed has potential to be developed for adventure tourism. Under an ecotourism development plan, communities have organized into ecotourism committees and improved business contacts with travel agents. Eco-lodges have been built in two villages, and a women's group has been organized to make handicrafts. Various activities have been conducted to strengthen the ability of communities to support ecotourism ventures. Challenges include the difficulty of access, and the lack of a consolidated board or consortium to coordinate and direct efforts in the region.

Discussion

Comment from the floor: Costa Rica identified the need to pay for environmental services early on and established that 15% of the taxes of hydrocarbons would be directed towards the payment of environmental services. Five years ago, they found that only a third of this was actually going to environmental services. In Mexico, we knew this and tried to be more realistic – establishing a specific financial organization to take the money out of the hands of the politicians.

Question to Hermayani: Are there intermediaries in the ecotourism sector and how much do they get paid? **Hermayani's response:** $670 per tourist is allocated to the people in the community according to the service they provide. The venture is supported by the Worldwide Fund for Nature Germany, which is helping to mobilize tourists in Germany. Next January it will organize a trip for ecotourism companies in Germany to assess the potential of the site.

Question to Zhang: How are the financial benefits of the CDM project to be distributed to communities? Who owns the CERs? **Zhang's response:** The distribution of benefits depends on land-use rights. In this case, the local village owns the land and leases it out to individual farmers under contract. So the benefits are distributed according to the contract; the farmers offer the land and the companies invest and provide technical input. The company owns 60% of the benefits from forestry products and the farmers get 40%. For the carbon benefits, farmers get 60% and company 40%.

Question to Zhang: The procedure to qualify under the CDM seems very difficult and complicated. Is that your experience? **Zhang's response:** Yes, the modalities and procedures are very complicated. It took us two years to qualify. By now, eight methodologies have been approved and with these we will save perhaps one year. The CDM recognizes the problem and has been trying to provide technical tools that are simpler to use. Maybe in the future the procedure will be streamlined.

SESSION 4: COMMUNITY-BASED FOREST ENTERPRISES: NTFPS AS A SOURCE OF POVERTY ALLEVIATION

Chair: Professor Chen Xuhe, ICBR

Non-timber forest products in India, their sustainable management and trade

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NTFPs have provided subsistence to forest-dependent communities in India since time immemorial, but they have come to greater prominence in the last two decades due to an increasing preference for natural product-based medicines, cosmetics, etc, and a reduction in the supply of timber and timber products. NTFPs are traditionally collected by the village poor and tribal people to meet household needs and also to generate cash income. NTFPs account for about 50% of government's total forest revenue. The direct economic contribution of NTFPs in India has been estimated to be about US$27 billion, compared to US$17 billion for wood products. A total of 13,725 plants are listed for various purposes, including medicinal, edible, cultural and material use, fibres, fodder, pesticides, gums, resins and dyes, and incense and perfumes.

Nearly 400 million people living in and around forests in India depend on NTFPs for their sustenance and supplemental income. NTFPs provide up to 50% of the income of about 30% of rural people. Individually, NTFP gatherers are at a disadvantage in the market place because: they have practically no information about market prices or the profit margins earned by middlemen and manufacturers; they often have limited time to devote to marketing; their main product is usually raw and unprocessed; and many other reasons. A number of state governments have assumed control of certain NTFPs with the aims of: preventing unscrupulous intermediaries and their agents from exploiting NTFP collectors; ensuring fair wages to collectors; enhancing revenue to the state; ensuring quality; and maximizing the collection of produce. Joint forest management was introduced in India in 1990 based on the concept of 'care and share'; it aims to encourage partnerships between state forest departments and local communities.

The challenge for governments is to devise policies that strike a balance between the livelihoods of collectors and the sustainability of NTFP harvesting. There is also a need to strengthen the link between NTFP management and joint forest management, encourage 3P approaches, and to provide greater financial support to forestry, particularly for the sustainable development of NTFPs. The application of technology in developing the processing and value addition of NTFPs can bring greater benefits to the local communities. The mass afforestation of degraded and waste lands with bamboo must be encouraged.

Bioenergy village: independent supply of heat and electricity through biomass – the experience from Juehnde, Germany

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Consultant
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Bioenergy is produced through the conversion of biomass into energy in the form of electricity or heat. We consider the key products of biomass, such as liquid and gasified fuels, as pre-products of bioenergy. Fuelwood, wood and charcoal should also be considered as pre-products for bioenergy.

Forest-based bioenergy was the subject of a conference in Hanover, Germany, in May. It concluded that: wood-based bioenergy offers countries, including developing countries in the tropics, an opportunity to improve their energy security (supply); wood industries can use wood residues for the co-generation of energy, thereby increasing the cost-effectiveness of their operations and improving energy efficiency; the use of wood-based bioenergy, both in the wood industry and generally, can help reduce greenhouse gas emissions; the wood-based bioenergy sector needs to be developed on the basis of sustainable forest management; and the international community should support the development of wood-based bioenergy in tropical countries.

Biomass offers the potential for the generation of bioenergy at the village or regional level. Various technologies are available for the generation of electric power and heat either separately or jointly. Bioenergy generated from local biomass resources not only contributes to local or regional energy self-sufficiency of energy but also enhances economic and social development.

For more than ten years in Germany, the use of forest-based and agriculture-based biomass for bioenergy has been given priority at a political level. Juehnde is a village not far from Hanover that has become self-sufficient in renewable energy. Biomass from agriculture and forests feeds a local bioenergy plant, which provides heat for village houses and generates electricity that is sold into the public grid. The plant has three essential components: 1) an anaerobic digestion plant (biogas) with a block-type thermal power station (electricity); 2) a woodchip-burning boiler (for heat to supply households); and 3) a village heating grid. Juehnde households receive a heat supply on a contractual basis and at preferential rates and are shareholders in the bioenergy cooperative, which runs the total operation at a profit. This example could serve as a model for consideration in other ITTO/FAO member countries. NTFPs, including bamboo and rattan, and other biomass resources, including timber, could be the subject of similar local or regional biomass generation projects.

Improvement of the sustainable management and utilization of NTFPs in Cambodia

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This ITTO-funded project has field sites in four provinces of Cambodia. The main objective is to improve local livelihoods by achieving the social, economic and environmental sustainable management of NTFPs. It aims to do this by helping to reorganize the local management of NTFPs, creating village associations that will strengthen local involvement in the market place. These associations will also play the role of an NTFP warehouse, lend money or rice to collectors when necessary, and negotiate in the market. The project also aims to build local capacity to better integrate local villagers in markets for NTFPs by improving existing market channels. Increasing in-migration suggests that this project is very important. Land prices are going up and people are slashing and burning to claim ownership. Increasing the value of the forest through higher prices for NTFPs, and value adding, is essential to combating this trend.

Providing village communities with basic technological training for extracting valuable essential oils from *Eucalyptus citriodora* plantations in rural areas of Congo

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Adding value to the forest is one of the main ways of generating income for local populations. In the Congo, plantations established in the 1940s can be used for the extraction of an NTFP, eucalyptus oil, for the benefit of local communities. Since the 1940s, more than 60 forest plantation species have been introduced, the main one being *Eucalyptus citriodora*.

Forest exploitation dates back to 1928, but its irrational and anarchic character pointed to the need for plantations. Several entities were created successively to manage the plantation resource, the most recent, the National Forest Service (SNR) in 1989. SNR's objectives are to carry out reforestation across the country, to produce seeds, and to improve the rural areas. Today, SNR plantations cover 31,300 hectares, composed of: 22,500 hectares of a mix of limba (*Terminalia superba*), eucalypts, pines and araucaria; 3,000 hectares of limba; 2,760 hectares of eucalypts; 1,460 hectares of pines; and 1,590 hectares of eucalypts and pines. In addition, bodies other than SNR have also established plantations in the Congo.

Research has been conducted into the extraction of eucalyptus oil by hydro-distillation. Basically, the technique involves three cylindrical chambers linked together by pipes. The first chamber contains water, and eucalypt leaves are placed in the second. The water is heated in the first chamber and the steam piped into the second. The vapour passes through the leaves and is directed to the third chamber, where it is cooled and the oil captured. The essential oil floats to the top.

Eucalypt leaves are high in essential oils. A 6-month-old plantation planted at a density of 1,111 stems per hectare produced 41 kg of oil valued at US$18,000.

We are already experimenting with communal plantations at four sites, where large eucalypt plantations already exist. We have an available workforce: 40% of Congo's population is rural. We are training communities in nursery and plantation management and eucalypt oil extraction. One of the biggest challenges is dealing with the expectations of communities. To conclude, eucalypt essential oils are a high-value NTFP which will contribute to local communities and the fight against poverty.

Current status of bioenergy from non-wood forest biomass in China

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China has adopted the following targets for bioenergy: 5 gigawatts of electrical power by 2010, and 30 gigawatts by 2020; 1 million tonnes of compressed pellets by 2010, 50 million tonnes by 2020; 200,000 tonnes of biodiesel by 2010, 2 million tonnes by 2020; 2 million tonnes of bio-ethanol by 2001, 10 million tonnes by 2020.

China has a forest area of 175 million hectares. It produces 110 million tonnes of wood residue from logging and log processing, a further 42 million tonnes of residues from wood processing, and 60 million tonnes of other wood wastes. We also grow more than 4 million hectares of plants specifically for fuel oil production, with annual fruit production of more than 5 million tonnes, and produce more than 1.5 million tonnes of natural rosins annually. There are 45 million hectares of shrub forests, mainly in the northwest and southwest, with an annual biomass production of 181 million tonnes. There are also more than 3 million hectares of firewood forests, which can produce 80–100 million tonnes of biomass per year. And there 54 million hectares of barren areas which are not suitable for farming but could be planted with trees for bioenergy production.

Technologies to convert biomass to energy are being continually improved. They fall into three categories: thermochemical, biochemical, and chemical/physical. Pellets are composed of compressed biomass and are a convenient form of energy for households, industrial boilers and power plants. They can be manufactured using a hot extruder, but this requires a relatively high level of energy. Cool pelletizing technology is a simplified process and has a lower energy demand. To date, the main use of pellets is in industrial boilers: 250 million tonnes are needed to replace one-third of the coal used in current industrial boilers in China.

More than 80% of the cost of biodiesel production is the resource base, so expanding oil-bearing plantations is important. There are already more than 300 small-scale biomass gasification systems in rural areas and some large-scale demonstration projects are being established. By the end of 2004, China's biomass power generation capacity had reached 2 gigawatts. One million tonnes of bioethanol was produced in 2005, mainly from corn and wheat. Woody biomass will be the future feedstock of bioethanol, although the processes have not yet been industrialized. The main bottleneck is the high cost of pre-treatment of the raw fibre and the production of enzymes that can decompose the fibre into glucose.

The development of biomass energy is the greatest challenge of the 21st century. By developing the sector, we will reduce global warming, improve the environment and provide the energy we need for continued development.

Promotion of tropical NTFPs in the Guangxi Zhuang Autonomous Region, China, based on sustainable community development

Xiang Dongyun (Presented by Prof. Meng Yongqing, Chinese Academy of Forestry)
Guangxi Academy of Forestry
Guangxi, China

I will describe an ITTO-funded project in Guangxi Zhuang Autonomous Region. It commenced in 2005 with the aims of: surveying the resource, utilization and marketing of NTFPs; establishing demonstrations of NTFP production; and building community capacity to manage NTFPs. The region has 12.5 million hectares of forests and, within those, abundant NTFPs, including bamboo, rattan, natural medicine, pine rosin, nuts, woody plants for oil and perfumes, flowers and fruit, bee honey, edible fungi and ecotourism. The project selected three important NTFPs for particular attention: the star aniseed tree, which produces seed oil for perfumes and

foods, as well as shikimic acid, which is of medicinal value; cinnamon, used for perfumes, foods and medicine; and pine rosin, used in paper making, etc.

To date, the project has: completed a field survey of star aniseed, cinnamon and pine rosin resources, including distribution, area and yield; established nurseries for the production of aniseed, cinnamon and pine seedlings; established a 100-hectare demonstration plantation; completed surveys on the production, processing and marketing of these products; conducted training in local communities to improve capacity for managing NTFPs; and held a regional workshop on tropical NTFPs. We have experimented with three models: state-owned forest farms (on state-owned land); village community, on community-owned land, in which households manage their own plots and sell their own products; and company-household, in which companies provide finance, seeds and technology and households provide the land and labour.

Discussion

Question to Bonazebi: What benefits has the eucalypt oil distillation project had for the community? **Bonazebi's response:** The project is still in its initial phase. The people are used to seeing plantations set up; to move on to the concept of producing citrionella oil is not difficult for them to appreciate. The local population is positive towards the project.

Question to Meng: Which of the three ownership models you outlined is most viable? **Meng's Response:** All models are important but different places need different models.

Question to Bonazebi: You mentioned that you can produce 41 kg of eucalyptus oil per hectare – is this correct? **Bonazebi's response:** yes, according to the data provided, 41 kg of essential oil were produced at an estimated value of US$18,000 per hectare.

Question to Behari: Could you elaborate on the 3P concept? **Behari's response:** When we talk about public/private partnerships, the benefit is shared by the community and the private person. The role of the government is as a facilitator. The elected rural body, the panchayat, has been given rights to the activities. When it is involved then it is a three-way partnership, everyone is able to participate in the joint venture on community land but some part of the benefit goes to the community. The Government of India has a paper on this which is being finalized now.

Question to Behari: Is the new Tribal Peoples Act an example of something that will ensure the future of NTFPs? If not, what are the problems? **Behari's response:** The Tribal Peoples Act was not mentioned in my presentation but I am ready to answer! The Act, which has been passed by the parliament, is giving land tenure rights to tribal people – 2.45 hectares per family. The rules are still being framed to ensure that the Act is not misused. What will be its effect on sustainable development? It will have an impact on timber and NTFPs but NTFP management has always been in the hands of tribal people. Within the management plan they have usufruct rights to collect NTFPs, so they are relying on the forest for their subsistence. It is difficult to predict the fate of timber and NTFPs if 40% of the land goes into the hands of the community. The intention of the Act is quite clear – it is to ensure the conservation of biodiversity and the continuance of tribal people's livelihoods.

Question to Chu: Where is the investment in bioenergy coming from? To what extent is it directed to community development? **Chu's response:** Most of the investment is coming from the central government, and also from private companies. In China, foreign investment has been introduced in some areas. If you generate electricity using bioenergy the government will pay a price for it that is higher than the cost of production. Local governments also provide assistance for setting up bioenergy-based factories by lowering local taxes.

Question to Beang: How strong is community forestry in Cambodia? **Beang's response:** In Cambodia, the law provides communities with user rights to the forest. The government has also developed guidelines on community forestry management, but it is a new thing in Cambodia and implementation in the field is still developing.

Question to Schroeder: What access might those of us in tropical countries have to the experiences you describe? **Schroeder's response:** The transfer of information is no problem at all. Juehnde village is open for visits, although it has become so popular recently that you might have to line up. We now have something called 'biomass energy tourism'. There is also a website. The University of Göttingen is also a good source of information, particularly on the basic concept of the project on all the aspects, including socioeconomic. The project was developed by the university, which is still supporting it.

SESSION 5: CURRENT CHALLENGES AND OBSTACLES IN NTFP DEVELOPMENT

Chair: Paul Vantomme, FAO

Challenges and Opportunities to Sustainable Management of Forest Resources for Non-timber Products

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There has been a major shift in forestry globally, to give more attention to the livelihoods needs of the people who live in and around forests. There is increasing pressure from society at large, and increasing appreciation of this need within the profession. In many ways the issues are not new – social forestry, joint forest management, non-timber forest products development, and a range of integrated conservation and development projects have been attempted and analyzed in an effort to achieve both conservation and development objectives. However, the emphasis has shifted toward the livelihoods objective. Where engaging local people was once seen as a necessary step to encourage conservation, now there is much more focus on improving people's livelihoods as a main objective. Where social-forestry discourse was held mainly in side meetings at forestry conferences, it is now a main focus of the agenda at many conferences and meetings. Forestry and foresters need to find ways to respond to the challenge and to take advantage of the opportunities. This presentation contributes to that objective by briefly reviewing the evolution of the "livelihoods" issue, analyzing the concept of "poverty alleviation", and then discussing means \by which forestry can contribute to livelihoods improvement, with reference to recent research. It concludes with recommendations for action in the areas of research, practical interventions, and development agency policy and government policy.

The Global NTFP Partnership

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INBAR
Beijing, China

The Global NTFP Partnership was founded by a diverse range of international and national institutions, non-governmental organizations and private companies. It aims to link global, regional and national organizations engaged in NTFP research and development in four regions – Africa, East and Southeast Asia, Latin America, and South Asia – and raise the profile of NTFPs. It has 21 members, including three from the private sector, seven NGOs, four national agricultural research centres, four international agricultural research centres, two intergovernmental organizations and one UN specialized agency. The partnership's vision is to promote collaborative efforts, synergies and economies of scale for addressing strategic issues in NTFP research and development and achieving the Millennium Development Goals. It involves a variety of organizations worldwide and encompasses a very wide range of experience and knowledge. However, it lacks a central donor and there are difficulties in ensuring that all partners are able to communicate and contribute equally.

A survey of partners identified the following priority areas for collaboration: identification of priority species in a local context; identification of NTFPs with global applications; understanding livelihood systems and policy and socioeconomic contexts for resource use and conservation; utilization patterns; product and technology innovation; and market development. Financial support towards the position of a full-time coordinator, based in New Delhi, has been secured from the Centre for International Migration and Development, Germany. In addition, the state government of Uttarakhand has agreed to establish an international NTFP centre in Dehradun, India. In close cooperation with the Global NTFP Partnership, this will add substantial resources to research capacities in the sector.

Community-based forestry enterprises: recent developments in Brazil

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Seventy-five per cent of the Amazon is owned publicly – 35% as protected areas and 40% as 'other' public land – and 25% is owned privately. Sixty-two per cent of public lands are community forests of various types, including settlement projects, sustainable development settlement, forest settlement, Quilombola settlement projects, extractivist reserves, sustainable development reserves, and Indigenous lands. There are 1,600 community forestry initiatives in the Amazon, involving, among other things, NTFPs such as brazil nut, the Açaí palm (*Euterpe oleracea*), and rubber.

The forest reform process in Brazil has proceeded in six steps: 1) making forestry a priority; 2) engaging stakeholders in forest policy development; 3) creating the legal framework for the sustainable management of public forests; 4) giving a presence to sustainable forest development in government; 5) creating a mechanism to fund the efforts; and 6) decentralizing responsibilities and actions.

Step 1 was taken by the president himself, who made moving from an environmental to a developmental agenda one of the government's top priorities. The second task was to bring stakeholders to the table. In 2004, a National Board of Forests (CONAFLOR) was formed, comprising 39 members representing communities, workers, government, academics and NGOs. Step 3 was achieved with the development of a new forestry law, which also provided the basis of step 4 (by establishing the Brazilian Forest Service), step 5 (by creating a national forest fund) and step 6 (by providing for a two-year process in which responsibility for the regulation, licensing, monitoring and control of forests – except those on federal lands – shifts to state governments). The government is also providing funds through a range of policy instruments to assist in the reforms, including the provision of credit lines for smallholders, technical assistance, and so on.

Very recently, a national strategy involving eight ministries has been developed to support NTFP market chains, and workshops have been held around the country to select priority products and actions. A national policy on community forest management is also under development.

A model law for the sustainable development of NTFPs in Central Africa

Samuel Ebamana (presented by Paul Vantomme, FAO)
Cameroon

Why do we need a model law? The unsustainable use of NTFPs leads to resource depletion. Existing forest legislation is insufficient to promote sustainability and there is confusion between customary and written laws, which sometimes leads to conflict between forest users. Several initiatives are under way to protect biodiversity and other forest resources in the Congo Basin within the COMIFAC framework.

The model law has the following components: general dispositions (object, applicability, definitions, criteria); access to NTFPs (type of access, user rights, harvesting titles with norms and procedures to obtain, content of exploitation title); NTFP market chains (harvesting, transport, processing and commercialization procedures); final dispositions (taxation, special fund); infractions and sanctions; institutional set-up and capacity building; fiscal dispositions (competent authorities, procedures for the implementation of the model law); and annexes (procedures for permit requests, NTFP identification criteria).

The next steps are to submit the draft model law to COMIFAC, adoption by COMIFAC, modification to suit particular national contexts, and approval and implementation by participating countries.

Social and economic development through microcredit: the experience of Grameen Bank, Bangladesh

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The Grameen Bank is an independent Bangladeshi financial institution owned by the poor borrowers of the bank, mostly women, which works exclusively for them. Its mission is to alleviate poverty. Why does the Bank give priority to women? It discovered that channelling finance through a woman in a household brings more benefits to the household than money entering the household through a man. When a woman has an income she wants to buy a few utensils, she wants to improve the living conditions. The immediate beneficiary is the child.

The aim of the Bank's microcredit program is to provide the poor with easy access to finance, which is to be utilized for productive and daily earning purposes. Microcredit is a very important tool for poverty alleviation. Over the Bank's three decades of operation, it has reached 79,000 villages, grown its list of borrowers from 42 to 7.3 million, expanded to 2,459 branches, dispersed US$6.5 billion, and recovered 98.6% of loans.

The Bank has proved that poor women are bankable and can be even better customers than their richer counterparts. The only preparation needed to bring them into the fold is an appropriate credit delivery and recovery mechanism. In sum, microcredit is a very effective instrument for empowering the poor, especially women. It is cost-effective and sustainable. It is a system based on mutual trust and cooperation. It creates self-employment for the poorest, particularly poor women. It creates opportunities for the poor to move out of poverty.

GROUP DISCUSSIONS

Conference participants divided into five groups to discuss specific issues related to NTFPs and ecosystem services. Each group produced a set of issues and recommendations, which are reproduced below.

Group 1: Policy and regulatory frameworks for promoting NTFPs and environmental services

Introductory points

- NTFPs are likely of greater value (economically, environmentally, socially and culturally) globally than timber products.
- What measures need to be adopted to ensure and increase the sustainable production and management of NTFPs as part of ITTO's commitment to realize the potential for the multiple use of forests?
- NTFPs provide more diversified and varied livelihood opportunities to more people than the timber trade and therefore are of greater value to communities than timber. How can this benefit be realized and shared fairly and equitably?
- ITTO currently has not developed guidelines for the sustainable management of NTFPs.
- NTFPs have great diversity and as such each country should start to develop its own criteria and indicators while there will be a need to agree on basic criteria and indicators at regional and international levels in due course.

Key issues/problems

- Clear terminology and definitions: an NTFP should come from a forest. Different countries have different situations; e.g. Cameroon fallow land, agro-products. Many definitions exist. Need to ensure that whatever term a country or organization uses, its meaning is clear.
- International trade: when gathering international trade statistics, similar issues apply to the need to clarify data collection techniques that exist within countries. International trade law requires such clarification.
- Tenure and access to land: clarification of property and user rights within and between different sovereign legal systems – civil (constitutional), customary, etc.
- Financial and fiscal mechanisms (e.g. taxation, subsidies, investment).
- Transboundary implications of NTFPs – positive aspects (e.g. China-Thailand, Indonesia-Malaysia, Liberia-Sierra Leone and Guinea).
- Applied research and development not appropriately packaged and disseminated to all relevant stakeholders.
- Lack of information dissemination.
- Insufficient capacity building, including education, training (e.g. curriculum development, marketing skills, production processing and management).
- International and regional legal obligations (e.g. contribution of NTFPs to meeting objectives of a number of multilateral environmental agreements, and World Trade Organization agreements).
- Benefits of NTFP development are not reaching the poorest.

Recommendations

1) ITTO develop guidelines for managing the sustainable and socially equitable use of NTFPs.
2) Analyse the justification for certification in promoting NTFPs.
3) Improve methodologies for the assessment of the social, economical and environmental importance of NTFPs and services in the context of sustainable forest management.
4) The development and/or improvement of legal frameworks applicable to all aspects of the production and management of NTFPs and services (e.g. tenure, access and user rights etc), involving all relevant stakeholders in this process.
5) ITTO member countries to develop cooperative agreements for sustainable management of NTFPs within common geographical boundaries.

6) Review and/or reform existing or needed financial and fiscal mechanisms for the promotion of NTFPs for the public, community and private sectors with the objective of reducing poverty.

7) Facilitate the collection and dissemination of applied research and knowledge of relevant stakeholders. Strengthen capacity building to enable the sustainable use of NTFPs to improve livelihoods.

Group 2: Social and economic contributions of NTFPs

NTFPs and environmental services are very important resources for the world's sustainability.

Main issues/problems

- NTFP and environmental services need more recognition at the national and international levels.
- There is a lack of indicator systems for monitoring the impact of sustainable NTFPs management.
- NTFPs are important for Indigenous people, especially women.
- In general, most NTFPs needs more support for research and technical development.
- There is an unfair distribution of benefits from NTFPs at the industrial level for local communities.

Recommendations

1) Governments and international organizations must recognize the importance of NTFPs and environmental services for the great number of people living in and around forests for subsistence and supplemental incomes.

2) Develop international indicator systems for monitoring the impacts of sustainable management of NTFPs on different socioeconomic and cultural groups.

3) Promote the empowerment of Indigenous people, including women, for the utilization, processing and commercialization of NTFPs.

4) Promote technical and financial support for the development of value-added NTFPs and environmental services to enhance sustainable livelihoods for rural communities.

5) Promote renewable natural resources, especially NTFPs, for industrial use with a fair distribution of monetary and environmental benefits to local populations.

Group 3: Technical improvements for value-adding NTFPs

Main issues/problems

- Major technical issues and problems exist for adding value to NTFPs.
- There is a lack of national and international standards for processing NTFPs.
- There is a lack of national and international standards for quality control of NTFPs.
- There is a lack of techniques for identifying economically and environmentally promising NTFPs.
- There have been few studies of specific features of NTFPs.
- Much of the existing information is only available in case studies carried out at the local level; international trade statistics do not always give a realistic picture of the market.
- There are no technical guidelines for sustainable management (cultivation, harvest and domestication) and use of NTFPs.
- There is a lack of knowledge and appropriate technologies for value-added processing and storing NTFPs.
- Markets are not well developed.
- Objectives and action plans have not been well defined for NTFPs.

Recommendations

1) Define objective and action plans for NTFPs.

2) Identify knowledge gaps and develop/extend technologies for the value-added processing of NTFPs, including post-harvesting techniques.

3) Develop a manual/guidelines to facilitate technology transfer on value-added NTFPs.

4) Develop appropriate standards and certifications for different groups of NTFPs at national, regional and international levels.

5) Encourage private sector involvement in technology development on NTFPs.

Group 4: Marketing and trade of NTFPs

Introductory points

- NTFPs are crucial for rural subsistence, livelihoods and contribute significantly to local, regional and international markets.
- NTFPs are often widely distributed, have largely decentralized harvesting and trade patterns and involve a large number of intermediaries.
- Some high-value, internationally traded products, such as Brazil nut, rattan, heart of palm, pine resin, maple syrup, mushrooms and bamboo, are important for regional and national economies.
- Value-chain issues (tracking the product through all stages of the production process) are central to marketing NTFPs.
- Commercialization of NTFPs, access to markets, or proximity to markets, has ecological consequences as well.
- In the future, products new to international markets might be required to meet standards for ecological sustainability and social responsibility.

Key issues/problems

- Marketing of NTFPs is disorganized.
- Absence of information about market prices, margins of profits and overall networking.
- Lack of knowledge, capacities for effective marketing.
- Lack of knowledge of sustainable harvesting, storage, market access/linkage between market and communities.
- Lack of financial support to local communities.
- Lack of grading system.
- Lack of cooperative and community marketing mechanism.
- Absence of low cost technologies for value addition system at the local level.
- Lack of data on NTFPs, their production, consumption, etc.
- Thrust on NTFPs for subsistence and not to create livelihood options.
- Lack of coherent policy framework supporting NTFP trade.
- Lack of attention at all levels on the sustainable harvesting and focused management of NTFPs.

Recommendations

1) Need for management focused on NTFPs.
2) Necessary financial support for sustainable development of NTFPs.
3) Transfer of technology for the development of processing and value addition of NTFPs.
4) Immediate need for the development of an international network for up-to-date information on NTFPs and their harvesting methodologies, prices and marketing mechanisms.
5) Capacity building for sustainable harvesting, grading, storage, market access, etc.
6) Development of an organised marketing mechanism for NTFPs with a supportive legal framework.

Group 5: Environmental Services provided by tropical forests

Introductory points

- Types of forest ecosystem services:
  - carbon sequestration (forest growth, protection), avoided carbon emissions (fuelwood)
  - hydrological services (most tangible)
  - scenic beauty/recreation
  - biodiversity support – including genetic resources
  - soil erosion control
  - disaster mitigation
  - climate buffering
  - environmental purification
  - support to agriculture and cattle (pollination).
- Objective: investment mechanism to develop demand, improve the supply of ecosystem services that add value to the forests.
- Payments for ecosystem services (PES): additional opportunities for production of timber and NTFPs.

- Establishment
  - define demand and supply
  - define use of ecosystem services in the national vision for the future
  - legal framework for recognizing ecosystem services and establishing institutional responsibility.
- Government and international demand provide core funding to establish the system, other stakeholders to ensure sustainability of funding.

Challenges

- Lack of knowledge, understanding.
- Suspicion of international demand for ecosystem services on carbon markets – perception that supply of 'ecosystem services' = 'no-use'.
- Methodologies for assessing and monitoring sustainable use.
- How to bring management/promotion of NTFPs and ecosystem services together.

Recommendations

- ITTO to support the development of:
  - capacities of monitoring and assessment of ecosystem services – to add value to tropical forests and mitigate poverty
  - effective procedure for valuation and for PES – for efficient and effective action to avoid deforestation
  - better instruments for financing ecosystem services, especially from the private sector
  - integration in national development/sectoral planning and legal frameworks.

CONFERENCE CONCLUSIONS AND RECOMMENDATIONS

Key issues

- The NTFP sector is highly diverse and, often, region- or country-specific. While a great strength, this diversity has not been helpful in communicating the importance of NTFPs to decision-makers. There is also a wide diversity of definitions of NTFPs and ecosystem services, and of the units used to measure such products and services, which hinders the development of the sector.
- Forests provide many services, including: carbon sequestration (forest growth, protection), avoided carbon emissions, hydrological services, scenic beauty/recreation, biodiversity conservation, soil erosion control, disaster mitigation, climate buffering, environmental purification, and pollination. Payments for these services can help reduce both poverty and deforestation. Recent experiences in Mexico and China show that schemes to introduce such payments are feasible within a clear national legal and institutional framework and with start-up funding.
- Governments and forestry institutions have tended to neglect research and development into NTFPs and ecosystem services, although for some products and services this is changing rapidly.
- NTFPs are important to many communities, particularly the rural poor and among women, probably much more important than available data indicate. Some high-value, internationally traded NTFPs also make significant contributions to national economies. However, the benefits of the NTFP trade are not always distributed equitably and markets are often informal, disorganized and open to exploitation.
- For many NTFPs, the value chain is not well developed and more value-adding at the local level could provide forest-based communities with significant benefits.
- The sustainable use of NTFPs and ecosystem services are key elements of sustainable forest management, but this is not always clear to forest managers. There is a lack of normative guidance on the management of many NTFPs and a need to pursue the integrated ('multiple-use') sustainable management of forests for all goods and services.
- Information on the production, use and trade of NTFPs is generally very poor at all levels. It is known, however, that NTFPs are being extracted at higher than the sustainable rate in many forests.
- A lack of clear resource tenure, access and rights inhibits the development of community-based forest enterprises. Fiscal policies and regulations are also often counter-productive to the successful commercialization of NTFPs and ecosystem services.
- Many NTFPs and ecosystem services transcend national boundaries and offer an opportunity for strengthening trade and cooperation between countries. International legal mechanisms exist that play a role in the trade of NTFPs, but not all governments make full use of this role.
- There is a suspicion among some policy-makers and forest owners and users that payments for carbon credits will mean the exclusion of other uses, such as the extraction of timber and non-timber products. However, this is not necessarily true.

Recommendations

Governments and international organizations should:

- Fully recognize the huge existing and potential role of NTFPs and forest services in sustaining and adding wealth to people living in and around forests;
- Develop action plans to promote the sustainable management, use, value adding and trade of NTFPs;
- Improve the terminology, definitions and classification of NTFPs and forest services to ensure a consistent approach to their management and trade;
- Set up an international working group to further elaborate appropriate and globally applicable classification systems for NTFPs and forest services;
- Ensure that existing law enforcement initiatives and procedures are also applied to the NTFP sector;

- Where appropriate, and within the context of each country's situation:
  - institute and support participatory processes to develop and improve legal and policy frameworks that support the production and trade of NTFPs and forest services, including by addressing land tenure, resource access, and user rights;
  - ensure that these laws and policies allow and assist Indigenous and local communities, especially women, to develop successful community-based forest enterprises;
  - ensure that such laws and policies also encourage the improved organization and equitability of markets for NTFPs and forest services at the local, national and international levels;
- Review the need for new and/or improved financial mechanisms to promote community-based forest enterprises based on NTFPs and forest services with the objective of reducing poverty;
- Support the transfer of appropriate technologies for adding value to NTFPs;
- Develop guidelines for the sustainable and socially equitable use of NTFPs and forest ecosystem services in the context of sustainable forest management;
- Strengthen capacity among local communities, government and the private sector to apply such guidelines;
- Boost research and development into NTFPs and payments for ecosystem services, including by:
  - facilitating the collection and dissemination of applied research and knowledge
  - improving methodologies for assessing the social, economical and environmental importance of NTFPs and services in the context of sustainable forest management
  - Encouraging the greater involvement of the private sector in technology development
  - identifying knowledge gaps and improving research into and the transfer of appropriate technology for adding value to NTFPs, particularly post-harvesting and processing techniques at the village level,
  - clarifying the costs and benefits of certification for all stakeholders in the NTFP value chain;
- Strengthen international networks and collaboration on NTFPs to improve the quality, availability and exchange of technical, marketing and management information; and
- Support:
  - the development of capacities for monitoring and assessing ecosystem services and payments for them as a way of adding value to tropical forests and reducing poverty
  - the development of effective procedures for the valuation of environmental services
  - the search for better instruments for financing forest ecosystem services, especially from the private sector
  - integration in national development/sectoral planning and legal frameworks.

ACRONYMS

ASEAN	Association of South East Asian Nations
CDM	Clean Development Mechanism
CER	Certified emission reduction
CFE	Community-based forest enterprise
COMIFAC	Commission in charge of the Forests of Central Africa [*Commission en charge des Forêts d'Afrique Centrale*]
FAO	Food and Agriculture Organization of the United Nations
GTZ	German Technical Cooperation [*Deutsche Gesellschaft für Technische Zusammenarbeit GmbH*]
ICBR	International Centre for Bamboo and Rattan
INBAR	International Network for Bamboo and Rattan
ITTO	International Tropical Timber Organization
NTFP	Non-timber forest product
PES	Payments for ecosystem services
REDD	Reduced emissions from deforestation and forest degradation
SNR	National Forest Service [*Service National de Reboisement*] (Republic of the Congo)
UN	United Nations

CONFERENCE PROGRAMME

International Conference on Sustainable Development of Non-Timber Forest Products and Services

6–28 September 2007

International Bamboo and Rattan Tower, Beijing, China

Organized by ITTO and CAF in collaboration with ICBR, INBAR and FAO

Time	Theme	Speaker
Day 1: Wednesday, 26 September Moderator: Prof. Shougong ZHANG, President of Chinese Academy of Forestry		
8:00 – 9:00	Registration	
9:00 – 9:50	Opening & Welcome Remarks Representative of Chinese Ministry of Commerce, Beijing, China Representative of Chinese State Forestry Administration, Beijing, China Madame Jiang Zehui, Former President of Chinese Academy of Forestry, Beijing, China Dr. Manoel Sobral Filho, Executive Director, ITTO, Yokohama, Japan	
9:50 - 10:20	Group photo Coffee/Tea break	
Session 1: Global and Regional Overview in Non-Timber Forest Products (NTFPs) Chair: Prof. Shirong LIU, Vice President, Chinese Academy of Forestry		
10:20–10:50	Global trends in NTFPs trade and their prospects for income generation	Mr. Paul Vantomme FAO, Rome, Italy
10:50–11:20	Global issues and opportunities in promoting community forest management and enterprises	Mr. Alastair Sarre ITTO, Japan
11:20–11:40	The current situation and future perspective of non-timber forest products development in China	Prof. Shougong ZHANG President Chinese Academy of Forestry, Beijing
11:40–12:00	Non-timber production and sustainable development in the Amazon [ITTO project PD 31/99 Rev.3 (I)]	Prof. Floriano Pastore, Brazil
12:00–12:20	Sustainable management of non-timber forest products (NTFPs) in Cameroon, Congo, Gabon and Central African Republic [ITTO pre-project PPD 19/01 Rev.2 (I)]	Mr. CLETO NDIKUMAGENGE Forest Conservation Programme IUCN regional office Yaoundé, Cameroon
12:20–12:40	Questions and answers	
12:40-14:00	Lunch	

Session 2: Production and Marketing of NTFPs: Product Specific Trends and Scientific Findings Chair: Ms. Coosje Hoogendoorn, DG of INBAR		
14:00–14:20	Bamboo as an important NTFP species - its resources and utilization: challenges for sympodial bamboo [ITTO Project PD 10/00Rev.2 (F,I)]	Prof. Maoyi FU, Subtropical Forest Research Institute, Fuyang, China
14:20–14:40	Development and application of new engineered materials from bamboo resources	Prof. Xuhe CHEN Advisor ICBR, Beijing, China
14:40–15:00	Potential rural communities sustainable development through bamboo forest management and utilization in Peru	Dr. Josefina Takahashi Executive Director PERUBAMBU Lima, Peru
15:00-15:20	Promoting sustainable utilization of bamboo through community participation in sustainable forest management in Myanmar [ITTO project PD 146/02 Rev.1 (I)]	Mr. Ohn Winn Director Forest Research Institute, Yezin, Myanmar
15:20–15:50	Questions and answers	
15:50–16:20	Coffee/Tea break	
16:20–16:40	Promotion of NTFPs in transboundary biodiversity conservation: lessons learned from the Lanjak Entimau Wildlife Sanctuary and the Pulong Tau National Park, Sarawak, Malaysia [ITTO project PD106/90 Rev.1 (F) and PD 244/03 Rev.3 (F)]	Dr. Paul Chai Sarawak, Malaysia
16:40-17:00	Sustainable use and conservation of NTFPs in Colombia	Dr. Renè Lòpez Camacho Universidad Distrital Francisco Josè de Caldas. Bogotà, Colombia
17:00–17:20	Development and application of production and utilization technologies for rattan sustainable development in the ASEAN member countries [ITTO project PD 334/05 Rev.2 (I)]	Dr. Marcial Amaro Director ERDB - Ecosystems Research and Development Bureau Laguna, Philippines
17:20-17:40	Questions and answers	
17:40-18:10	Break-out groups Group I: Policy and regulatory frameworks for promoting NTFPs Group II: Social and economic contributions of NTFPs Group III:Technical improvements for value adding NTFPs Group IV: Marketing and trade of NTFPs Group V: Environmental services provided by tropical forests	
18:30	Reception hosted by CAF	
Day 2: Thursday, 27 September		
Session 3: Forest services: Opportunities for Alternative Investments Chair: Mr. Emmanuel Ze Meka, ITTO		
8:30 – 9:20	Potential and challenges of carbon markets for the tropical forestry sector: market developments related to avoided tropical deforestation (video conference – including Q and A)	Dr. Sandra Brown Winrock International USA
9:20 – 9:40	Payment of environmental services provided by tropical forests: experiences from Mexico	Mr. Carlos E. González Vicente National Forestry Commission (CONAFOR) Guadalajara, Mexico
9:40 –10:00	Creating and sustaining a market for environmental services from China's tropical forests [ITTO PD 295/04 Rev.2 (M)]	Mr. Hou Yuanzhao Research Institute of Forestry Policy, Chinese Academy of Forestry, Beijing, China

10:00-10:20	Questions and answers	
10:20–10:50	Coffee/Tea break	
10:50-11:10	Economic policy and financial innovation for investment in forest environmental services	Ms. Hitomi Rankine United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP) Bangkok, Thailand
11:10–11:30	Carbon credits from reforestation for Guangxi watershed management in Pearl River basin in China under the Clean Development Mechanism of the Kyoto Protocol	Dr. Xiaoquan Zhang, Institute of Forest Ecology and Environment, Chinese Academy of Forestry, Beijing, China
11:30–11:50	Eco-tourism developments in a community-based transboundary management plan for the Betung Kerihun national park, West Kalimantan, Indonesia [ITTO project PD 26/93 and PD 44/00]	Mr. Hermayani Putera WWF Indonesia Jakarta, Indonesia
11:50-12:30	Questions and answers	
12:30–14:00	Lunch	
Session 4: Community-based Forest Enterprises – NTFPs as a Source of Poverty Alleviation Chair: Prof. Chen Xuhe, ICBR		
14:00-14:20	Non-timber forest products in India, their sustainable management and trade	Dr. Bipin Behari Ministry of Environment and Forests, New Delhi, India
14:20-14:40	Promotion of tropical non-wood forest products (NWFPs), in Guangxi autonomous region, P R. China, based on sustainable community development [ITTO project PD 73/01 Rev.5 (I,M)]	Prof. Dongyun XIANG Guangxi Forestry Academy Guangxi, China
14:40-15:00	Improvement of the sustainable management and utilization of NTFPs in Cambodia [ITTO project PD275/04 R.2 (I)]	Mr. Ly Chou Beang, Cambodia Forestry Administration, Phnom Penh, Cambodia
15:00-15:20	Providing village communities with basic technological training for extracting valuable essential oils from *Eucalyptus citriodpra* plantations in rural areas of Congo [ITTO project PD 364/05 Rev.3 (I)]	Mr. Bonazebi Pierre Ministry of Forest Economy and Environment Brazzaville, Republic of Congo
15:20-15:40	Coffee/Tea break	
15:40-16:00	Current status of bio-energy from non-wood forest biomass in China	Dr. Fuxiang CHU Chinese Academy of Forestry, Beijing, China
16:00-16:20	Charcoal supply chains in Ethiopia, Kenya and Mozambique	Mr. Jeeva Duraisany, INBAR, Beijing, China
16:20-16:40	Bio-energy village: independent supply of heat and electricity through biomass – experience from Junde, Germany	Dr. Peter Schröder Germany
16:40-17:00	Questions and answers	
17:00–18:30	Group discussions Group I: Policy and regulatory frameworks for promoting NTFPs Group II: Social and economic contributions of NTFPs Group III:Technical improvements for value adding NTFPs Group IV: Marketing and trade of NTFPs Group V: Environmental services provided by tropical forests	
19:00	Reception hosted by ITTO	

Day 3: Friday, 28 September		
Session 5: Current Challenges and Obstacles in NTFP Development Chair: Mr. Paul Vantomme, FAO		
8:30-9:20	Challenges and opportunities to sustainable management of forest resources for non-timber products (Video conference - including Q and A)	Dr. Brian Belcher Centre for Non-Timber Resources, Royal Roads University Victoria, B.C., Canada
9:20-10:00	The Global NTFP Partnership	Dr.Ralf Kwaschik, INBAR, Beijing, China
10:00-10:20	Community-based forest enterprises: Policy developments in Brazil	Ms. Márcia Muchagata Brazilian Forest Service Brazil
10:20-10:40	How best to include NTFP into the existing forest policy and regulatory frameworks: experiences from the Central African region	Mr. Samuel Ebamana Cameroon
10:40-11:00	Social and economic development through microcredit: an experience of Grameen Bank, Bangladesh	Mr. Md. Siddiqur Rahman General Manager and Chief of Audit Grameen Bank Head Office Dhaka, Bangladesh
11:00-11:30	Questions and answers	
11:30-11:50	Coffee/Tea break	
Session 6: Future Prospects for NTFP Development and Forest Services Chair: Dr. Hwan Ok Ma, ITTO		
11:50–13:00	Presentation of Working Groups Group I: Policy and regulatory frameworks for promoting NTFPs Group II: Social and economic contributions of NTFPs Group III:Technical improvements for value adding NTFPs Group IV: Marketing and trade of NTFPs Group V: Environmental services provided by tropical forests	Moderators of five working groups
13:00–13:30	Conclusions and recommendations of the conference: follow-up actions to promote tropical NTFPs and services	Mr Alastair Sarre, ITTO Mr Paul Vantomme, FAO
Session 7: Closing Plenary Moderator: Prof. Shirong Liu, Vice President, Chinese Academy of Forestry		
13:30-13:40	Closing session	ITTO CAF
13:40-14:30	Farewell lunch	

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