THEME 5:

NTFPs MODELS

Planting Medicinal Plants under the Forest Canopy: Solutions for Hunger and Poverty Alleviation and Conservation of Medical Plant Resources in Son La Province

Dinh Thi Hoa[1]

Medicinal plants represent the most diverse range of resources in Non-Timber Tree and Forest Product (NTFPs) groups, according to use targets. They grow mostly in mountainous areas in natural forest environment, however these ***natural resources are being harvested extensively by ethnic minority people*** residing in forest areas. Such communities are often poor and are economically based upon the subsistence farming of cultivated mountain fields and the harvesting of forest products.

Medicinal plants are commonly used and harvested by local farmers, who have extensive experience using them for treating disease and improving overall health. In contrast, industrially produced medicine has many limitations such as high cost, adverse side-effects, and overuse. Medicinal herbs have therefore become increasingly favoured for their low price and safety, in particular species such as Hoang Dang (*Fibraurea tinctoria* Lour), which is effective for treating aches, Sa nhân (*Amomum xanthioides*), which is used to treat digestive system problems, and other species that treat common ailments.

Due to increasing demand for medicinal plants, local farmer not only harvest these plants for personal use, but also harvest large quantities to sell commercially in both local markets and for export to other countries, especially China.

According to statistics from 2005, 2,661 tonnes of Sa nhan and 2,861 tons of Thao qua have been harvested in Viet Nam (Agriculture and Rural Development Magazine, No. 97 part I, December 2006). If conservation solutions are not quickly identified to address the over-harvesting of these natural resources, a real threat of a loss of bio-diversity will emerge, leading eventually to the extinction of some species. ***The challenge is to find ways to ensure stable incomes for mountainous farmers who are dependent on the forests, while preserving forest resources.***

In recent years, many households have planted high-value medicinal plants on their farms or under the forest canopy. This cultivation method has advantages. For example, only a short period of time is required for harvesting, and the products have high economic value. These factors have led many farmers to adopt the method.

NTFPs in Son La province

Son La is a mountainous province in the northwest of Viet Nam. Three-quarters of the topography is mountainous, therefore Son La plays a critical role in the protection of watershed forests for the Da and Red Rivers – the two biggest rivers in Viet Nam.

There are 12 ethnic minority groups in Son La province, however the majority are Thai and H'mong people (62.67 per cent). Education levels are very low, and while local livelihoods are heavily dependent on the forests, awareness of forest protection is not high, mostly due to their difficult, subsistence-based lifestyles. Therefore, forest protection issues in Son La in particular, and in the northwest area in general, should be in linked to economic development objectives and, most importantly, generating job opportunities for local farmers.

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According to a 2005 FIPI survey, Son La province has a range of promising medicinal plant species suitable for development such as Sa nhan, Thao qua, Cu Binh voi, Morinda, and Hoang dan. However, these natural resources are in danger of being over-harvested.

Sa nhan

Sa nhan is a valuable medicinal herb and is used in many countries, however it exists in a diverse range of forms in Viet Nam. According to a survey conducted by a group of researchers from Northwest University (2007) in Thuan Chau district

Photo - Sa nhan is harvested from natural forest by local farmer in Thuan Chau – Son La.

(a poor district in Son La), seven Sa nhan species grow under the forest canopy in the area, of which Red Sa nhan is the most popular and valuable. Local farmers have harvested these plants in the forest and sold them to traders at prices not equivalent to their real value. Every year, a high quantity of Sa nhan is exported to other countries.

It is widely accepted that Sa nhan can be planted in Son La, as research shows that the species grows naturally in the province. In addition, some models of Sa nhan plantations under the forest canopy have been successful in areas such as Cau Hai, Thanh Son (Phu Tho province) and Mai Chau (Hoa Binh province), where the specie's productivity reaches rather high levels of 100-200kg fruit/ha, with a value of 7–14 VND (Chu Thi Thom – Forest Product Harvesting and Plantation Techniques, Labor Publish House, 2006). But in fact, there are virtually no farmers in Son La province that can plant this species to generate stable incomes for their families.

It is feasible that guidelines could be provided for local farmers to plant Sa nhan under the forest canopy in Son La. This is an effective method for solving two problems at once: generating income for ethnic minority people living near and/or depending on forests; and preserving this species of valuable medicinal plant.

In addition, due to the ecological character of Sa nhan, it can only be grown under a forest canopy of 0.5-0.6 metres. In an area with a high density of Sa nhan under natural forest, farmers are required to protect, tend and plant additional crops. Consequently, local farmers involved in generating income from Sa nhan cultivation would need to protect the forests to ensure the growth

Photo - Hoang dang is harvested and sold at the local market

of Sa nhan. This creates a link between forest protection and income generation, and enables an effective way to support farmers in environmental conservation.

In addition to Sa nhan, local farmers can plant other valuable medicinal plants such as Hoang Dang, Long cu li, and Cu Binh voi in their home gardens or farms to generate income.

As a result, Sa nhan plantations will contribute to hunger and poverty alleviation for ethnic communities in Son la province, and contribute effectively to protecting biodiversity in general and to NTFPs resource conservation in particular.

Initial Achievements in Planting *Amomum Longiligulare* in Quan Chu Commune, Dai Tu District, Thai Nguyen Province

Nguyen Tap[1], Pham Thanh Huyen[2], Le Thanh Son[3], Ngo Duc Phuong[4] Cu Hai Long[5], Ngo Van Trai[6], Vu Van Quyet[7].

INTRODUCTION

Amomum longiligulare is a precious plant used as a traditional medicine, spice and source of aromatic material.

Viet Nam is very rich in wild *Amomum longiligulare* and at least four species are commonly used in the country, including: sa nhân (*Amomum villosum* Lour.); sa nhan hoa thua (*A. thyrsoideum Gagnep.*); sa nhan than cao (*A. ovoideum Pierre ex Gagnep.*); and sa nhan tim (*A. longiligulare* T. L. Wu) [References 1-3]. Each year, a large quantity of Amomum longiligulare is collected from the wild for the domestic market and export.

The demand for *Amomum longiligulare* is increasing, however, due to many reasons, the amount of the plant collected each year is decreasing. Therefore, research aimed at planting *Amomum longiligulare* in mountainous areas is of high concern and interest for the forestry and health sectors.

Following trials over many years, the Medica under the Ministry of Health (MoH) selected *Amomum longiligulare* T. L. Wu to be planted in

a number of localities in both the south and north of Viet Nam. This activity has produced good results.

With financial support from the Action Learning Fund (ALF) under the NTFPs Project Phase II, which is funded by the Government of the Netherlands, the Medica has implemented a sub-project entitled 'Setting up an *Amomum longiligulare* T. L. Wu model in non-farm areas in the buffer zone of Tam Dao National Park'. This is proved to be a good model suitable for replication by local farmers and the introduction of a precious medicinal plant has contributed creating more employment opportunities, increased incomes, and improved living standards for the local people.

TARGETS, LOCATION, CONTENT AND METHODOLOGY

Target

Sa nhan tim (*Amomum longiligulare* T. L. Wu), of Zingiberaceae.

Location and cultivating land

The project is located in Hoa Binh II village, Quan Chu commune, Dai Tu district, Thai Nguyen province, which is in the buffer zone of Tam Dao National Park.

Amomum longiligulare T. L. Wu was planted in fallow degraded land where tea had previously been cultivated. The total area of the selected sites measured more than 2,000 hectares and belonged to five farmers of the Dao and Kinh ethnic groups: Mr Trieu Tien Suu (4,150 m^2), Mr Le Van Tam (5,100 m2), Mr Trieu Tien Tan (3,710 m^2),

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4 Institute for Medicinal Materials
5 Institute for Medicinal Materials
6 Institute for Medicinal Materials
7 Tam Dao National Park

Mr Trieu Tien Lap (3,610 m^2) and Ms Dinh Thi Thin (3,520m^2).

Content

- *A.longiligulare* T. L. Wu was grown by tillers and project participants examined and measured the rate of germination, growing and flowering and fruiting process.
- Training was provided to the households on planting, tending and maintaining techniques etc, so they could continue to give guidance to others.

Research methodology

The Chinese method of growing *A.longiligulare* was customised to suit conditions in Viet Nam. Observations were carried out every two months to examine the number of tillers per cluster, the height of the plants and the measurements of its green leaves/tillers. This information was processed into a standard statistical analysis that could be easily disseminated to the farmers.

RESEARCH AND DISCUSSION RESULTS

Seeds, soil preparation and planting methods

- Planting material: Young and medium tillers of the plant (*Amomum longiligulare* T. L. Wu) collected from the wild in Dak Lak province. The tillers were separated from the plant and the top growth and roots of the tillers were removed, leaving only a stem measuring 40-50 cm.
- Soil preparation: Soil was prepared in the middle of October 2004 after site selection. Project staff gave instructions to farmers to remove small woody trees and their stumps, weeds and bushes (leaving coverage of 10-30 per cent), and to dry and burn the removed material. The soil was then excavated, rocks removed and 30-cm deep pits dug every one metre, which were fertilized with composted manure (201 tonnes per hectare).
- Planting season ranged from November 15 to December 15, 2004
- Method: One tiller was vertically planted in each hole on a base of manure, which was covered with a 10-cm layer of soil and then compacted with pressure from the planters' feet. Since the plants were planted in winter, they had to be watered immediately after being placed in the soil. The total project area of more than two hectares was cultivated with approximately 20,300 *A.longiligulare* T. L. Wu tillers. In 2005, two phases of additional planting were conducted, comprising 300 new tillers each time, to replace plants that had died.

Tending, protecting and monitoring

As an Action Learning sub-project, the planting process was introduced to farmers by staff of Medica through two training courses (with handouts delivered to the farmers), and work was carried out by both the staff and farmers.

To protect the plants from animals, the cultivated area was fenced and regularly monitored. the tending process included watering, weeding every two-to-three months (for the first year), and the use of a herbicide. In addition, an additional fertiliser (NPK-S 10:5.3.13 from the Lam Thao Company) was applied twice in October 2005 (one tonne per two hectares) and in May 2006 (0.5 tonne per two hectares). The fertiliser was applied evenly around the root after weeding.

Monitoring was conducted every two months by counting the number of tillers/clusters, measuring the height of the tillers and counting the number of green leaves/cluster. This work was carried out within sample plots of 100 m2. One out of every five plots from each farmer was selected (of a total of five plots). In each plot, the statistics were recorded from 35-50 clusters each time. These figures were compiled in tables and averages calculated from the statistics.

Growth and development of cultivated *Amomum longiligularetim*

- Germination duration: from 1.5 to three months (by March 30, 2005)
- Germination rate: highest rate 83.4 per cent; lowest rate 76.0 per cent; during additional planting in April 2005, germination rate reached 90 per cent

The first flowers started appearing in some clusters 17-18 months after planting. For those planted between February and April, flowers only appeared 20-24 months after planting. Though it was a sub-season (autumn-winter), only a small percentage of clusters produced flowers and fruits. This is a problem that had not been encountered before or mentioned in any published documents

By March 2007, some flowers were observed and on May 12, when the Amomum longiligulare was 29-30 months old, the following data was recorded:

Observations of the growth of Amomum longiligularetim

Data / Date	Average number of tiller per cluster	Average height (cm)	Average number of green leaves/ plant	Note
2-3/3/2005	1.09	7.94	2.78	37.02% clusters not germinated yet
13-14/5/2005	1.31	19.48	6.11	16.60% ingeminated clusters
5-6/7/2005	2.32	23.56	7.16	Well germinated, started tillering
3-4/10/2005	3.77	70.38	12.03	Well tillering. Quick development in height and number of green leaves/tillers
6-7/12/2005	4.81	71.06	12.9	Continued tillering but slow development in height and number of leaves
22-23/2/2006	5.02	73.35	13.01	Good tillering but slow development in height and number of leaves (winter time)
19/5/2006	11.21	95.81	14.9	Good growth and development (spring-summer)
7/2006	Could not count			Excellent tillering impossible to see separate clusters
6/8/2006	Could not count			Some started flowering.
12/9/2006	Could not count			Some still flowering
12/2006	Could not count			Some already produced fruits while flowering still going on
4-5/2/2007	Could not count			Some ready fruit left, first shoots appeared, in yellow and withered away
19/3/2007	Many new shoots and roots appeared			New shoots appeared in the season I/2007

- 39.96 tillers/sqm, of which 9.27 tillers were in bloom or producing young bud/spm (23.19 per cent); and
- Each tiller had 1.76 clusters of flowers or buds.

This was the first crop of *Amomum longiligulare* planted in Quan Chu. From 2008 onward, the plants will produce more flowers and fruits and reaching a stability in its yeild.

Results of support given to farmers

With specific guidance provided by the sub-project staff, all five households could master the required cultivation techniques, including soil preparation, tending and growth monitoring. Apart from the technical handbook, a log book was used to record all activities conducted.

Outputs of the monitoring and evaluation visits by the ALF management showed that all the households knew the techniques very well and were even be able to provide guidance to other households.

OTHER MAJOR RESULTS

Increasing interest in the community

The model of one hectare of *Amomum longiligularetim* in Hoa Binh II, Quan Chu commune drew a substaintial amount of attention from many farmers. Though the harvest time is yet to come, many households have expressed interest in planting *Amomum longiligularetim* because many of them have fallow land.

During the workshop and field visits, which involved four stakeholders (scientists, managers, farmers and enterpreuners), in Quan Chu in November 2006, the following important conclusion was made: “There is a need to expand the model of *Amomum longiligularetim* in the local area. Enterprises are committed to buying the products produced from the models”.

Development of technical manuals and communication activities

- Based on the results from the sub-project and in combination with earlier reseach, some technical materials for wider dissemination have been produced, including:
- Technical procedures for planting *Amomum longiligularetim*;
- Colour leaflets on planting *Amomum longiligularetim* with condensed, easy-to-undertand contents;
- A technical book on *Amomum longiligularetim*, financed by the NTFPs Project Phase II, which will be published soon; and
- A 15-minute news programme on planting *Amomum longiligularetim*, which was produced in cooperation with Viet NamTelevision. This programme will be broadcast during an episode of "Cùng với nông dân bàn cách làm giàu" on VTV.

CONCLUSION

After two years, the sub-project entitled 'Setting up a *Amomum longiligulare* T. L. Wu model in the buffer zone of Tam Dao National Park in non-farm areas' has achieved the following targets as planned.

1. Successful planting of *Amomum longiligularetim* on non-farm land in the buffer zone of Tam Dao National Park with a total area of more than two hectares. The plant grew very well and produced its first flowers 17-18 months after planting. At present (April, 2007), the second round of flowering is continuing and looks set to be a very productive season.
2. Due to special conditions, *Amomum longiligularetim* was planted in winter in contrary to the normal practice, but with great efforts by the involved parties, the plant has proved to grow very well. This has contributed new scientific evidence on planting *Amomum longiligularetim* in Viet Nam(i.e. it is possible to plant it in winter and the plant produces flowers after 18 months).
3. While only intended as a demonstration model, the sub-project has been initially successful in providing technical guidance and transfering knowledge to project particpants, and drawing increased attention from farmers and related sectors.

4. the sub-project has produced some useful technical materials, including a handbook, leaflets, and TV programme, which will be widely disseminated to promote Amomum longiligularetim across the country.

The sub-project has been completed, however, there is a need for financial support from other donors to expand Amomum longiligularetim planting areas in Quan Chu in order to produce more products for the market and contribute to imporoving the local people's livelihoods.

ACKNOWLEDGEMENT

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Development of Special Fruit Tree Models from Three Species: *Pimela alba, Castanopsis boisii* and *Anise*

Hoang Le Minh[1]

INTRODUCTION

For a long time, *Pimela alba*, *castanopsis boisii* and *Anise trees* have been popular NTFPs, providing high levels of nutrition and export value. However, creating plantations of these trees from seeds has met with many problems, such as the long period of time required before trees are ready to be harvested, difficulties in generating fruit (a lack of male trees), and the large height of the trees, which creates difficulties in the harvesting process.

In the recent years, the Forestry Nursery Enterprise in the Northern East Region has applied new technologies and bred the above trees through cloning mother trees with outstanding results. Cloned trees avoid the disadvantages of seedling trees and provide fruit in a shorter period of time, a factor making them more suitable for poverty alleviation among forest-dependent people.

In order to disseminate the results of this research, it is necessary to develop this experiment into a model, document the lessons learnt, develop the model and replicate the technology to other provinces.

In the last two years, the project has provided local people with guidance in creating forest plantations in accordance with the model and involved enterprises in product consumption to ensure that this model is of high quality. The project also developed manuals and organised workshops to disseminate the achieved results and models to people in the targeted communes and neighbouring localities.

IMPLEMENTATION

The project was implemented by developing the plantation model in Lung Xa village, Tan Doan commune, Van Quan district, Lang Son province, from which it can be expanded into the other regions. The direct beneficiaries from the trees planted in the demonstration sites are households directly involved in the project and indirect beneficiaries such as the organisations, institutions and individuals who use the model's materials and/or vision as specific agricultural extension materials. Through this project, the Forest Nursery Enterprise proved the value of the research and the ability for model replication and expansion.

The model was implemented in a three-hectare area managed by a group appointed by local households, which received support from staff of the Forestry Nursery Enterprise and communal People's Committee. Participating households were both the implementers and managers during the model development period and after the project's phasing out.

The project was carried out between January 2005 and May 2007, and encountered a range of advantages and difficulties during this period.

Advantages

- The Forestry Nursery Enterprise selected Lung Xa village, Tan Doan commune for the development of a model for the three above-mentioned trees and was highly supported by different levels of authority, from the district People's Committee and communal People's Committee, to the Village Management Board and community in general.

1 Forestry Nursery Enterprise in the North-East Region

- Residents in the project site, third zone, mainly comprise tay ethnic minority people and their accessibility to technological advances in agro-forestry production was still limited. There was no electricity in the region, little land for cultivating rice, and old, inefficient cultivating practices were still widely employed.
- Despite low levels of knowledge and inadequate information on technological advances, local people enthusiastically participated in the project and took advantage of the opportunity to learn new ideas and techniques.
- Staff members at the district and commune levels strongly support the implementation of the project model.
- The selected site had appropriate conditions in terms of soil and climate suitable for the trees identified for the model, which were indigenous trees in the region.
- For the first time, the implementation of the model for the selected trees changed the cultivation practices of the local people, and helped them to be more involved with scientific and technological advances.

Disadvantages

- The outdated cultivation practices of the local people, limited land for production, and no progress in the application of technological advances presented serious obstacles to the project's success.
- The unrestricted wandering of buffaloes and cows through the model's plantation areas had serious impacts on protecting the project trees.
- The slope of the area where the project was being developed was quite steep, which presented difficulties for the model's implementation. an area was identified with more flat terrain, but it was located far from town, which would have presented difficulties in transportation and tree maintenance.
- In recent years, the weather in the area has become more challenging for agroforest activities, with long periods without rain becoming increasingly common (there were around eight months in 2005 without rain). This presented unexpected challenges in terms of cultivating the trees adequately.

MAIN ASPECTS OF THE PROJECT

- In the early days of the project, Forestry nursery enterprise staff held many village meetings to discuss ways to implement the model, which included selecting a group of households located close together that were able to provide an enthusiastic labour force ready to adopt new ideas and technological advances.
- Technical training was provided to selected households in selecting appropriate land for cultivation, site preparation (including clearance activities to limit the slope), digging holes in the field site, fertilising and filling in the holes in a specific tortoise-shell shape, etc.
- A temporary nursery garden was then prepared to house the young trees at the field site, taking into consideration the local weather conditions. after work began at the site, study tours were organised for villagers to visit models from other enterprises and provinces. by observing first-hand the development of new cultivation models, the villagers became more confident and trusting in the forestry nursery enterprise model.
- When weather conditions allowed, which included adequate water levels, forestry nursery enterprise staff trained the participating households in correct planting techniques to ensure high growth rates among the young trees. after 30 days, the households had to check and replant any trees that had died.
- Forestry nursery enterprise technical staff collaborated with the villagers to make a protective fence using existing materials and thorn trees around the model area to avoid the trees being damaged by roaming buffaloes and cows.
- Local people participating in the project were introduced to a wide range of techniques to take care of the trees after planting, including regular pruning of the wild shoots, cutting of wild

grass, fertilising regularly on a seasonal basis in accordance with technical guidelines, and spraying pesticides.

- Exchange visits and workshops were organised to introduce local people to businesses and other potential consumers of their products to ensure post-harvest consumption.

ACHIEVEMENTS

After two years of implemetation, the model has obtained some primary achievements.

- In order to ensure better results than traditional practices, local people should be provided with access to information and technological advances during the first stages of cultivation.
- On-the-job training together with technical guidance helped the local people to apply technological advances in plantation.
- Field site techniciens and the local people had regular meetings to exchange information and ideas on forest development, methodologies and cultivation techniques on sloping land. Other topics included the production and planting of NTFPs on appropriate land to increase income, educating local people on the effectiveness of planting on sloping land, and discussions regarding mixed plantations of short-term trees and forest trees.
- The project found that local people are able to cultivate high-quality breeding trees that can achieve good results.
- During the first year, the project chose to plant Acacia to provide shade for the three types of trees used in the model. However, during implementation, villagers suggested Dau Thu coc be used instead of Acacia because they had been planting it for many years with good results.

SOME PENDING ISSUES

The traditional pratice among people living in mountanous areas to allow livestock to wander in the winter affected the quality of the model's outcomes. The protective fence was damaged by the cattle and some trees in the model area were destroyed as a result.

Some households also did not take care of the trees according to the technical guidelines and planted short-term crops (corn) in the area intended for the principal trees identified for the project. As a result, some of the principal trees in the area were affected.

ASSESSMENT, CONCLUSION AND RECOMMENDATION

General assessment

During the project, the Forestry Nursery Enterprise in the North-east Region regularly followed up the implemention of activities as scheduled and in accordance with techncial and quality requirements.

The funds allocated to carry out the activities were used appropriately and in line with the approved cost norm.

Currently, almost all of the model trees are growing in normal conditions and trees that have died have been replaced. Some households take care of the trees well, while others do not. During the last season, some Castanopsis boisii trees bore flowers, which encouraged local people to increasingly believe in the effectiveness of the model.

Conclusion

In recent years, forest-dependent people have begun to learn how to plant forest trees of high economic value that have shorter flowering periods and produce fruit favoured by the market. These products have contributed to improving living standards among mountainous people.

Under the framework of the project and with financial support from the NTFPs Sector Support Project Phase 2, the model for three special, early harvesting fruit trees developed between the Forestry Nursery Enterprise in the North-east Region and local people in Lung Pa village was well recogised and received a good response from

the community.

The project introduced these mountainous people to new information, technology and enterprise models, thereby providing a new sustainable direction to improve the incomes of forest-dependent people.

Recommendation

As the project was implemented during a very short period of time, it is difficult to assess appropriately the effectiveness of the forest tree model used. Forestry Nursery Enterprise will continue to provide guidance and support the households involved in the project in the years ahead in order to achieve the objectives of the initiative.

THEME 6:

SUSTAINABLE HARVESTING

Sustainable Wild Collection and NTFPs – the International Standard for Sustainable Wild Collection of Medicinal and Aromatic Plants (ISSC-MAP)

Danna J. Leaman[1], Britta Pätzold[2] and Thomas Osborn[3]

INTRODUCTION

Forests provide various goods and services for human beings, including non-timber forest products (NTFPs), which play an important role as a source of medicines, food and construction materials, and provide income opportunities for local households. NTFPs are collected from the wild in large quantities world-wide.

Nevertheless, according to Shanley et al. (2002) NTFPs have long been 'invisible' to, or undervalued by many government policy-makers, non-governmental organizations (NGOs) and scientific researchers, most of whom have directed the bulk of their attention toward wood-based forest products. The authors conclude that as a result the economic significance of NTFPs is poorly documented and relatively little information exists concerning their ecology, use and management. There is, however, growing recognition of the important economic, social and ecological values of NTFPs, and the complementary roles they can play to timber, agriculture and other land uses. NTFP harvests can have lower impacts on forest ecosystems than other uses, provide a range of social and economic benefits to local groups, and are potentially compatible with efforts to integrate the use and conservation of biodiversity (Shanley et al, 2002).

Efforts to conserve forest biodiversity as the basis for health care and income generation increasingly include programmes on sustainable management and use of NTFPs. However, growing demand for plant material, including NTFPs, directed for example to the pharmaceutical and cosmetic sectors, together with land conversion and habitat loss are putting pressure on these natural resources. Based on a review of published medicinal floras, Schippmann, Leaman & Cunningham (2006) estimate that 50,000 to 70,000 plant species are used in traditional and modern medical systems throughout the world, many of those collected from forests[4]. The same authors propose that approximately 3,000 medicinal and aromatic plant (MAP) species are involved in international trade, based on the number of documented species imported to and exported from Germany and other major centres of MAP trade. The great majority of MAP species in trade is wild-collected (Lange & Schippmann 1997; Srivastava, Lambert & Vietmeyer 1996; Xiao Pen-gen 1991).

The dominance of wild-collection is likely to continue over the long term due to numerous factors, including: (1) Little is known about the growth and reproduction requirements of most MAP species, which are derived from many taxonomic groups for which there is little or no experience of

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4 Definitions of use of plant species often overlap. In this document the term 'medicinal and aromatic plants (MAP)' includes plants used to produce pharmaceuticals, dietary supplement products and natural health products, beauty aids, cosmetics and personal care products, as well as some products marketed in the culinary/food sector.

cultivation; (2) The time, research, and experience leading to domestication and cultivation are costly, and relatively few MAP species have the large and stable markets required to support these inputs; (3) In many communities where wild collection of MAP is an important source of income, land for cultivation of non-food crops is limited. Moreover, cultivation (particularly on a commercial scale) may provide fewer social and economic benefits than wild collection of MAP species (Leakey & Izac 1997). Wild collection of MAP secures valuable income for many rural households, especially in developing countries, and is an important factor in the source countries' local economies (Schippmann et al. in press). Sustainable wild-collection of MAP species is therefore an important economic, social, health, and conservation priority.

The concept of "sustainable use" reaches beyond environmental and ecological well-being of species and ecosystems to include social equity, basic livelihood security, and ethical relationships between governments, businesses, and communities. In recent years a number of initiatives have been launched to achieve a better framework for the sustainable use of biological diversity, particularly the Convention on Biological Diversity (CBD) (UNEP 2001). Under the CBD, more specific guidance for the ecological, socio-economic, and equity basis for conservation and sustainable use of biodiversity has been articulated in the Ecosystem Approach (CBD 2000), the Bonn Guidelines on Access to Genetic Resources and Fair and Equitable Sharing of the Benefits Arising out of their Utilization (CBD 2002a), the Global Strategy for Plant Conservation (CBD 2002b) and the Addis Ababa Principles and Guidelines for the Sustainable Use of Biodiversity (CBD 2004).

This broad notion of sustainability has been adopted in existing norms, standards, and guidelines that are relevant to wild collection of MAP (and therefore several NTFPs), including: the Forest Stewardship Council (FSC), the International Federation of Organic Agricultural Movements (IFOAM), and the Fairtrade Labelling Organizations International (FLO)[5] . Other relevant models include natural resource co-management agreements with indigenous communities, and access and benefit sharing arrangements between genetic resource users and providers.

More specifically focusing on medicinal plants, the 1993 WHO/IUCN/WWF Guidelines on the Conservation of Medicinal Plants (WHO, IUCN & WWF 1993) and the 2004 WHO Guidelines on Good Agricultural and Collection Practices (GACP) for Medicinal Plants (WHO 2003) provide general guidance and principles for the development of a global framework of practice standards for MAP. Of these documents, only the 1993 Guidelines directly address ecological and socio-economic/ equity issues related to sustainable wild harvest, and these are now out of date. WHO, IUCN, WWF and TRAFFIC are currently working together to revise these Guidelines through an international consultation process, and with the intent to incorporate broader guidance and principles related to sustainable use of biological diversity, access and benefit sharing, and fair business practices. Publication of these revised and updated Guidelines is anticipated in 2007.

Existing principles and guidelines for conservation and sustainable use of medicinal plants address primarily the national and international political level, but only indirectly provide the medicinal plant industry and other stakeholders, including collectors, with specific guidance on sustainable sourcing practices. For example, the revised WHO/IUCN/WWF/TRAFFIC Guidelines on the Conservation of Medicinal Plants will provide general principles addressed primarily to governments and other political stakeholders, NGOs, international government organizations (IGOs), and businesses worldwide. These guidelines call for the development of concrete practice standards and criteria for the conservation and sustainable use of medicinal plants as a

5 For a summary and analysis of efforts to consider the relevance and application to NTFPs of various models aimed at certification of sustainable wild collection, see Shanley et al. (2002).

practical interface between the general principles set out in the Guidelines, and management plans that must be developed for particular species and specific situations.

Recognizing a gap in the tools available to define sustainable wild collection, and to put it into practice, an International Standard for Sustainable Wild Collection of Medicinal and Aromatic Plants (ISSC-MAP) has been developed by a partnership of conservation authorities and organizations, namely WWF, TRAFFIC, the Medicinal Plants Specialist Group (MPSG) of the World Conservation Union IUCN, and the German Federal Agency for Nature Conservation BfN.

Compared with timber, food crops, and other products currently included in FSC, organic and other sustainable use certification schemes, wild collection of MAP presents some weighty challenges, including: the large number and diversity of taxonomic groups, each with unique circumstances of ecology, habitat, and pressures on the resource; the need to develop good collection practices specific to each species and situation; unpredictable and often unrecognized environmental factors that influence annual yield of wild populations; unclear land and resource tenure and management authority; the large number and variety of products, uses, and markets; and long, complex supply chains between sources and markets. Added to these challenges are limited recognition of the economic, social, and ecological value of wild MAP resources, and a widespread uncertainty about who is responsible for ensuring that wild MAP resources are used sustainably.

DEVELOPMENT OF THE ISSC - MAP

As noted above, the process to elaborate the International Standard for the Sustainable Wild Collection of Medicinal and Aromatic plants (ISSC-MAP) is a joint initiative of WWF, TRAFFIC, the Medicinal Plants Specialist Group (MPSG) of the World Conservation Union IUCN, and the German Federal Agency for Nature Conservation (BfN). These organizations formed a steering group to oversee the development of the standard, and brought together an international, interdisciplinary Advisory Group to involve relevant stakeholders from ecological, socio-economic and fair-trade sectors in the process of developing and testing the Standard[6] . The Advisory Group members' specific expertise and advice on the content of the standard, the development of practical guidance, and the opportunities to harmonize the development of this standard with other relevant standard frameworks will continue to be applied as the Standard is implemented and further refined.

A first draft of this standard was completed in November 2004 for discussion with members of the Advisory Group (Leaman 2004). The first draft consisted of four separate practice standards[7] (I. Ecosystem and MAP resource management; II. Wild collection of MAP resources; III Domestication, cultivation, and enhanced in situ production of Map resources; and IV. Rights, responsibilities, and equitable relations of stakeholders). The first draft was presented during the World Conservation Forum of the 3rd IUCN World Conservation Congress in Bangkok in November 2004. A first expert workshop on the Isle of Vilm (December 2004) provided a discussion forum for the members of the Advisory Group on this first draft standards document and other process related issues.

A second draft, distributed to the Advisory Group in April 2005, condensed the original four practice standards into a single standard with ten principles, related criteria, and proposed indicators (Leaman & Salvador 2005). Based on comments from the Advisory Group, a field consultation phase late in 2005 (Salvador 2005), and a second workshop on the Isle of Vilm in December 2005[8], ISSC-MAP version 1.0 was made available in February 2007.

6 A current list of members of the Advisory Group is available on the project website: http://www.floraweb.de/map-pro/.

7 The first draft MAP standard was loosely modelled on the structure of the Marine Aquarium Council (MAC) "Core Standards and Best Practice Guidance for the Marine Aquarium Trade" (MAC 2002), and on the Working Draft ABS Management Tool currently under development by the State Secretariat for Economic Affairs (SECO), Government of Switzerland (SECO 2005)

8 Summaries of the field consultation and minutes of the Vilm workshops are available on the project website: http://www.floraweb.de/map-pro/.

RESULTS: ISSC – MAP VERSION 1.0

Version 1.0 of the Standard was launched at the international organic products fair BioFach, which took place in Nuremburg, Germany, in February 2007 and is now available for application to plant collection operations.

The purpose of the ISSC-MAP, as defined by the Advisory Group, is to ensure the continued use and the long-term survival of MAP species and populations in their habitats, while respecting the traditions, cultures and livelihoods of all stakeholders. The objectives of the standard are: to provide a framework of principles and criteria that can be applied to the management of MAP species and their ecosystems, to serve as a basis for monitoring and reporting, and to recommend requirements for sustainable wild collection of MAP. ISSC-MAP Version 1.0 has six principles and 18 criteria, addressing ecological, social, and economic requirements for sustainable wild collection of MAP. These are listed in Table 1. The criteria are complemented by more than 100 indicators as well as suggestions for methods of verification. The Standard focuses on ecological aspects that are often neglected: the need for thorough but cost-effective resource assessments and the determination of sustainable yields.

Table 1. ISSC-MAP Version 1.0 (2007): principles and criteria

SECTION 1: WILD COLLECTION AND CONSERVATION REQUIREMENTS
Principle 1. Maintaining Wild MAP Resources Wild collection of MAP resources shall be conducted at a scale and rate and in a manner that maintains populations and species over the long term.
Conservation status of target MAP species The conservation status of target MAP species and populations is assessed and regularly reviewed. 1.2 Knowledge-based collection practices MAP collection and management practices are based on adequate identification, inventory, assessment, and monitoring of the target species and collection impacts. Collection intensity and species regeneration The rate (intensity and frequency) of MAP collection does not exceed the target species' ability to regenerate over the long term.
Principle 2. Preventing Negative Environmental Impacts Negative impacts caused by MAP collection activities on other wild species, the collection area, and neighbouring areas shall be prevented.
2.1 Sensitive taxa and habitats Rare, threatened, and endangered species and habitats that are likely to be affected by MAP collection and management are identified and protected.
2.2 Habitat (landscape level) management Management activities supporting wild MAP collection do not adversely affect ecosystem diversity, processes, and functions.

SECTION II: LEGAL AND ETHICAL REQUIREMENTS
Principle 3. Complying with Laws, Regulations, and Agreements MAP collection and management activities shall be carried out under legitimate tenure arrangements, and comply with relevant laws, regulations, and agreements.
3.1 Tenure, management authority, and use rights Collectors and managers have a clear and recognized right and authority to use and manage the target MAP resources.
3.2 Laws, regulations, and administrative requirements Collection and management of MAP resources complies with all international agreements and with national, and local laws, regulations, and administrative requirements, including those related to protected species and areas.
Principle 4. Respecting Customary Rights Local communities' and indigenous peoples' customary rights to use and manage collection areas and wild collected MAP resources shall be recognized and respected.
4.1 Traditional use, access rights, and cultural heritage Local communities and indigenous people with legal or customary tenure or use rights maintain control, to the extent necessary to protect their rights or resources, over MAP collection operations.
4.2 Benefit sharing Agreements with local communities and indigenous people are based on appropriate and adequate knowledge of MAP resource tenure, management requirements, and resource value.
SECTION III: MANAGEMENT AND BUSINESS REQUIREMENTS
Principle 5. Applying Responsible Management Practices Wild collection of MAP species shall be based on adaptive, practical, participatory, and transparent management practices.
5.1 Species / area management plan- A species / area management plan defines adaptive, practical management processes and good collection practices.
5.2 Inventory, assessment, and monitoring Management of MAP wild collection is supported by adequate and practical resource inventory, assessment, and monitoring of collection impacts.
5.3 Transparency and participation MAP collection activities are carried out in a transparent manner with respect to management planning and implementation, recording and sharing information, and involving stakeholders.

5.4 Documentation

Procedures for collecting, managing, and sharing information required for effective collection management are established and carried out.

Principle 6. Applying Responsible Business Practices

Wild collection of wild MAP resources shall be undertaken to support quality, financial, and labour requirements of the market without sacrificing sustainability of the resource.

6.1 Market / buyer specifications

The sustainable collection and handling of MAP resources is managed and planned according to market requirements in order to prevent or minimise the collection of products unlikely to be sold.

6.2 Traceability

Storage and handling of MAP resources is managed to support traceability to collection area.

6.3 Financial viability

Mechanisms are encouraged to ensure the financial viability of systems of sustainable wild collection of MAP resources.

6.4 Training and capacity building

Resource managers and collectors have adequate skills (training, supervision, experience) to implement the provisions of the management plan, and to comply with the requirements of this standard.

6.5 Worker safety and compensation

MAP collection management provides adequate work-related health, safety, and financial compensation to collectors and other workers

DISCUSSION: THE SCOPE OF APPLICATION AND IMPLEMENTATON OF THE ISSC-MAP

Moving from the development phase to implementation, new structures are required for governance and management of the ISSC-MAP. With four additional members the steering group has added certification and business expertise and expanded its regional expertise. A technical committee drawn from members of the Advisory Group is being established to advise the steering group on specific issues related to implementation and further development of the Standard.

The aim for the Standard continues to be that it should be applicable to the wide array of geographic, ecological, cultural, economic, and trade conditions in which wild-collected MAP are found. It addresses wild collection of MAP materials for commercial (rather than subsistence, or local use) purposes. The standard focuses on good ecological practices but also aims to support responsible social standards and business practices that affect collectors, collection operations, and the environments in which MAP resources are collected. Harmonization with appropriate ecosystem, fair trade, production, product quality, and other relevant standards is considered an important avenue for developing and implementing this standard.

The Standard's developers recognise that, for it to be successfully implemented, the ISSC-MAP must be relevant and practical to different scales of

operation, from autonomous groups of collectors to enterprises fully supported by large companies; and from low-volume collection to large-scale collection operations. In the further development of this standard, the costs associated with field assessment, monitoring, and evaluation must also be considered, as well as the requirements of existing or new institutions and resource management authorities.

In a study on potential implementation scenarios for the ISSC-MAP, carried out in early 2006, approximately 70 experts world-wide were interviewed. Based on the outcomes of this study, four priority implementation strategies have been identified: Certification, Resource Management, Voluntary Codes of Practice, and Legal Adoption and Policy. The initial implementation phase (2007-2008) will focus on these four priority strategies, evaluating the relevance and feasibility of these alternative applications of ISSC-MAP in different regions and at different scales of operation. The issue of whether voluntary approaches or local labelling schemes might develop into a more rigorous certification framework will also be examined, and how these efforts might best be harmonized with existing relevant frameworks, such as sustainable forest practices, organic agriculture, and product quality standards.

During this phase, an emphasis will also be placed on increasing awareness of the Standard among potential ISSC-MAP users, encouraging participation of potential ISSC-MAP users in the process of further developing and implementing the Standard, ensuring the credibility of the overseers of the Standard, establishing mechanisms to ensure the accountability of the users of the Standard and assessing the willingness of industry and consumers to support additional costs associated with applying the Standard.

Additional guidance will also be developed. for some elements, for example methodologies for rapid resource assessments, and experiences gained will also be used to further refine the Standard, with Version 2.0 to be produced in 2009.

In Viet Nam, as well as the wider region, there is considerable evidence harvested directly from the wild, not only for use in local traditional medicine and income-generation, but also increasingly as part of commercial projects (Walston and Ashwell in press; Nguyen Dao Ngoc Van and Nguyen Tap in press). Whether or not such actions are sustainable is often overlooked, often to the detriment of the species and those communities that rely on them, until resources become very difficult to find and, as with some well known species, almost impossible to find in the wild.

Several species that may be threatened directly by unsustainable harvesting include the widely-distributed plant Yellow vine Coscinium spp. from which the chemical 'berberine' is extracted, and used traditionally for stomach upsets. This species have been over-harvested in Viet Nam to such an extent that plants are now rarely found and commercial use is now restricted under national legislation (Nguyen Tap pers. com. 2007). Coscinium spp. are now harvested from Laos and Cambodia to supply enough berberine for demand both from Viet Nam and the large Chinese traditional medicine market. The development of sustainable harvesting guidelines for this species may not only assist in preventing the further decline of the species throughout the region (and an increase in Vietnamese populations) but may also provide a potentially steady source of income for local people as well as steady supply of product for the international market.

Other species tell a similar tale of unsustainable wild-collection. Such species include the increasingly threatened, but unprotected, Drynaria fortunei, Tetrapanax papyriferus, Dipsacus asper, Fallopia multiflora and Morinda officinalis. For all these species, wild-sourcing is the norm and commercial overexploitation is directly threatening their existence in the wild in Viet Nam (Nguyen Dao Ngoc Van and Nguyen Tap in press).

Many more species in Viet Nam and the wider region can be cited as examples of taxa whose populations have been affected through such unsustainable exploitation (Walston and Ashwell

in press; Nguyen Dao Ngoc Van and Nguyen Tap in press). The application of ISSC-MAP to these species could provide a mechanism by which sustainable harvesting can be achieved in the region, such that species are not threatened by extinction through over-collection, and local livelihoods not threatened by the loss of important and useful plant species.

In Viet Nam and the wider region there is scope for companies, NGOs and governments to apply Version 1.0 of the ISSC-MAP guidelines to wild plant collection activities to develop a basis for 'best practice' for sustainable collection. Implementation projects are currently in the process of being identified, to assess how the Standard can best support sustainable management of the region's medicinal plant resources. With dwindling wild resources, the ISSC-MAP provides an opportunity for companies to maintain (or even increase) supply to local and international markets (and provide confidence for market stability) while at the same time safeguarding the medicinal plant heritage for the future. To be useful and successful, any standard must have tangible, beneficial results for producers, resource managers and consumers. For industry a "communication tool" within the supply chain would be provided - required documentation leads to more transparency in the supply chain. Resource managers (who are in many cases also the producers) would benefit from concrete, reliable guidelines for protection, harvest and monitoring. For consumers, there must be evidence that sustainably collected MAP products are better products and therefore worthy of a higher price and or greater loyalty to a product, manufacturer or retailer. A widely accepted standard that guarantees sustainable use of wild resources will benefit nature by providing incentives for the conservation of species and their habitats.

If you, or anyone you know, might be interested in working to implement ISSC-MAP in your countries please contact the authors.

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Some Gaps in the Conservation of *Lyndera myrrha* in Cam Xuyen District, Ha Tinh Province

Tran Thi Kim Lien[1]

INTRODUCTION

In Viet Nam, O duoc (*Lyndera myrrha*) grows naturally in some northern provinces such as Hoa Binh and Ha Tay, and in central areas such as Thanh Hoa, Nghe An and Ha Tinh provinces. It is suitable for growth on forest and bare land, and with similar species and other shrubs.

O duoc ranges from 1.3-1.4 metres high and the top of each leaf is smooth and shiny, while the bottom of the leaves is not. The tree has a fragrant smell but a bitter taste, especially the root. It is very useful for treating stomach aches, dyspepsia, vomiting, worms in children, swelling and headaches. The current sale pricefor O duoc in Cam Xuyen district is VND2,000 per kilo of fresh root, and the productivity of the species is three tonnes per hectare two-to-three years after planting.

There are a variety of reasons why O duoc is in danger of extinction, including over-exploitation by local farmers and the unsustainable use of forest land for timber production. The price of O duoc has also declined sharply since 2005, discouraging local farmers and authorities from protecting the species. O duoc has been listed in the Red Book by IUCN as a species in danger of extinction.

THE PROJECT

Seven households participated in the project from March 2005 to March 2007 over a 10-hectare area of forest land in Cam Xuyen district. The objectives of the initiative included the sustainable conservation and development of medicinal herbs and ensuring ecological equality for tree selection and arrangement in the local area.

It is hoped that the harvesting of O duoc will generate adequate incomes for households within the district. Trial research has been undertaken, with the best results selected for developing components for the next phase.

IMPLEMENTATION PROCESS

A survey was undertaken to determine the location of O duoc in the target commune of the project area. The survey group included field team members (field team leader, agricultural/ forestry extensionist of the commune), district forest protection staff, staff from the Ke Go Natural Reservation Management Board, staff from Protective Forest Management Board, and some farming households that often harvest wild O duoc in Cam Xuyen district. The survey covered 10 upland communes in Cam Xuyen District and comprised interviewing households who often harvest wild O duoc.

Initially, households who often harvest O duoc were gathered to discuss a preliminary plan on O duoc conservation within the local area. Qualified households were selected to participate in the project based on enthusiasm, desire for preservation, availability of allocated land and labour, and familiarity with O duoc. A conservation plan was agreed upon by all participants, including technical solutions, roles and responsibilities for the duration of the project.

TECHNICAL SOLUTIONS

The area was divided into an area of 10 hectares with O duoc planted in four trial plots. The following different technical solutions were applied for each plot.

1 NTFPs Project

- Plot 1: wild o duoc was retained on a four-hectare plot with other vegetation such as sim, mua and ha thu o. this plot received no technical interventions.
- Plot 2: vegetation was cleared over a three-hectare plot, with only o duoc retained. the only technical impact was clearing the area of vegetation.
- Plot 3: vegetation was cleared and a mixture of non-timber forest products (NTFPs) (huong bai – *dianella ensifolia*) planted.
- Plot 4: all vegetation, including o duoc, was cleared and the soil plowed. o duoc was then planted with a mix of other NTFPs species (may tat and huong bai).

Additional planting techniques included the planting of may nep, may tat, acasia, and eucalyptus around the area as a protective fence and to generate additional income. Initial technical guidelines on harvesting O duoc were compiled and will be utilised when the trees are ready for harvesting.

It is generally understood that Harvesting is best done in the autumn or spring, but it can be conducted throughout the year. Trees must be over two-years-old, the leaves on old branches yellow and the seeds black and ripe. Harvesting techniques include using small blade hoes to break the soil around the bottom of the trees and then cutting two-thirds of the root off.

The field team and seven households discussed technical solutions for each trial plot, mostly based on their indigenous knowledge. During the implementation process, project staff and field teams provided technical guidelines and monitored the activities, together with local households, to find solutions for emerging problems.

OUTPUTS

Two O duoc species were found within the 10 ha of conservation area: O duoc with a white top and O duoc with a red top. Based on extensive experience, local farmers believe red top O duoc has a higher oil content in its body, branches, leaves and roots, and has a better smell and higher price in the market.

Initially, four technical manuals and technical guidelines for harvesting O duoc products were developed for the four trial solutions, with the aim of disseminating and providing guidelines for local farmers on the sustainable management of the plant and area. In addition, the households were encouraged not to replace O duoc with other fast-growing and easy-to-consume forest tree species such as Hybrid Acasia and Eucalyptus, even though the economic benefits of O duoc are lower.

No.	Species	Area(ha)	Quantity	Notes
1	O duoc	6ha	10,100 plants (46.43% compared to expectation)	Plant concentratively in area of 0.5ha (plot no. 4) and mix plant in area of 2.5ha (plot no. 3)
2	Huong bai	1ha	1,400 kg (93,33%)	Mix plant O duoc plot no. 3 and 4
3	Mây tat		10,000 plants	2,000 plants are planted surrounding, 8,000 plants are planted mixture with O duoc
4	Eucalyptus		1,500 trees	Plant around the area
5	Hybrid-Acasia		1,000 trees	Plant around the area

PRELIMINARY ASSESSMENT OF THE ACTIVITY

Advantages	Disadvantages
The project has supported some items 7 households were very activel during the implementation 10ha of O duoc have received land use rights certificates O duoc is a long-term tree species, after 30-40 years it can be protected and harvested and there is no need for replantation. Because of the oil in O duoc's leaves, livestock will not eat it, thus it's easy to protect; Insects have not been found on the leaves, body or root	Market is not stable: price of O duoc in 2001-2003 was 4,500 VND/kg, but in 2006 it was only 1,200-1,500 VND/kg. All the technical solutions are only indigenous knowledge collected from local farmer, there is not any scientific basis for comparision, thus the effects of trial plots are still low (tree's survival rate is low with poor growth) It's difficult to find and produce O duoc seedlings for additional plantation; Harvesting is difficult; After 2 years of trial, there are not any scientific conclusions on the trial plots
Opportunities	**Challenges**
There are at least 10ha of land suitable for O duoc, this is a necessary element for scientific research for the assessment of adaptation; It's possible to develop a area with a mixture of O duoc and other NTFPs species for short-term income and for longer term income; this is more suitable with local farmers; This activity has been included in the documentation section of the Project's activities, this is one of the unsuccessful activities and this is an opportunity for reference of the network.	Households are voluntary, although they have set up groups for working, there are no regulations for operation and activities; it will be easy for conflicts if the price of O duoc increases. Pressure on forest tree species is high, local farmers cannot maintain conservation activities of O duoc if the price in market remains low It cannot be ensured that there is a balance between conservation and development. If we focus in expanding the tree area for forest coverage and production forest, then the O duoc area will be lost. There is not any scientific research on O duoc.

RECOMMENDATIONS

It is important that scientific research be conducted on the adaptation of O duoc to soil conditions. Such research is valuable in relation to determining the economic and conservation values between the two species of O duoc found within the conservation area. In addition, the development of technical guidelines for dissemination to communities will be important in the development of this livelihood and conservation opportunity. Lastly, there should be a balance between conservation and development to protect this medicinal herb, which is in danger of extinction.

Sustainable Harvesting of NTFPs in Natural Tropical Forests of India: Challenge Ahead for Livelihood Security of Forest Dependent Tribal Communities

R.K. Pandey[1] and Satvant Kaur Sainiia[2]

ABSTRACT

The tropical forests of India contain several commercially important Non-Timber Forest Products (NTFPs). These resources not only secure the livelihoods of forest-dependent tribal people, but also have the potential to augment their annual income. Nearly 500 million people in India rely on NTFPs for their livelihood.

In recent years, degradation of forests has continued unabated in developing countries such as India. The fast depletion of these resources has been a major concern of managers, policy-makers and forest-dependent people at large, due to the direct impact the reduction of forests has on conservation, ecological perpetuation and socio-economic security. Due to the high rate of forest depletion, those NTFPs in high demand are under threat in *in-situ* conditions and need immediate management interventions; ideally, through innovative, effective and accepted technology with community participation under the Joint Forest Management System in India.

Increased demand for NTFPs has led users to disregard traditional harvesting practices that support sustainable management. To combat this trend, a collaborative, integrated approach is necessary, one that encourages active community interest in improving skills and capabilities not only to enhance livelihoods, but also to conserve vulnerable genetic resources.

This paper describes the innovative techniques developed for the sustainable harvesting of eight commercially important NTFPs (C*hlorophytum tuberosum*, *Curculigo orchioides*, *Curcuma angustifolia*, *Dioscorea daemona*, *Asparagus racemosus*, *Plumbago zeylanica*, *Bauhinia vahlii* and *Embelia robusta*) with the active participation of the Baiga and Gond aboriginal forest-dependent tribes in eastern Madhya Pradesh of central India.

The dissemination of sustainable harvesting techniques by developing skills and self-assessments among communities at the grassroots level was found to be an accepted innovative approach to encourage both the sustainable harvesting and managing of utilisable forest resources in a natural tropical forest ecosystem. Detailed findings of this case study show an integrated approach is an effective tool for the conservation and sustainable management of NTFPs in state government-owned natural forest in India under the Joint Forest Management System.

To obtain a copy of the full-length version of this paper, please contact R.K. Pandey, Correspondent Author and Head of the Forest Ecology & Environment Division, State Forest Research Institute, Jabalpur, Madhya Pradesh, India at pandeyrk1@yahoo.com

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Documentation and Trial of a Participatory Methodology to Sustainably Harvest Non-timber Forest Products

Mike Dine[1]

BACKGROUND

Traditionally, people living in and around forests have always harvested and used locally a diverse range of Non-Timber Forest Products (NTFPs), and they will continue to do so (Tran & Dine, 2007). Bans on logging in many provinces have resulted in households living in mountainous regions of Viet Nam turning their attention towards harvesting and selling NTFPs as a substantial source of supplementary or main income. NTFPs are of continuing importance in providing employment during breaks in the agricultural cycle, act as a coping strategy and buffer when livelihoods are at risk, and are used for household emergencies.

Many NTFPs are essential to the well-being of local people who rely daily upon them for subsistence, food, medicines, spices, oil, resin, tannins and dyeing substances, fibers for handicraft and cloth, tools etc. The high demand and prices paid for a wide range of NTFPs species by traders from Viet Nam and China has led to a substantial and rapid decline in the diversity, abundance and quality of some NTFPs species (Tran & Dine, 2007). Many harvesters receive a low price for their products at the farm gate, due to them only selling raw unprocessed NTFPs and exploitation by traders, who are in a strong negotiating position that allows them to dictate prices well below those paid at nearby markets.

Furthermore, many local forest-dependent people report that they can no longer find some species that were once common (e.g. rattan) in the forest and they must travel longer distances to obtain NTFPs resources. This has also resulted in forcing these people to harvest species opportunistically, regardless of their maturity and size (Tran & Dine, 2007).

Reductions in natural forest area and quality, coupled with increases in both the demand and value of many NTFPs, has changed the pattern of harvesting during the last 20 years. Ironically, during the last 10 years in Viet Nam, there has been an increasing realisation that NTFPs management and development via such initiatives as the IUCN NTFPs Sub Sector Support Projects Phases 1 and 2, represents a sustainable and less ecologically destructive management paradigm than forest plantations or shifting agriculture.

Traditional harvesting techniques were often destructive and wasteful. However, harvesters only extracted enough products to satisfy their immediate needs and consequently, forest areas were able to recover sufficiently without significant longer term impacts. As stated above, strong market demand and prices for NTFPs are a constant presence, resulting in shortages of materials and a further incentive for harvesters to be non-selective in their harvesting practices and collect anything of market value. This in turn places greater pressure upon the remaining forest resources (Tran & Dine, 2007).

ADDRESSING THE PROBLEM OF UNSUSTAINABLE HARVESTING PRACTICES

Staff from the NTFPs Sub-Sector Support Project Phase 2 found that prevailing traditional harvesting practices were a significant threat to both forest biodiversity and future livelihoods at all three Pilot Field Sites within Quang Ninh and Bac Giang provinces. The pressures mentioned previously in

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this paper had resulted in changes in the nature of harvesting practices, which unfortunately had not resulted in the evolution of harvesting practices which were less wasteful, more efficient and in line with the needs of both the local communities and forest ecology in general (Tran & Dine, 2007). Hence, positive interventions were necessary to be introduced to:

- Raise awareness of the current impact of previous unsustainable practices upon forest resources;
- Understand the longer term impacts of such practices for the future incomes of both the local communities and their future generations; and
- Modify or introduce new sustainable NTFPs harvesting techniques and practices to ensure that there will be an ongoing resource of NTFPs in local forest areas.

It is well known in Viet Nam that forest-dependent households have considerable indigenous knowledge of forest resources i.e. an understanding of forest ecology, plant physiology, plant reproductive cycles and applications for a wide variety of NTFPs species. The vast majority of this indigenous knowledge was undocumented and therefore NTFPs Project staff sought to record such information to determine the most appropriate methods of harvesting NTFPs in a sustainable manner, which resonated with local people's culture and values.

A collaboration was formed with staff from the Faculty of Forest Plants at Xuan Mai Forestry University to develop and document a participatory process whereby indigenous knowledge was recorded and then used to trial an in-forest methodology on alternative NTFPs harvesting techniques.

The objectives of the indigenous knowledge survey were to:

- observe and document current indigenous harvesting techniques for NTFPs in high demand and those that are of biodiversity conservation significance.
- work with indigenous people to record their knowledge of forest ecology, forest resources and NTFPs harvesting techniques currently employed.
- develop new, or modify harvesting techniques, which are more sustainable than those currently practiced.
- trial a participatory methodology with indigenous people, which requires them to demonstrate and self-assess their current NTFPs harvesting techniques and practices.
- identify areas for specific NTFPs species where practical in-forest training workshops may be organised.

The results from this survey were used to prepare a highly participatory field methodology, training format and sequential photograph training materials with minimal words. The main guiding principles for the design of the training was to ensure that:

- It was highly experiential and participatory in nature;
- Harvesters were encouraged to self-evaluate their harvesting techniques and those of their peers; and
- It was largely field based, with little written theory due to the level of local education and literacy, which made most training resources other than those with numerous pictures, inappropriate.

The initial indigenous survey was conducted at the Van Don Field Site (Quang Ninh province). The lessons learned through the trial were then analysed and refined for implementation as training courses at all of the three Northern Pilot Field Sites - Son Dong district (Bac Giang province) and Hoanh Bo and Van Don districts (Quang Ninh province).

METHODOLOGY

Indigenous NTFPs knowledge survey

Background information collation

Prior to field visits, the following data was gathered as background information to assist in understanding the importance and presence of key NTFPs resources:

- NTFPs plant inventory of the Van Don Field Site (compiled by NTFPs Project in June 2003);
- list of local rare species listed within the Viet Nam Red Book; and
- selected key NTFPs species groupings according to their use values i.e. bamboo and rattans for handicrafts; and bamboo, medicinal plants, fruit and resin trees, plants for bark and fibre and other uses.

Group workshop

Initial field survey work commenced with a group workshop facilitated by an experienced NTFPs trainer with household representatives from a diverse range of gender groups i.e young, old and middle-aged men and women. Participants were selected based upon their reputation as knowledgeable local NTFPs harvesters who spend a large proportion of their time in local forest areas.

The group workshop was organised for one day before the in-forest workshop commenced. The principle aim of this activity was to ensure that a highly participatory and interactive process was operating to encourage the participants to share their knowledge.

Three distinctive sessions were organised and information was recorded on large pieces of paper, ensuring that participants were able to follow the discussion threads and use previously recorded data as reference material to enhance opportunities to further contribute their ideas. In addition, some exercises required participants to write down their opinions on multi-coloured paper e.g. what they thought NTFPs were and consisted of, and share their opinions with the group.

Session One: Definitions and baseline Information

- Definition of NTFPs - a shared understanding and common definition was necessary for participants and trainers alike.
- A list was compiled of NTFPs currently harvested and used by local people.
- A list was compiled of locally traded NTFPs species.
- A discussion conducted on the historical use of local forests and changes in forest cover and quality during the past 30 years.

Session Two: Identification of key NTFPs with both economic and biodiversity significance

A participatory group exercise was facilitated by the trainer, who sketched pictures on paper based on participants' contributions. A number of ethnic groups participated in the workshop and hence, local names varied according to their languages. Therefore this exercise was necessary to ensure that all participants had a common understanding of the species being discussed. It was determined prior that information would be collected on 20 NTFPs species from the six NTFPs groupings mentioned above.

As each picture was drawn, participants contributed the following information:

- Names of species – both local and common;
- Which parts of each plant were harvested and used;
- Preferred habitat of each species;
- When the plant reached reproductive maturity; and
- Level of local abundance.

Session Three: Location of potential areas for the In-forest NTFPs Workshop

Participants worked with the trainer and large maps of the two Van Don pilot villages to locate particular NTFPs species identified during Session2. These locations would be used to both

document the in-forest harvesting methodologies and to identify suitable locations for the future training workshops.

In-forest workshop

This workshop was conducted over two days and visited all the locations identified by the NTFPs harvesters during Session 3 of the Group Workshop. The format was designed to be simple and easy to implement. Participants accompanied the trainer into the forest and as they encountered samples of each of the 20 NTFPs species, they were asked to share their knowledge and demonstrate the techniques they would employ to harvest the species for both domestic consumption and for sale.

Participants were also asked the following sequence of questions for each species:

- Why did they use their current harvesting technique? i.e. practicality, traditional, efficiency etc.;
- Did they think this technique was necessary to obtain the part of the plant they desired?;
- Did they believe the technique employed was absolutely necessary or even wasteful, and why?;
- Did they think the technique employed encouraged regeneration or reuse of the plant once they finished harvesting it, and why?;
- hHow did the NTFPs species reproduce? i.e. seeds, regeneration of roots e.g. tubers etc.; and
- What were the seasonal dates for flowering, fruiting and seeding?

These questions were designed to lead participants down a logical thought pathway, whereby as they answered each question as a group, they were able to become more aware of their harvesting habits and start to self-analyse and assess their techniques themselves and as a peer group.

Initially, the trainer demonstrated step-by-step alternative harvesting techniques and explained the reasons for each step. For example, the current practice to harvest Morinda (*Morinda officinalis*) was to cut the vine before removing the entire tuber. Alternatively, it was suggested that harvesters leave the vine intact in the canopy and leave a small section of the tuber still attached to the vine, which could then be replanted to encourage regeneration.

Another example related to La Khoi (*Ardisia silvestris*), where the current practice was to remove the entire plant, roots and all, from the ground, regardless of the time of year. All parts of La Khoi have medicinal value, with the leaves being the most potent. Alternatively, it was suggested that the stem and roots remain in the ground, leaves growing along the stem were harvested and new leaves retained for photosynthesis. Once the plant reached 1.5 metres high, it was suggested that it was cut close to the ground (above two leaf-growing nodes) to encourage multi-stemming.

Gradually, as each of the 20 NTFPs species was encountered and group discussion continued, participants started to analyse their techniques and discuss them amongst the group. Voluntary suggestions for alternative and more sustainable NTFPs harvesting techniques for each species were then offered by participants.

Information was recorded and sequential photographs were taken of the harvesting techniques and practices (both traditional and alternative) for each species.

TRAINING WORKSHOPS

Reflection upon indigenous knowledge survey

The techniques employed and tested during the indigenous survey were analysed and a methodology was devised for in-forest training. The group meeting workshops proved to be a success, as was the participatory in-forest workshop.

Some observations made during the Indigenous Knowledge Survey requiring extra attention for inclusion in the in-forest training included the following areas.

- The concept of sustainability would need to be explained. the vast majority of NTFPs harvesters had little concept of sustainability and inter-generational equity i.e. how their current actions in local forest areas would affect the diversity, abundance and quality of NTFPs for their children and grandchildren;
- Training materials should be prepared and include mostly sequential harvesting photographs/ pictures and little writing to cater for participants with lower literacy and education levels, and for those who speak ethnic languages;
- A need was identified to focus more intensely on the various pressures causing unsustainable harvesting practices and how harvesters could receive benefits in the future by modifying their harvesting techniques;
- The relationship between market-induced pressures and the longer term viability of harvesting NTFPs for regular household income would need to be explained/explored;
- Participatory games/tools would need to be developed to experientially demonstrate many of the concepts the project was attempting to raise awareness of;
- In-forest training should employ sequence-based logical group discussions to encourage participants to evaluate and reflect upon their techniques and practices and those of their peers. in turn, participants should be encouraged to suggest and demonstrate alternative practices themselves based upon this heightened state of awareness.

Training course – group meeting workshop

A similar methodology was employed for the training courses, including both a one-day group meeting and three-day in-forest workshops. The Group Meeting Workshop was broken into three sessions and included the following content (more detail can be found in Tran & Dine, 2007).

Session 1: Introduction and sharing harvesting experiences

- Objectives of the training workshop.
- Definitions of NTFPs.
- Group discussion on participants' experiences in NTFPs harvesting and changes over time.
- Overview of principles employed for sustainable harvesting to occur.

Session 2: Sustainability and implications of forest management and use

Game: Harvesting status of some NTFPs within the commune (inter-generational awareness exercise)

Four groups were formed, i.e. grandparents, parents, grandchildren and great grandchildren. Each 'generation' was asked to remove as many fruit or sweets as they desired and calculate how many remained. In turn, each 'generation' was asked to do the same. How much remained afterwards for future 'generations'? This exercise was an important tool which acted as an analogy to demonstrate inter-generational equity resulting from current techniques and practices of NTFPs harvesting, and the potential forest legacy left for future generations.

1. What is sustainability? Why is sustainability necessary?

2. Implications of different management options

This included a similar activity to that undertaken in Session 2 of the Indigenous NTFPs Knowledge Survey. However, participants were asked to examine their harvesting techniques for each species as a group before attending the in-forest workshop, and evaluate what they thought were the advantages and disadvantages of their current harvesting techniques.

Session 3: Sustainable harvesting of NTFPs

- Changes in forest quality and the availability of NTFPs (similar to Activity 4 in Session 1 of the Indigenous NTFPs Knowledge Survey).
- Basic market knowledge and understanding.
- Causes of unsustainable harvesting techniques.

- What is the difference between sustainable or unsustainable NTFPs harvesting techniques and practices?
- Training materials with sequential photographs for 20 species were distributed to participants at the commencement of this activity component.

Training workshop – in-forest workshop

During the Indigenous NTFPs Knowledge Survey, the participatory in-forest workshop methodology was refined progressively as a response to the gradual increase in awareness of participants. Furthermore, this methodology with, lessons learned included, was once again implemented, however greater emphasis was placed upon:

- demonstrations by participants of the harvesting techniques they employed and group discussions of whether those techniques were sustainable;
- group discussion and examination of plant biology, e.g. root systems, age maturity, (addressing opportunistic harvesting, regardless of maturity and size of the product) and habitat;
- seasonal cycle of individual species i.e. flowering, fruiting and seeding, and the most appropriate times for harvesting products based upon these cycles;
- discussions regarding alternative harvesting methodologies for each species; and
- demonstrations by participants of how they would harvest each species alternatively.

KEY LESSONS LEARNED

During the implementation of both the Indigenous NTFPs Knowledge Survey and the training workshops, the following key lessons learned were gathered.

- To raise awareness of the current impact of previous unsustainable practices upon forest resources, NTFPs harvesters must be aware of the linkages between the longer term impacts of their harvesting practices and how they relate to gradual changes in their household income over time.
- There must be an understanding of the causes of current harvesting practices, i.e. traditions, market, changes in local population density, harvesting intensity etc. and barriers to making changes to these practices e.g. traditions, income for the present rather than future, inequitable access to forest land, 'the forest is still large and plentiful' mentality, distance to markets, undeveloped market chains etc.
- Importance of participation of NTFPs harvesters throughout the process i.e. sharing their knowledge, which encouraged constant input based upon this knowledge.
- Creation of opportunities for participants to self-appraise and assess their harvesting techniques and those of their peers, and to raise collective awareness through group discussions in line with shared value systems.
- Participatory and demonstrative tools are essential for inclusion in the group meeting workshop to demonstrate the course content e.g. inter-generational awareness exercise, drawing pictures of NTFPs as a focal point for contribution and discussion etc.
- The teacher-to-participant ratio should be small for the in-forest training workshops e.g. a maximum of 10 participants per trainer. we observed that groups of 15-25 participants limited the ability of participants to contribute their ideas and demonstrate their current and potential harvesting techniques.
- Follow-up training workshops need to be implemented at regular intervals during different seasons, e.g. flowering, fruiting and seeding, to both reinforce concepts and evaluate whether any harvesting behavioural changes have occurred as a result of the training.
- Changes to sustainable NTFPs harvesting practices are not just related to participatory training of NTFPs harvesters. without equitable allocation and access to forest land and support from local and district authorities (e.g. development of binding, community-agreed NTFPs harvesting

regulations with supplementary self-regulated community enforcement), there is little incentive for harvesters to modify their old techniques and practices. hence, harvesters will continue to opportunistically harvest NTFPs using non-selective and unsustainable methods in order to obtain products before their competitors do.

CONCLUSION

Harvesting of NTFPs resources will continue to be an important livelihood and income source for many households in the foreseeable future. Demand for NTFPs will continue to rise and exert great pressures upon forest resources and forest-dependent people who respond to market demands. The continuation of the application of 20-year old harvesting techniques which were sustainable, yet still destructive and wasteful, is of great concern for both future generations and forest biodiversity.

During the course of this paper, a participatory methodology utilising indigenous knowledge and values relating to NTFPs usage has been demonstrated. Furthermore, by raising awareness of the impact of current NTFPs harvesting techniques amongst NTFPs harvesters through a participatory process, the NTFPs Project hopes to promote sustainable forest and biodiversity management by encouraging changes in NTFPs harvesting behaviour.

References

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THEME 7 :
METHODS

Market Analysis and Development (MA&D): Process, Methods, and Tools for Developing Community-based Enterprises[1]

Katherine Warner[2] , Isabelle Lecup & Ken Nicholson

Market analysis and development focusing on common property natural resources such as Non-Timber Tree and Forest Products (NTFPs) and products from coastal ecosystems have not received the same attention as farm products or timber. In particular, in the case of NTFPs they were mistakenly perceived as providing no more than a minor portion of income for rural communities. Currently, however, there is a better understanding of their contribution to local and national economies. As forested areas and coastal ecosystems in Asia and other regions persistently suffer degradation, the preservation and renewal of biodiversity is increasingly being linked to a strategy of integrating conservation with the creation of economic incentives and alternative income sources for local communities.

However, in project design there is often insufficient attention given to the process/methods of identifying potential products that can make a contribution to increasing the incomes of the extremely poor, who are the most dependent on natural resources (for example, issues such as who will select products and enterprises, the types of group organization required, long-term linkages to business support services, etc.), nor are funds earmarked for the costs associated with product development and increased access to markets for the rural poor (recruitment of field staff, market development activities, seed capital, etc.).

There is growing recognition that expertise in participatory market system analysis is needed for strengthening existing micro enterprises or for the creation of new businesses. The strategy of linking the conservation of natural resources with development activities requires personnel trained not only in sustainable management, domestication and extraction, but also in community-based entrepreneurship development and marketing.

Identifying what products or activities (for example systems for sustainable extraction, value addition through processing, etc.) will be feasible for a community requires an understanding not only of what can be successfully produced, but also what can be profitably sold.

At the beginning of a project, what products, how the community and its members will benefit, and who will buy the products needs to be rigorously identified within the context of sustainable natural resource management. Projects also need to formulate strategies with communities and local governments in order to reduce pressure on forests or coastal resources through the introduction of trees grown on farms or in community forests or coastal breeding systems for economically important species.

The process for participatory market analysis presented in this paper is designed to ensure that both the field worker and community members

1 The Market Analysis and Development process and tools were developed by Isabelle Lecup and Ken Nicholson. It was published in 2000 by FAO Community Forestry Unit) in collaboration with RECOFTC (Regional Community Forestry Training Center, Bangkok, Thailand) with funding provided by the Forests, Trees and Peoples Programme (FTPP), a multi-donor trust programme that included Sweden, Norway and the Netherlands. It is now available on the FAO website. Other MA&D also available on the website include case studies of MA&D implementation.

2 Head of Country Group 1, IUCN

identify products and enterprises which encourage the sustainable management of natural resources and highlight where realistic possibilities exist for creating forward and backward linkages to markets, service providers and communities.

THE MARKET ANALYSIS AND DEVELOPMENT APPROACH

The Market Analysis and Development (MA&D) approach has been designed and developed specifically to assist people to achieve a sustainable livelihood system in which their household and community economic assets are increased and local resource management is improved. MA&D enables local people to identify potential products and develop markets that will provide income and benefits without degrading their resource base.

Based on over 25 years of locally-based enterprise development experiences in Asia, the MA&D methodology is a step-by-step process which provides local people and communities with the ability to identify and develop viable tree and forest products, coastal- and marine-based products and ecotourism enterprises within the context of sustainable resource utilisation and equitable distribution of benefits. By taking into consideration not only the commercial aspects of an enterprise, but also the environmental, social and technological aspects, MA&D helps communities directly link natural resource management and conservation activities to income-generating opportunities.

MA&D is different from conventional business and enterprise planning. Rather than only considering the commercial aspects of an enterprise, the MA&D approach also considers environmental (level of harvesting, etc.), social (local capacity, policy, etc.) and technological (type of technology needed, etc.) issues during the development of a business structure.

The goal of MA&D is to assist local people in developing income-generating enterprises while conserving tree and forest and/or coastal and marine resources.

The major strengths of the MA&D approach include:

- its focus on identifying and developing enterprises based on four areas of development-social/institutional, market/economy, resource/ environmental management, and science/ technology.
- its emphasis on institutional development, which ensures that user groups or community enterprises will be independent and sustainable after facilitators leave.
- its focus on identifying not only economically viable products, but also socially and environmentally suitable products. this makes it highly adaptable to a variety of settings such as conservation and protected area management, poverty alleviation and ecotourism.
- its commitment to an iterative approach that is highly flexible and adaptable and continuously provides opportunities for the user to ensure that activities are oriented towards themselves or the target groups they facilitate. decisions are made at the end of each phase regarding which options have to be chosen by users before moving on to the next phase.

WHO BENEFITS?

Local entrepreneurs

Entrepreneurs are local people who use their tree and forest products, or coastal and marine products, for generating income, not just for subsistence. They can be producers, manufacturers and/or traders. MA&D enables them to plan and develop equitable, ecologically sustainable, socially acceptable and financially viable enterprises.

Field staff, facilitators and planners

Using MA&D enables field staff, facilitators and planners to integrate social and resource management issues into their work with local entrepreneurs. MA&D provides a wide scope for investigating the market environment and avoiding failure.

Government agencies and development organisations

MA&D reduce the risk of time and funds being spent on unsuccessful enterprise development. It is a cost-effective process that assists in the development of viable enterprises.

WHY DO MA&D?

The MA&D approach supports the development of small, natural resource-based enterprises and because of its focus on ecological sustainability, it is especially applicable to enterprises based on resources that need to be protected or conserved.

MA&D promotes four important aspects of development.

1. Sustainability

Sustainable resource use: MA&D provides safeguards for developing markets and products that do not lead to over-exploitation. An integral part of the process of identifying and planning potential enterprises is the assessment of the sustainability of local environments. The process strengthens the potential for sustainable resource management.

Market sustainability: Changes in the market environment can be assessed and products adapted in order to remain competitive and attractive to the targeted customers.

Social/institutional sustainability: MA&D's focus on capacity building and strengthening institutions at the local level supports the development and success of small enterprises. One of the long-term goals of the MA&D approach is for community members to develop and operate their enterprises independently. MA&D also assists in identifying potential areas of conflict and promotes equitable distribution of benefits. MA&D assists in identifying potential social or equity problems associated with a potential product. For example, in southern Nepal, male farmers had chosen to cultivate and eventually market the seeds of two fruits, Harro (Terminalia chebula) and Barro (Terminalia bellerica), which were used for medicinal purposes. However, a social survey during the first phase of the MA&D process revealed that local women did not support the idea because the harvesting and processing would be too time-consuming and would increase their workloads, with minimal benefits. The two products were abandoned and another product, Gurjo (Tinospora cordifolia) was selected, a herb that could also be used in medicines, which many women were already collecting and processing, and which could be marketed more effectively.

Technical sustainability: MA&D provides long-term benefits for community members by ensuring they learn to utilise and maintain equipment and gain an understanding of production, manufacturing and marketing processes.

2. Participation

The community members developing enterprises are the main decision-makers, even though they may need the initial support of a facilitator. One of the long-term goals of MA&D is for community members to develop further and operate their enterprises independently.

3. Capacity building

MA&D focuses on capacity-building and strengthening institutions at the local level in order to provide the support local people need to control their own resources and to develop and run small enterprises.

4. Strategic alliances

MA&D relies heavily on the formation of strategic alliances with businesses, companies and organisations. These alliances help to establish market links between local enterprises and markets, assist entrepreneurial development through training and capacity building, and provide potential sources of financing. The flow of information that comes from these partnerships is critical for local people who do not have easy access to marketing information and credit.

THE MA&D PROCESS

MA&D consists of a Preliminary Phase and three main phases of implementation, each broken

down into a series of steps in which community members are guided through a capacity building process to identify and establish enterprises either as individuals or as groups, depending on the resource management, processing and marketing characteristics of the product (See Annex 1). The direct user is assumed to be a facilitator, working closely with interested community members, who work in teams to gather information throughout the entire process.

While utilising a step-by-step clearly described process, MA&D is not an exact science or a recipe that can be blindly applied. Instead, MA&D is a sequence of activities for planning sustainable enterprises that uses methods (written information collection, interviews and observation) and tools such as guidelines, diagrams (marketing chain), maps, matrixes and formats for preparing a business plan. The facilitators and community member must come up with ideas themselves and develop their own personal knowledge to better benefit from the use of the planning framework. MA&D provides an overall framework that must be adapted to each situation, and the amount of time, money and human resources needed for MA&D depends on the size of the enterprise involved.

Preliminary phase

The objective of the preliminary phase is to create a solid foundation for enterprise development activities. The primary outputs include a report with justification for site selection, selection of field facilitators and community representatives, and overviews of existing experiences and opportunities and constraints in market systems at the national, provincial and local levels. This phase may be modified for an ongoing project in which site selection has already been made. In such cases, the focus of the preliminary phase is on the selection of field facilitators and community representatives, and filling gaps in any information that is needed but not collected earlier by the pre-existing project.

The MA&D toolbox includes several well-known tools which are adapted in order to focus on marketing aspects. These include resource mapping, livelihood analysis, production calendars, Venn diagrams, analysis of marketing channels, and activity profiling. It also includes financial tools that define and project economic viability, including the calculation of profit and loss.

Phase 1: Assess the existing situation

Phase 1 identifies potential enterprises; inventories existing resources and products; identifies products that are already providing income for local people; and, eliminates non-viable products. The economic objectives of local people interested in developing enterprises are also identified.

Outputs

- Short list of products on which to base the next phase of MA&D
- Identification of local people interested in developing enterprises
- Understanding of the social, environmental, technical and institutional contexts of a range of products
- An interest group formed to undertake the next phase

Resources required

Location: Although the work takes place mainly in the field, an overview of the national policy, socio-economic conditions, and institutional and political situations is also needed. A market survey at both the national and international levels may be required in order to identify opportunities and constraints.

Time: One to three weeks, depending on the size of the enterprise, the accessibility of the area, the complexity of the natural and human environment, and the complexity of the potential markets.

Team: Usually a team of one to three facilitators, plus assistants and interpreters. The size of the team varies according to the size of the enterprise and the number of sites.

Budget: Items to be budgeted (not including programme staff working on marketing and other coordination or technical staff that may provide support; etc.) include training village data

collectors (two days), data collection and analysis and participation in regular workshops organised by the local tree and forest products users (up to 12 days), and a survey of the market system within the district or provinces (two-to-seven days). If a market survey in a neighbouring area is deemed necessary, an additional 2-3 weeks is needed.

Phase 2: Identify products, markets and means of marketing

The second phase of MA&D includes selecting promising products, identifying potential markets and discussing the means of marketing. The focus is on identifying constraints and opportunities for new products and/or new markets.

Outputs

- List of possible products
- Assessment/feasibility study report
- Data collected to design a business plan
- Formation of interest groups around promising products
- Formation of team to undertake final phase

Resources required

Location: Could require a market analysis outside the locality to the provincial, national and sometimes international levels in order to assess the potential of a product.

Time: One to four weeks, depending on the complexity of the marketing channels for the chosen products, and the availability or accessibility of market information.

Team: MA&D team from Phase 1. Alliances may be formed if market surveys need to be conducted outside the locality.

Budget: Time required for market survey by the team, or facilitated by a marketing specialist, and significant transportation and communication costs.

Phase 3: Plan enterprises for sustainable development

In the final phase, the product and market development plan is developed. The focus is on how to develop and implement a market strategy for existing or new products and/or new markets, and to strengthen existing enterprises or establish new ones. Local entrepreneurs are guided through a pilot phase and training, learn to monitor progress and to adapt when change is needed.

Outputs

- An enterprise strategy comprising the selected products
- Marketing and management plans
- Action plan to ensure proper implementation
- Financing obtained as specified in the capital needs statement

Resources required

Location: Production site and sale site

Time: One-to-three weeks for one product and one group of entrepreneurs, plus a pilot phase (one year or more) and ongoing monitoring and evaluation.

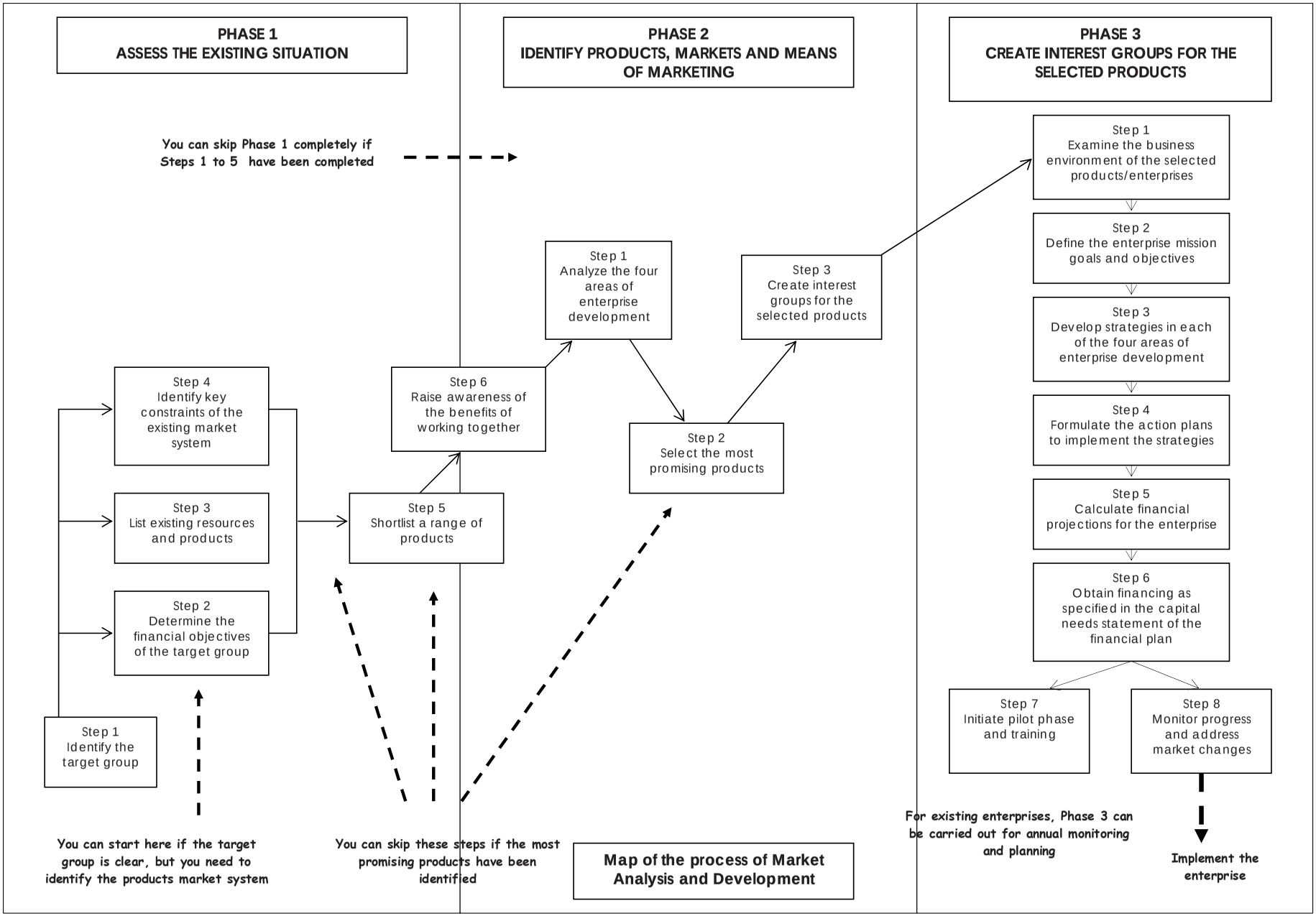
Team: MA&D team formed in previous phase. Less need for outside expertise during monitoring period.

Budget: Cost of workshops for entrepreneurs and to cover time required to analyse the data and develop the enterprise strategy and business plan and to secure funding.

SUMMARY

MA&D is a methodology that has been used by various organisations throughout the world. It has been successful in assisting in the development of viable community-based enterprises that are environmentally, socially, technically and economically sustainable. Because of its focus on ecological sustainability, it is especially applicable to enterprises based on resources that need to be protected or conserved, as well as providing a wide scope for investigating the market environment and avoiding failure.

Annex 1: Map of the process of Maket Analysis and Development



A Documentation Strategy to Develop the Potential of NTFPs as a Source of Livelihood Diversification for Local Communities in the Batang Toru Orangutan Conservation Programme

Jusupta Tarigan, Endri Martini, James Roshetko, Iwan Kurniawan[1]

Summary

Batang Toru, located in the northern part of Sumatran Island, is one of the few remaining areas supporting populations of the Sumatran orangutan (*Pongo abelii*). The existence of an orangutan population of 400 in the area was documented through a Population and Habitat Viability Assessment (PHVA) (Singleton et al, 2004), however recent studies estimate that the population may currently number only 380. Although the Batang Toru orangutan population is smaller, its threat from habitat loss is relatively low (below 2 per cent annually). This low rate of habitat loss is the result of topographic features that limit access, and traditional indigenous forest management systems that are sustainable and value a healthy environment.

Besides orangutans, the Batan Torus forest is also rich with other endemic plant and animal species (e.g. *Dipterocarpaceae species Shorea spp.*, *Anisoptera spp.*, *Dipterocarpus spp.* and the Sumatran tiger). Until now, the range of land use systems practiced by local communities in Batang Toru has been compatible with the conservation of the area's unique and globally important biodiversity. However, in the future, the expanding human population of Batang Toru may threaten the forest and all of its components if suitable livelihood options are not identified and developed. In this context, we see a number of Non-timber Forest Products (NTFPs) produced in Batang Toru forest systems (e.g. mixed tree gardens, agroforests and forests) as having the potential to diversify and secure viable livelihood options for the people of Batang Toru.

Currently, there are 27,906 households in 251 villages who depend upon 91,400 ha of Batang Toru forested area. The long history of sustainable forest resource management by local communities comprises a gradient of land use intensities ranging from mixed tree gardens (*kebun campur*), where species composition is largely controlled by farmers and management is intermediate, to natural forests, where impact from human intervention is light as only small quantities of products are harvested. A variety of useful and valuable products are sourced through the various land use systems, but management is through extension rather than intensive.

The primary products from the mixed tree gardens of Batang Toru are rubber (*Hevea brasiliensis*), cacao and, in some villages, sugar palm (*Arenga pinnata*). These crops are the main source of on-farm family subsistence/income. In the natural forests and agroforests, plant species (which are forest species that have been domesticated or semi-domesticated) that are important or hold potential include: gaharu (incense from *Aquillaria sp.* Tree), benzoin (*Styrax benzoin*), durian (*Durio zibethinus*) and petai (*Parkia speciosa*), nilam (patchouli oil), and flowers (orchids and Nepenthes). The products from these species are used for home consumption and sold in local/provincial markets. In all three land use systems (mixed tree gardens, agroforests and natural

1 World Agroforestry Centre and Winrock International

forests), planning and management are limited and improvements in managing the species/crops and developing market linkages could benefit the productivity, profitability and sustainability of these systems.

Hence, in collaboration with local partners (including local governments), during last 18 months, ICRAF and Winrock International have been assisting Batang Toru local communities to conceptualise and develop conservation-livelihood enhancement strategies. These strategies provide a framework for: i) recognising communities' traditional role in conserving natural resources; ii) recognising which local agricultural/forest livelihood systems are compatible with environmental conservation; and iii) strengthening communities and other stakeholders' understanding/commitment to conservation as an approach to protect environmental services (biodiversity, watersheds and carbon stocks). Strategies also identify and/or provide technical and marketing services and improvements to enable communities to enhance the productivity and profitability of NTFPs in their agroforestry livelihood systems.

To obtain a copy of the full-length version of this paper, please contact Jusupta Tarigan at jtarigan@cgiar.org

Participatory Methodology for Production of NTFPs Training Materials: An Achievement of the NTFPs Project

Nguyen Viet Khoa[1]

Traditional methodologies for documenting NTFPs forestry extension initiatives have shown some weaknesses in the past, including the following feedback from target user groups:

- The material was not produced upon users' demands, thus the publication was not widely accepted;
- There was no integration between the experiences and indigenous knowledge of the local people in the publication;
- The main content of the material came from the author's ideas, hence, when being applied, it did not suit the current situation of NTFPs conservation and development;
- There were very few documents produced for farmers and poor people.

One of the objectives of the NTFPs Sub-Sector Support Project Phase II was enhancing the capacity for agricultural and forestry extension centres at the provincial level to contribute to NTFPs conservation and development and help stabilise the livelihoods of local people living near forests. In order to achieve this objective, the project supported these centres to develop forestry extension materials, applying the 'writeshop' approach, which was successful tested and replicated within the agriculture extension systems of the two project sites in Quang Ninh and Ha Tinh provinces.

Before developing the information, it was necessary and important to carry out a 'user needs assessment' for the material. Therefore, the assessment team, comprising forestry extension officers and the NTFPs Support Project field officer, conducted interviews with different user groups to identify their needs in relation to the material, both in terms of content and form.

The needs were carefully analysed and formed the basis for identifying the themes for the material. However, criteria for theme selection were developed with the participation of different user groups.

The next step was selecting authors, editors and artists to illustrate the material. Authors of the material had to be capable, skillful farmers or either agriculture extensionists or scientists. Proficient editors were selected to ensure the material was objective and accurate and a working group was established, which had to complete a first draft before a workshop was held to collect comments.

The consultation workshops were organised with the participation of farmers, agriculture extensionists and the NTFPs Support Project field officer. During this time, the first, second and third draft versions were revised to incorporate the comments and feedback received from participants. The final draft of the material was tested through training and consultation meetings. The working group then revised the draft to produce a final version for printing, which took into account all suggestions made during the consultation phase.

The NTFPs Support Project has published many useful materials using this methodology, including publications such as the NTFPs basic material set, booklets on NTFPs breeding and planting, and brochures and training materials on NTFPs for farmers, especially for the poor and low-income people.

The importance of this methodology has been documented and widely applied within the agriculture extension system of the provinces under the project.

1 NTFPs Sub-Sector Support Project Phase II

How Can the Poor Benefit from NTFPs Enterprise Development? An Exploration by CARE International's CEFM Project in Cho Don District, Bac Kan Province, Viet Nam

Nguyen Anh Thinh & Fiona Percy[1]

INTRODUCTION

The Community Empowerment for Forest Management (CEFM) project under the Civil Action for Social Inclusion (CASI) programme of CARE International in Viet Nam supports poor and forest-dependent communities to sustainably manage allocated forests, access unallocated forest land through community forestry, and equitably share the costs and benefits which contribute towards reducing poverty. It promotes and facilitates community forest governance and management and forest-based income generation and information dissemination. The community priorities identified for forest-based enterprise development are all Non-Timber Forest Products (NTFPs).

The CEFM project is being carried out from 2006 to 2009 in 20 villages of two remote communes in Cho Don district, Bac Kan province, northern Viet Nam (240 km from Ha Noi) and involves a predominantly ethnic minority population.

Project surveys have found that NTFPs management can play an important role in sustainable forest management, especially where they generate additional income and contribute to poverty reduction. However, not all stakeholders involved in NTFPs commercialisation processes get equal access and benefits. One of the key project tasks is to find appropriate methods to ensure poor and forest-dependent communities can participate in NTFPs and forest management.

OVERVIEW OF NTFPS IN CEFM PROJECT SITE

Forests and forest lands were allocated to the households and local authorities (commune level) between 1995 and 1997, and rechecked in 2005 for a stable-use timeframe of 50 years.

There are three types of forests in the project site, including production, protection and special use forest land (see Table 1).

According to the CEFM project, NTFPs are “products which have non-timber origins and have been harvested from the forest, forest land and non-forest trees”. The project surveys found that due to variations in natural forest conditions (secondary forests, forests in limestone mountains, etc.) and the unsustainable exploitation of NTFPs in the past, there is a very limited range and volume of NTFPs in the area.

1 CARE International

Table 1: Forest areas and types in the CEFM project site

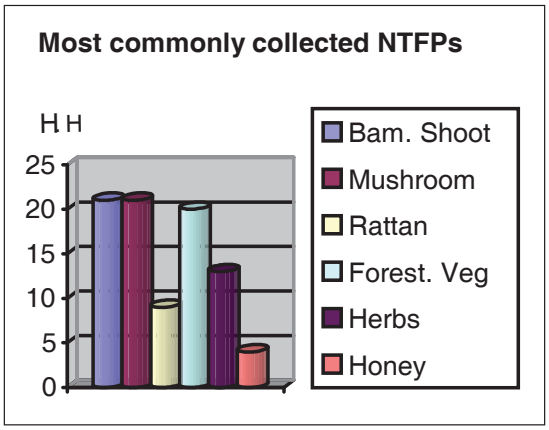
Areas	Total natural areas	Non-Forest and forest land	Forest and forest land (ha)			
			Total	Protection	Production	Special use
Cho Don	91,115	13,247.30	77,867.7	22,642.6	53,437.1	1,788
Xuan Lac	8,421	956.2	7464.8	1940.5	3736.3	1,788*
Ban Thi	6,499	1247.0	5252.0	3973.5	1278.5	0

** The special use forest in Xuan Lac is the Nam Xuan Lac Species and Habitat Conservation area.*

NTFPs are collected from production and protection forests allocated to households and government forests (unallocated forest and conservation areas). They are generally highly seasonal, and vary greatly in quality and quantity during harvesting. In terms of household income, NTFPs contribute between 10-50 per cent of local household income. The poor depend more on NTFPs than the average and better-off households.

The most commonly collected NTFPs in Cho Don district are bamboo shoots, mushrooms, rattan, forest vegetables, herbs, honey and cake-wrapping leaves (see Figure 1); while the most commonly collected NTFPs in terms of value are bamboo shoots, herbs (*Sargentodosa* Huyet Dang, *Coptis chinensis* France Hoang Lien, and *Nauclea purpurea* Roxb Mat gau), mushrooms, rattan, forest vegetables and honey. However, only bamboo shoots and herbs are harvested in large enough volumes for commercial purposes.

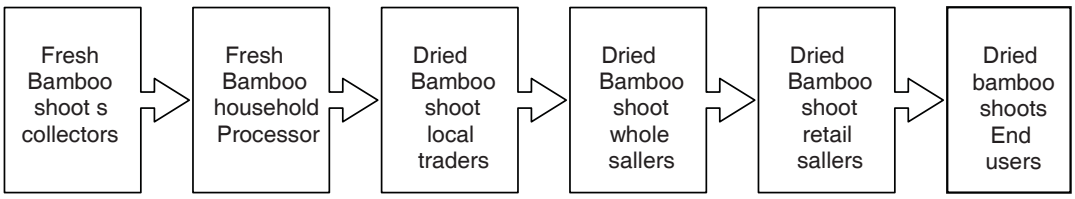
Figure 1: Most commonly collected NTFPs in Cho Don district



For example, bamboo shoots are collected from the forests by primary collectors (often villagers living next to the forests). Some collectors, usually the poorest, sell the fresh shoots to primary processors (households in the communities). Other collectors also play the role of primary processors and store the products at home. Most local traders are from Cho Don district (about 50 km from the villages), but some local traders are from better-off households in the communes. They come to each household to collect the dried bamboo shoots, with the price dependent on grade (the type, age and processing methods

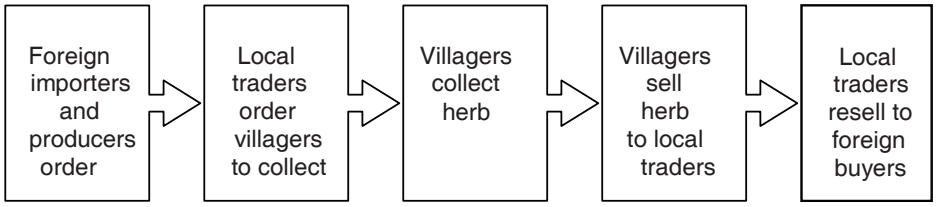
of bamboo shoots determine quality), volume, moisture, season and negotiation skills. The local traders do the grading and packing and then sell the products to wholesalers in Ha Noi. The involvement of the villagers in the commercialisation process is illustrated in Box 1.

Box 1: Bamboo shoots value chain



The value chain for forest herbs is different from bamboo shoots. Villagers are the primary collectors and collect the herbs when they are available. They sell them to local traders in the commune, who play the role of agents for outside traders. Herbs are sold as raw materials so no processing is required. When the herbs collected reach a sufficient volume for a truck, the local traders call the outside trader to come and buy the product. The involvement of the villagers in the herb commercialisation process is illustrated in the Box 2.

Box 2: Herbs (Sargentodosa) value chain



Therefore, in addition to NTFPs acting as a source of food, they also provide additional cash income for poor households through the collection of NTFPs relating to medicine, construction materials, bamboo shoots and herbs. No special skills are required for collecting and processing such products.

Arrangements between individual households do allow for poorer people with no forest land to harvest from households with forest land based on a mutual agreement, such as for the collecting of firewood. Poor villagers collect NTFPs more than middle-income or better-off households, and depend more on the seasonal income they gain. However, they have less access to forest land.

EXCLUSION OF THE POOR FROM NTFPS COMMERCIALISATION

There are many reasons why poor people have not been reached by, or have received very little benefit, from the NTFPs commercialisation process. These include the fact that:

- Forest and forest land and control is not usually in the hands of the poor. Statistically, the percentage of households in the project site with no or little forest and forest land ranges from 10-40 per cent (especially for H'Mong ethnic minority people), and they are among the poorest of the villagers. This leads to a situation where the poor receive little access and benefits from NTFPs. Instead, they illegally exploit NTFPs from government forest and conservation areas.

- The cost of entry is high. Most poor people collect NTFPs and sell them as raw materials in the villages or communes. Transportation and processing activities require investment that is out of reach of the poor. While such operations can add a lot of value to the products, this often fails to reach the poor. In the project site, almost all herbs are sold as raw materials, while only a few households engage in bamboo shoot processing (boiling, fermented and drying).
- A lack of capital and storage techniques mean the poor receive less benefits from the commercialisation process. For example, villagers sell dried bamboo shoots in the harvest season (from May to November) for low prices. If they could store and sell the products later in the year (just before Lunar New Year), they could receive double the price.
- Tthere are no marketplaces or market information. In remote communes, households must sell their products to local traders, who conceal information relating to the market and consumer demands. For example, sun-dried and oven-dried bamboo shoots are sold for the same price on the national market, but when buying from villagers or local markets, traders pay a higher price for sun-dried bamboo shoots, suggesting that oven-dried are of lower quality or inferior colour. Villagers are not aware of this discrepancy. In the case of herbs, local villagers

Bamboo harvested and selling in the market

Herbs harvested and selling in the market

do not know what the herb is used for and do not know the real value of the products. The price is set by the traders, who buy NTFPs at a low price from villagers.

Methods to enable the poor to access real benefits from NTFPs commercialisation

The CEFM project supports community dialogues on access to forest resources and benefits, analyses of potential value addition from NTFPs enhancements, and the development of forest use and interest groups for identified products. It facilitates community-level agreements for participatory forest management, which will allow access to forest products by poorer villagers on land allocated to other households, as well as government forests. As the communities belong to ethnic minority groups, the project aims to tailor its approach to their specific needs and constraints.

CEFM supports enhanced benefits for the poor through the following initiatives.

- **Establishing a Forest Governance System (FGS):** the FGS includes the district implementation team (Cho Don District People's Committee, Forest Protection Department, Department of Agriculture and Forestry, and Women's Union), commune implementation team (Communal People's Committee, Women's Union, forestry staff, and extension worker), and community forest management boards at the village level (forest user groups FUGs, interest groups IGS, village head and facilitators). Local authorities implement national community forestry policies and adhere to the principles of grassroots democracy to foster democratic governance and transparency in the forestry sector, which provides a framework for NTFPs management. the FGS creates an enabling environment for FUGs and IGS, which targets and encourages women and poor people to participate in forest management. in particular, the FGS supports community discussions on: land/forest land allocation and poor community members' access to NTFPs and their benefits (when they are members of FUGs or IGS); community level agreements and rules relating to equitable access to NTFPs; sustainable conservation and collection practices; and benefit sharing. The main focal point for interventions and group development are the village facilitators. They are selected by their own community and given training on facilitation skills, as well as other capacity building, and will create a networking platform for knowledge learning and information sharing.
- **Establishing FUGs:** FUGs include all users of resources from clearly demarcated forest areas managed by the community. In the project area, they are households living next to government forests. Currently, the process for allocating government forest land to communities is under negotiation and may take some time to finalise. The project has cooperated with Cho Don District's 661 project and local authorities to make forest protection contracts with the FUGs, targeting the landless or near-landless poorest households, which are given priority to be members of the groups. In return, the groups can develop and legally exploit NTFPs in these forests and receive the protection fees from the government (vnd87,000 per ha per year). Regardless of the status of forest land tenure, the communities then become engaged in forest management. This improves access by the poor to NTFPs and benefit-sharing because, as a member of the FUGs, they are no longer excluded from forest use activities. With support from the project, more work related to NTFPs can be allocated to the poor. At the same time, women and poor households are encouraged to be part of the group management board and participate in decision-making processes.
- **Establish IGS:** this is an important task of the CEFM project as IGS include all households in a village which are interested in a specific NTFPs. The process to establish IGS is as follows. A village meeting is conducted with the participation of all household representatives. The purpose

of IGS is clearly stated: that all group members will join forces towards sharing knowledge, commercialising NTFPs, and sharing the costs and benefits equitably. During the meeting, the selection criteria for membership of IGS is also agreed upon, e.g. members must be interested in the identified activity; priority given to the poor and women; and there must be a commitment for participating in forest protection and sharing experience with others outside and inside the group. Each group comprises no more than 15 people. If more than 15 people are interested in the same activity, they are divided into two groups. Once they are established, the project establishes a network for sharing and learning between IGS from different villages. Some interest groups aim to attract predominantly women through offering training services tailored to the specific NTFPs, or processes that they are most involved in, such as collecting and processing mushrooms or wrapping leaves (a seasonal activity). The project builds capacity for all the IGS in term of providing training in techniques for husbandry, harvesting, transport, processing and packaging. The IGS are also encouraged and facilitated to co-operate and allocate resources for different steps in the commercialisation process, including division of labour among men and women, depending on their abilities. These methods secure the involvement of women and the poor in community forest management and NTFPs commercialisation, leading to more equitable cost and benefits sharing.

- NTFPs certification: In the project site, NTFPs are sourced from households, government forests and conservation areas. During the project implementation, it was observed that secondary traders encounter risks when they trade in NTFPs which do not have clear origins (especially herbs like Sargentodosa). Their NTFPs and the vehicles used to transport them may be confiscated by local authorities or the Forest Protection Department and they may be fined. Secondary traders pay a low price for products as compensation for the risk involved. This results in a poor return for primary collectors. The project will facilitate the involvement of local authorities in the legal aspect of exploiting NTFPs. This can be done by setting up a simple participatory certification system which can certify the origins of NTFPs and lift the barrier to market entry by the poor.
- **Monitoring and evaluation:** The project will facilitate the establishment of a village-level system to monitor the impact on poor villagers to ensure their access to resources and benefits are tracked and methods are adjusted in response to emerging factors.

NTFPs ENTERPRISE DEVELOPMENT

Recognising the important roles of NTFPs in poverty reduction, the CEFM project has applied a number of methods and processes to develop both current NTFPs, as well as new ones at the site, including the following initiatives.

Capacity building

Capacity building and technical support focuses on village facilitators, FUGs and IGS. They will be trained in NTFPs market analysis, production, harvesting, processing, packaging and marketing processes, as well as management of forest resources and organisational management skills. The training model will be to train peer trainers from FUGs and IGS, who can pass on their new knowledge to peers from groups in their own village. Capacity building of FUGs and IGS in accessing information and services (financial, technical etc.) and in negotiation, numeracy and other social/trading skills are also provided. In addition, the project explores the possibility of training local villagers to be the primary traders.

NTFPs resource assessment

The main objectives of the resource inventory in the project area (both household and government forests) are the identification of NTFPs species, volume, value, harvesting seasons, people involved in collection,

conditions for NTFPs planting etc. The assessment provided important data for the NTFPs intervention activity plan, which includes the participation of the poor. The assessment was conducted in three steps. First, a social inventory meeting was conducted in each village with village-mapping tool kits used for gathering all information related to NTFPs availability, volume and value, who collects what and when, and how much they contribute to the total income of a household etc. Different wealth-ranked household groups were interviewed to understand the different access to NTFPs and benefits gained by poor and less poor households. Second, four villages were chosen for an NTFPs study at the household level, resulting in a directory of NTFPs local knowledge and practices. Lastly, a participatory process with an actual physical inventory was done on selected village and government forest land following training from the Forest Planning and Inventory Institute. This exercise involved: the household whose allocated land was surveyed and their neighbours; villagers neighbouring land surveyed and owned by the government; the village head and village facilitator; local village experts who were willing to help and who knew the area well; and the cadastrian officer representing the Commune People's Committee. Through this process, the village was able to conduct inventories on all land when required by themselves, and both the project and the NTFPs harvesters have an indication of available volumes of natural NTFPs to guide harvesting practices and expectations of volumes achieved. The next step is to support an analysis of inventory results, which will provide accurate guidelines for harvesting.

Target the NTFPs selection process

Based on the participatory inventory, livelihood surveys and NTFPs research, a list of NTFPs suitable for each village was made. The project helped each village select their target NTFPs for commercialisation. The selection criteria employed aimed for maximum inclusion of the poor and included NTFPs which: suit the local natural conditions; have an available market; match poor people's financial capacity; are easy to plant and replicate; and allow early harvesting to realise benefits after a short period of time. NTFPs were ranked in term of priority for commercialisation using the village's selection process and the project list. Hence, the selection of bamboo shoots and herbs as the first NTFPs for support.

NTFPs value chain analysis

In the NTFPs value chain, there are some benefit conflicts between the actors (sellers and purchasers). In this relationship, the traders in the project area take advantage of the collectors because most of the collectors are ethnic minority, are poor and lack market information. The project facilitates analysis by each actor in the value chain and encourages dialogue between them to create a more level playing field for information-sharing and negotiation on price, sales volumes, quality, etc. At the same time, social responsibility awareness-raising was conducted among local traders, particularly in sharing information on product uses and values, and providing technical and other support to producers. These will be delivered in term of IEC and BCC materials and facilitating negotiation, as well as identifying win-win situations where traders also benefit from increased access to collectors.

Cultivation

Production of NTFPs is highly susceptible to natural conditions such as climate, soil, slopes, etc. The prioritised NTFPs (rattan, shan tea, canari, bamboo, bee-keeping, and grass-growing) were selected according to their suitability with the local conditions, high-value benefits for the communities, provision of both long- and short-term income, multi-purpose species, etc. Currently, bamboo for shoots and shan tea are being cultivated on

a household pilot scale in order to ascertain their economic benefits and suitability. Each village selected six households for NTFPs cultivation models based on criteria such as: existing experience; no or little agricultural lands; being poor; commitment to the project and willingness to help others to replicate the models (sharing experiences and seedlings). To ensure success, before cultivation, the project conducted training targeting women and the poor and FFS training methods were applied. During these sessions, it was emphasised that planting NTFPs enriches the forest and creates income generation opportunities.

Conservation and non-destructive harvesting

The project's research found that villages seemed to share a common risk of over-exploiting common forest areas. In general, villagers take care not to over-exploit NTFPs in their 'own' household areas, but in the common areas (unallocated/government forests), they collect as much as they can. It is apparent that the primary collectors of NTFPs are either unaware of good collection practices or are unable to follow these due to short-term interests and pressure from petty traders. This has led to the over-harvesting of NTFPs at inappropriate times, leading to poor quality products and the degradation of forest resources. The CEFM project will facilitate the formation of good collection and conservation practices (reflected in village conventions), which contribute to NTFPs development. The practices will be implemented through capacity building of the FUGs and IGs, community forest management boards, primary collectors, etc.

Processing and value addition

Value addition of NTFPs through processing can play a major role in creating additional employment for the rural poor. However, as described above, the NTFPs in the project areas are sold as raw materials such as bamboo shoots, herbs and rattans. An example of bamboo shoots processing can demonstrate how much value is added. In villages, the primary collectors sell 10 kgs of fresh bamboo shoots for $1. After processing, the processor can make 1 kg of dried bamboo shoots and sell it to local traders for $3. The processor earns two times more than the collectors. For that reason, the project will encourage primary processing at the primary collectors' level through activities such as drying, decortification, salting, pickling, grading etc., and provide the necessary training for maintaining quality. These methods/processes help collectors and the poor to become more involved in, and benefit from, the value chain. In addition, after processing, the weight of the products is reduced, which cuts the cost of transport, storage, packing etc.

Marketing

NTFPs marketing is one of the weakest points preventing poor villagers in the project site from entering the commercialisation process. Due to the remoteness of their villages and lack of access to proper transportation, villagers are not able to access markets and market information, and are weak at bargaining to gain a fair price for their products. Villagers collect NTFPs as much as they can, regardless of market demands and/or prices. In addition, villagers sell their NTFPs without much cooperation with their neighbours, which sometimes benefits the purchasers. The project area is very famous for pickled dried bamboo shoots, which are produced according to indigenous processing methods. However, as they are sold without any packaging or branding, end users have no knowledge of where the product came from, leading to losses in market opportunities. In response, as part of the value chain approach, the project will support IGs to conduct market analyses of specific NTFPs (for example bamboo shoots and shan tea) with the participation of experts. This process will involve the participation of IG members, the village head and facilitator, villagers keen on trading, local traders of NTFPs and other products, and other stakeholders. If external experts are used, they will help the analysis process in term of methodologies only. Marketing training will be conducted

for IGs and the project will also explore the possibility of training local authorities to be trade promoters in communes and produce a database on important NTFPs, yields, production areas, information on NTFPs trade, a trader's directory etc.

EXPERIENCES, CHALLENGES AND LESSONS TO DATE

In the project implementation process, methods and processes have been, or will be applied, to ensure poor and forest-dependent communities can equitably access the shared benefits from NTFPs commercialisation. It is recognised that many challenges lie ahead. For example, enriching NTFPs harvests by cultivating different valuable species may take periods of between some years (bamboo) to decades (canari) before they will produce benefits. During this period, poor villagers may continue to over-exploit forest resources while they wait for income from the newly planted NTFPs, due to growing pressure to generate income, despite the introduction of conservation practices. The project, in addition to developing NTFPs, will therefore also create other land-based income generation opportunities for the villagers and the poor, which are compatible with sustainable development such as upland rice and maize cultivation, cattle raising, forest planting, etc.

NTFPs processing creates value addition in term of employment for the poor. However, due to the limited number of NTFPs at the project areas, the collected species require little or only semi-processing, resulting in low incomes for the collectors. Furthermore, some NTFPs, such as herbs, require special processing and hygienic conditions that the local processing capacities cannot meet.

It has been mentioned that many poor households have little or no forest land. Arrangements between individual households do allow poorer people with no forest land to harvest from households with forest land based on mutual agreement. But this has only applied to firewood due to the limited supply of NTFPs, which is not adequate even for the forest owners. Hence, there is a need to introduce cultivation and forest enrichment in production and protected forest land. With large areas of land with potential for NTFPs development, and support from the project, this situation will be improved gradually.

Removing the barriers to NTFPs market entry for the poor is a challenging task for the project. It includes improving the status of collectors so there is more balance in their relationship with traders. To do that, capacity building, including improved access to market information, focuses on the FUGs and IGs, whose members are poor. These groups are encouraged and supported to reduce marketing and transport costs by working collectively. However, if the FUGs and IGs are not functioning well, or if poorer members do not actively participate, the poor will still be excluded from the profit-sharing resulting from NTFPs commercialisation. Lessons learnt from other projects show that the real power of such groups often falls into the hands of a few members (usually the richer), who are able to influence others. To reduce this trend, the project will encourage transparency and decision-making based on common consensus. At the same time, the richer members will be given incentives when they help the poor, such as the recognition and respect of the community. Project monitoring will also capture information on relative benefits to different members and share this within the villages to improve the motivation for village-wide benefits.

The last, but not least, challenge of the project is to secure poor people's forest rights, including the right to access NTFPs. The current project arrangement for local communities to receive the cultivation forest protection service from the government (2007-2010) does not clarify the forest tenure status, leading to unclear forest rights for communities in terms of NTFPs

exploitation. If the policies change, communities risk losing the NTFPs they grow in the protected forests. This would encourage illegal exploitation and produce conflicts between conservation and development, conservation and unsustainability, and government and local villagers' rights.

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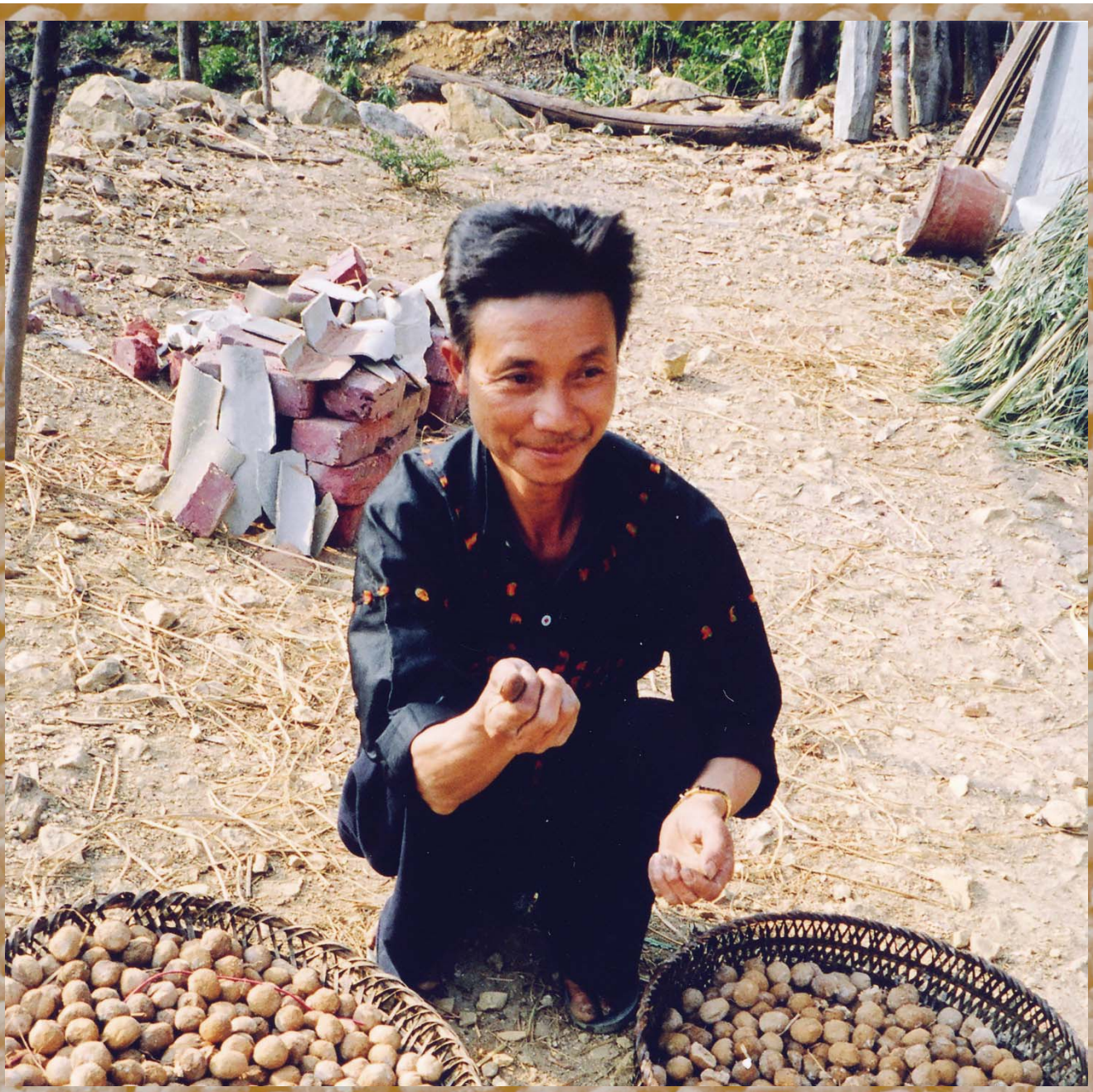

THEME 8:

BUSINESS

NTFPs Business in Viet Nam

Nick Shirra[1]

Non-Timber Forest Product (NTFPs) development can often be relatively profitable for business, despite the constraints typical to this sector. Businesses working with collectors of NTFPs products are often working with 'poor' households who mainly live in remote regions. NTFPs products include many high-value species such as spices, essential oils, wildlife and medical ingredients.

There is a total of 12.6 million hectares of forest in Viet Nam, comprising 37 per cent of the land area. The annual NTFPs business in Viet Nam is estimated to be well over $1 billion a year, making it one of the largest sub-sectors of industry in the country.

Working in the NTFPs sector in Viet Nam presents many challenges. A lack of infrastructure in remote locations and the cost of transportation create constraints to business development. In addition, the sector is one of the most unregulated and unofficial areas for enterprises to generate business (e.g. the collection of wild plants and animals is conducted by small-scale harvesters without a formal organizational structure). The levels of processing and value-adding are often low, and collection of materials is quite labour intensive.

Risk is high for small-scale producers taking on new crops or business development, although collection in the wild has fewer risks. Other issues include frequently low levels of fixed asset investment, as well as a slow rate of return on investment capital (for example, many tree crops take between three and five years before fruiting occurs).

NTFPs business can be seen by many as unattractive for investment unless there is guaranteed high profit. However, it is suggested that donors and development projects should not subsidise operations or investment risks, but instead should provide technical support. New ventures should be led completely by a private sector investor, rather than set up by donors or development agencies. Such projects should be market-led and based on an intelligent analysis of market information. While such information can be difficult to attain, it can still be gained through subscription sources.

In conclusion, NTFPs business has its constraints but it can still often be attractive enough to justify investment. Such businesses often work with the poor, and donors and development projects can initiate activities to promote such relationships, but at times some activities can inhibit the promotion of NTFPs development. The best promotion practices should always be followed.

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1 Wood and Agri Business Services Ltd. (Viet Nam)

Community-based Enterprise of Malva Nut Juice in Eastern Thailand

Somjai Srimongkontip and Caroline Dunn[1]

INTRODUCTION

Malva is a tree of the Sterculiaceae family and is identified under different scientific names such as *Scaphium macropodum* and *Sterculia lychnophora*. Malva nut or “samrong” in Thai and "mak chong" in Lao, are popular for their medicinal properties in China, where they are known as "pandahai". These nuts are actually desiccated fruits that produce an edible jelly when soaked in water.

In Thailand, there are two separate markets for malva nut: the market for the raw product, which is sold by local collectors to local producers and wholesalers; and the value-added juice product, which is sold to wholesalers in other provinces and directly to local stores. The price of the raw material of malva nuts is fairly similar around the region and stands at approximately 80-100 baht per kilogram. As there are about 20 malva juice producers in Chantaburi, at times there is a shortage of malva nuts in the market. Some producers therefore import malva nuts at 80 baht per kilogram from Lao and Cambodia, although the quality of the imported nut is poor due to premature harvesting and insufficient drying techniques.

Malva nut juice is common in Chanthaburi due to the local availability of the malva tree. Juice production in the town has expanded following the introduction of new production methods, which were developed at the local technical institute, Ratchamangala Technology Institute. Training has been provided to local people through the institute annually since 2000 and the juice is processed into either cans or plastic cups (for yogurt).

Malva nut juice enterprises are either private businesses set up by individuals, or community enterprises. Since the development of the Thai Government's One Tambon One Product (OTOP) policies, which aim to mobilise all available resources to strengthen the grassroots economy, most community enterprises are registered as OTOP groups.

THE COMMUNITY-BASED ENTERPRISE

Wan Lueng community enterprise was introduced to malva nut processing training at the Rajamangala Technology Institute. The group initially used the production facilities at the institute before seeking support to establish their own production enterprises. Being registered as a OTOP group under the Ministry of Agriculture ensures technical and financial support from the District Agricultural Extension Office.

In terms of the formation and management of a community enterprise group, membership is bought in shares, which cost 20 baht each, and a maximum of 1,000 shares can be owned by each member. A malva nut worker, who is also a member, will receive wages of 140 -170 per day depending on their skills and the length of time they have been in the group. As the Wan Lueng group has a more community-oriented focus, it tries to employ poor people from local communities. The total membership of around 100 members is made up from residents of eight different villages in the sub-district.

1 Regional Community Forestry Training Centre for Asia and the Pacific (RECOFTC)

The group employs around 45 people, and villagers can earn from 3,000-4,500 baht per month, either as supplementary income for their farms, or as their main source if they are landless.

The group uses members' contributions to finance a revolving fund to run the business. The group initially made a significant profit and redistributed 150 per cent of members' contributions. This was later found to be a mistake after the Ministry of Agriculture and Cooperatives offered training in bookkeeping, and the group reported a loss during the second year. In 2004, they made a profit again with a more moderate distribution of 10 per cent for members.

PROFITABILITY

Malva nut juice is not widely known to consumers in other regions of Thailand. The product is marketed mostly in souvenir shops within Chantaburi province and neighboring provinces such as Rayong and Trad.

In terms of a whole business, it is estimated that malva nut juice production can generate revenue of approximately 500,000 baht per month from 5,000 dozen cups. As the net profit of one cup might be 1-2 baht/cup, it is estimated that the income of one private enterprise can reach between 60,000-120,000 baht/month. For the Wan Lueng community enterprise, approximately 70,000 dozen cans are sold, bringing revenue of 7,000,000 baht to the group each year.

SUPPORT FOR THE ENTERPRISE

Technical support for processing

The Rajamangala Technology Institute is recognised as discovering malva nut processing and has facilities to process around 6,000-7,000 cans of malva nut juice per day. As providing training for related career development is considered one of the mandates of the institute, training in malva nut processing has been conducted annually since 1999, and the chairperson of the Wan Lueng Community Enterprise Group attended the course in 2002. Initially, the institute allowed community groups to use its processing facilities and equipments, and the institute also generates income from malva nut processing by selling a small quantity itself. Other business groups can hire the institute to produce malva nut juice under different brand names.

Technical support for tree cultivation

In the past, the malva tree was officially promoted as a symbol of Chantaburi province. By 1999, the malva tree was one of three selected species for a research project on plant genetic conservation initiated by HRH Princess Sirindhorn. It is estimated the wild tree requires 10-12 years before it can be harvested.

To shorten the period before the first yield, Mr. Manoj Kul-Pruek-Sa, a Rajamangala Technology Institute lecturer, experimented by planting malva trees from seed for use as stocks for grafting. Under this project, one forest tree is considered the mother tree. In addition, there is a plot of four-year-old trees at the institute which are used for cuttings. Otherwise, forest trees are used for the experiment. So far, there are no results from the experiment as the first trees, now five-years-old, were all sold to farmers. These farmers have reported that there is no fruit on their trees yet, although they expect there could be within the next year or two. This expectation is based on the fact that other cultivated fruit trees generally bear fruit after five-to-eight years, despite the species taking longer in the wild.

The institute provides significant cost-free support for farmers in training on grafting and budding, and also serves local communities by sending a resource person from the institute to villages to provide training on budding and grafting malva trees, when requested by the local forestry agency. Farmers from other provinces can still buy malva seedlings from the institute, which produces 2,000-3,000 seedlings per year.

Financial support

Initially the group was eligible for small grants, which were later expanded significantly. Since the establishment of Bureau of Community Enterprise

Promotion and the OTOP policy in 2002, the Thai Government has a policy of providing financial support to community enterprises through different funding programmes such as the Village Fund and Small and Medium Enterprise (SMEs) Fund.

Presently, the sub-district administrative organisation (TAO), which is a local government unit, also supported the community group by providing a free loan for the development of income generation activities in the village. This loan also helps many community enterprise groups to purchase equipment for their factories.

In order to expand the market for malva nut juice and launch new products, producers, including the Rajamangala Technology Institute, have experimented with alternative processes to create different flavoured juices and instant malva nut powder. Presently, malva nut gel in saffron, chrysanthemum, green tea and bel juice are being produced throughout Chantaburi province.

Marketing support

The product is distributed directly to local shops and also transported to other provinces by the producers. Additionally, the juice is also available in some health shops in Bangkok. The product, therefore, is spread out among a curtain group of consumers in the city. The OTOP Fair seems to be an appropriate place to introduce malva nut juice to new consumers, however, consumers may also help to distribute the products by giving them to their friends and relatives. As it is sold by the dozen, it represents a nice example of a local Chanthaburi product and is a good souvenir from the area.

IMPACT OF ENTERPRISES

Economic impact

Malva nut enterprises have benefited from the labour market in Chanthaburi, through both private and community enterprises. Although the malva nut is seasonal, the fruit can be stored for two years if properly dried. This allows producers to process the juice all-year round. It means that local workers involved in malva nut processing can gain regular income ranging from 3,000-4,500 baht per month. One private enterprise actually pays higher wage rates than the community enterprises, with a minimum wage of 4,500 baht/ month.

Social impact

Community enterprises also provide income for labour under a system that helps those who most need the opportunity. Village headmen are approached to recommend villagers who need jobs, and the profits from the community enterprise group are used to assist the whole community, with 10 per cent allocated each to study tours, community development and social welfare.

Environmental impact

At this stage, harvesting is conducted in natural forests, which are mostly national parks. The most convenient harvesting method for villagers is to cut the whole tree, although the nuts collected by this method sometimes are not yet mature.

There has not been any research into the overall impact that this harvesting is having on the environment. The annual harvest of malva nut could be around 10 tonnes from the forest and, as each tree may yield between 10 and 40kgs, this means harvesting around 250-1,000 trees.

Trees grow in scattered areas, so the impact is generally spread out. However, it is not known how quickly the trees can regenerate, as a fruit bearing tree may take 10-12 years to grow. Currently, there are signs of regeneration in the forest.

Since malva nut processing has spread throughout Chantaburi province, harvesting malva nuts in the national park is now very strictly enforced and controlled. This has decreased malva tree cutting. In addition, some farmers are interested in planting malva trees for commercial purposes in the future.

POLICIES REGULATING MALVA NUT HARVESTING

Regulations relating to malva nut harvesting seem to be conflicting. On the one hand, harvesting of the tree by cutting is prohibited, while on the other hand, despite viable alternative harvesting practices, or support for cultivation, malva nut products are promoted through the OTOP policy.

Malva trees are classified as a rare species, and are considered to be in the stricter of the two rare species categories, according to Thai regulations. According to forest department regulations, the tree must not be cut at all, except in extraordinary circumstances, where an application must be made to the Ministry of Agriculture and Cooperatives. Local officials in the Khao Kitchakoot National Park are aware that villagers still cut the trees, and there were three cases in 2005 were villagers were found to be breaking regulations. When arrested, villagers are either fined or jailed, although villagers are usually fined 500 baht.

There are six villages in the Khao Kitchakoot National Park, one of the minor districts of Chantaburi, which are thought to harvest the malva nut. Traditional harvesting methods for the malva nut is collecting the mature fruit which has naturally dropped to the ground. However, the fruit is easily dispersed far away from the tree by strong winds, causing difficulties for collectors. Since the stem of the tree is tall and branchless, and the fruit is only available high above the canopy, it is possible, though difficult and dangerous, to climb to the fruit. Therefore, villagers end up cutting the whole tree down to access the fruits.

Locally, the bark of the tree is used as a veneer, while the soft wood is useful for temporary scaffolding for construction. At this stage, this method of harvesting has not been replaced and there is no viable cultivation as previously discussed. Currently, the local people largely feel that there is no shortage of malva nuts.

FUTURE OF THE ENTERPRISE

Most malva nut juice producers are optimistic about the future. The main reason for this positive outlook is that there are many people in Bangkok who still are not aware of malva nut products. The OTOP policy in Thailand seems to be one potential channel to promote the product to new consumers outside Chantaburi province. However, in many cases consumers are likely to have tried the fruits at some time in their past and be familiar with it. Some also believe the development of new products such as powder and different flavours will result in increasing demand.

Improved technology was one limitation mentioned, including the need to improve methods for processing the gel, and also refine equipment capacity. Further research on the medicinal properties is also thought to be important in promoting the product in the future. There is still no information about what effects the sterilisation process might have on the medicinal benefits of the product.

Raw material supplies are not thought to be an issue for the future of the product. At this stage, producers feel that supply is adequate. It is known that horticultural techniques in Thailand are well developed and producers are optimistic about the ability of farmers to begin producing fruit from cultivated trees. However, with the limited results in growing trees and fruit so far, it is felt that an expansion of the industry would place increasing pressure on the natural supply and environment.

Other producers interviewed felt that there would still be plenty of raw material available in Cambodia and Laos. This might be an alternative source in case of shortfalls in Thailand. According to forestry officials, there is an abundance of malva nut seedlings in Khao Kitchakoot National Park, and they are optimistic that even if all the mature trees were harvested, there would still be seedlings left for the future. They also believe that such a situaiton would force farmers to improve their cultivation methods.

Bridging the Gap – Medicinal Plants Innovation in Viet Nam[1]

Chris Wheatley[2], Do Thi Thu Ha[3], Thomas Osborn[4], & Peter Butler[5]

INTRODUCTION

'Bridging the Gap – Medicinal Plants Innovation in Viet Nam' (hereafter termed the Medicinal Plants Innovation (MPI) Partnership) builds on the results of the MPI Project (2003-7)[6]. Both project and partnership seek to help develop more sustainable livelihoods for ethnic minority groups in the Sapa district of northern Viet Nam, and also provide incentives for the conservation of threatened indigenous medicinal plant species. This paper provides an overview of the MPI project, and of the current efforts to develop a sustainable and equitable commercially-oriented partnership based on the results obtained to date.

The northern mountain region of Sapa has the highest poverty rate in Viet Nam. Ethnic minorities comprise over 50 per cent of the population, and their knowledge of forest plants and their derived products and uses represents one of their few assets. Sapa is an acknowledged national centre of expertise on the traditional use of medicinal plants and of their biodiversity. However, over-exploitation of the forests and medicinal plant species endangers the ecological integrity and biodiversity of these areas.

Previous efforts to develop livelihood options based on medicinal plants in Sapa have focused on non-native species and largely benefited the Kinh (ethnic Viet Namese).

Therefore the MPI project began by investigating whether native medicinal plants in Sapa had commercial potential for development in local, regional and international markets and whether they could be 'domesticated' and grown by local ethnic minorities, thereby contributing to both biodiversity conservation and to rural livelihoods.

The goal of the MPI project was the "sustainable development of high-value natural products based on medicinal plant species of conservation value in Viet Nam, emphasising the participation of local ethnic minority communities".

The MPI project combined the medicinal plant knowledge and experience of ethnic minority groups in Sapa with rigorous scientific studies to demonstrate the efficacy of their biological properties, with the aim developing high-value products for domestic and international markets. The project also covered sustainable production of these species by the ethnic minority communities themselves, both for conservation and product marketing purposes.

The project studied options for establishing an equitable value chain that links the ethnic minority communities in Sapa (as plant producers and primary processors) with high-value domestic and international markets so that the products derived from their production could be marketed effectively.

The marketing strategy aimed to maximise the value-added nature of products that can be produced from native medicinal plants of conservation value. Thus, market niches are now being sought that value the specific attributes of the products. These are based around the concept of "Effective, high-quality, natural plant products, from medicinal plant species of

1 This is the name for the SEED Award project partnership comprising SIMPA, SPE, FHR and CECEM (2007 SEED award winners www.seedinit.org)

2 International Coordinator, Forest Herbs Research Ltd, Nelson, New Zealand.

3 Director, Sapa Essentials, Viet Nam

4 Consultant, Sapa Essentials, Viet Nam

5 Director, Forest Herbs Research, Nelson, New Zealand

6 Financed by the New Zealand Agency for International development, NZAID

conservation value native to the Sapa district of northern Viet Nam, that are produced, harvested and commercialised sustainably by local ethnic minority communities".

Mechanisms have also been developed to ensure that the ethnic minority communities can own, and benefit from, the intellectual property generated by the project.

In addition to the four partners, the MPI project involved the following organisations in Viet Nam:

- Frontier-Viet Nam as a counterpart (2003)[7];
- Fauna & Flora International (FFI) as a counterpart (2004-5)[8];
- Sapa District Economic Department and Lao Cai Province People's Committee;
- The ethnic minority communities of Ta Phin, Ta Van, Lao Chai, and Sapa, (in Sapa District) plus o Quy Ho (Sapa town), comprising Dao, H'mong, Giay and Kinh ethnic groups, and including representatives from the commune People's Committees and mass organisations;
- Ha Noi University of Pharmacy, which provided expertise in botany, ethnobotany, propagation and production of medicinal plant species, and laboratory analyses and assays of plant materials;
- Institute of Materia Medica in Ha Noi, which provided expertise in botany and pharmacology. the Medicinal Plants Centre of Sapa, (under the management of the Institute of Materia Medica) has been providing plant propagation material for some species;
- Institute of Social Sciences in Ha Noi, for social impact assessments; and
- Craftlink[9], an export-oriented fair trade company in Viet Nam that has identified potential clients for natural products.

PROJECT ACHIEVEMENTS

The project has identified and developed high-value products from five selected indigenous medicinal plant species that can be cultivated by ethnic minority farmers in Sapa.

These target species were selected from over 800 native species found locally. The selection process was:

- participatory, involving all stakeholder groups (ethnic minorities, conservation, botanical and marketing experts, local authorities and mass organisations);
- open (with no preconceived targets); and
- logical, using a range of environmental, scientific, social-cultural and market-oriented criteria in a systematic manner.

Some key criteria used to filter the species were conservation value, growth cycle less than five years (i.e. not a tree), not poisonous, level of existing scientific knowledge, agronomic characteristics (ease of cultivation) and there being a good fit between traditional uses and international market potential (growth market segments).

Following selection of the target plant species, three project components operated in parallel, namely:

1. ***Plant propagation and production trials:*** were conducted to assess the feasibility of turning these species from wild-harvested plants into crops suited to production in the current smallholder farming systems found in upland communes of sapa. simple primary processing (drying, essential oil extraction) was also trialled.
2. ***research and development:*** based on surveys of traditional knowledge of these species by different ethnic groups, and on existing scientific knowledge, a series of R&D contracts were executed by research institutions in Viet Nam and New Zealand. these included:

7 Society for Environmental Exploration (www.frontier.ac.uk)
8 With funding from the EU
9 www.craftlink-Viet Nam.com

- bioassays, and further exploratory research project conducted by the bioactivity investigation group at otago university (located in wellington medical school, nz);
- biochemical assays conducted by other new zealand institutions (universities, crown research institutes); and
- assays and trials carried out by Ha Noi university of pharmacy and the institute of materia medica.

3. ***Enterprise and supply chain studies:*** were conducted to determine the most appropriate organisational and legal arrangements for the commercial development of the medicinal plants being studied in this project. This included arrangements with respect to the organization of crop production, harvesting and processing in rural communes of Sapa for further processing and distribution within Viet Nam and to export markets, and for the registration and assignation of intellectual property rights generated by the project.

   Feasibility studies for each species integrated the results from these three project components. three species were positively evaluated, and a diverse range of markets, potential products and uses were identified as follows.

Elsholtzia penduliflora

This species contains a unique essential oil that can be extracted by small-scale steam distillation. This herbaceous plant is easily propagated, fast-growing and has proved popular with smallholder farmers in Sapa. Plant and oil yields achieved in initial production plots (2005-2006 seasons) suggest that income from *Elsholtzia* production will be very competitive with that obtained from other cash crops. The oil can be used directly or further processed in to a balm (c.f. tiger balm) with a "deep heat" property that relieves aches, fevers etc. The balm product was formulated from *Elsholtzia* oil supplied to a New Zealand-based natural cosmetics firm in Nelson. Both oil and balm have potential for export to international markets, where the "ethnic minority, traditional use and conservation value" of the plants provides an additional strong marketing message for a unique essential oil. If this product does reach the international market, a royalty will be paid back to the community in Sapa based on unit sales of the balm (or other added-value product). The balm can also be manufactured in Sa pa (on a small-scale) and marketed to tourists in the local market (Sapa, Ha Noi etc). A market study completed in Sapa for this product found a high level of interest in the product, and a willingness to pay $4-5 for a small pot or jar of the balm product. SPE and FHR are currently exploring international markets for the balm and the oil from which it is derived, while Craftlink has undertaken market trials in Ha Noi and overseas.

Based on this positive experience, further studies are in progress in Sapa on other native plant species with potential for essential oil extraction, in order to develop a range of 'Sapa essential oils' and derived, added-value products. In 2006, production of a second *Elsholtzia* species (*E. blanda*) was started, with potential for a similar range of products (balms, soaps). *E. blanda* is used traditionally for relieving the irritation caused by insect bites, but also has a very pleasant, fresh aroma, suited to balms and soaps.

Stephania brachyandra

This plant is a vine that produces a large perennial tuber that may grow to several kilos in weight over a period of more than five years. Production trials with farmers have demonstrated that both vines and tubers can be harvested annually. Bioassays carried out at Bioactivity Investigation Group (BIG), University of Otago (with participation of staff from Ha Noi University of Pharmacy) have identified a number of marketable, novel biological properties of *S. brachyandra* tubers and vines. Of most interest is the finding that extracts from the tuber and vines contain significant anti-melanoma and anti-Type II diabetes bioactivities (in laboratory trials). Further investigation of these biological effects has been completed, confirming the initial results, although the compound responsible for the anti-melanoma bioactivity has not yet been identified.

A provisional patent based on these findings has been registered in New Zealand. This is in the process of being transferred by FHR to Viet Nam for the benefit of the Medicinal Plants Association in Sapa. Following this IP protection, FHR (with support from BIG in New Zealand) is seeking commercial partners interested in further investment for product development (for both natural and pharmaceutical products) based on these findings. Thus, it appears it is feasible to develop royalty-based income streams for the Sapa community based on the intellectual property generated by the MPI project on this species.

Acanthopanax trifoliatus

This species is a woody bush/small tree. Bark is harvested after two-to-three year's growth and has a number of traditional uses, including memory enhancement. Preliminary bioassays at BIG have indicated this species has significant bioactivity related to major natural products market segment (cognitive function, Alzheimer's disease). IP protection (patenting) may be viable for *S. brachyandra*, although project funds are insufficient to permit this. However, this would allow for the identification of commercial partners for the development of both natural and pharmaceutical products.

Establishing an equitable value chain

During the first two years of the MPI project, it became clear that there were no pre-existing commercial or socially oriented enterprises in the Sapa area that could take up the results of the project. A local medicinal plants processing firm had recently defaulted on farmer production contracts, and was no longer trusted by smallholders. It does not subscribe to ethical/fair trade standards. The Ha Noi-based Craftlink fair trade company was handicraft-oriented, and was interested in marketing the end-products, but was not interested in being involved at the production/ primary processing level.

After much discussion and debate among stakeholders, the farmers involved in the project decided to establish a Medicinal Plants Association under a new Viet Namese law which permits such organisations to undertake trading activities.

Following the end of the counterpart relationship with FFI in December 2005, the project coordination office converted into a company (SPE) oriented to support the association and the marketing of its products, as well as undertake the production of derived added-value products for local markets, under a fair trade/royalty-payment mechanism. FHR is providing ongoing support from New Zealand, while CECEM has contributed to training and business development in Viet Nam.

The equitable commercial development of the products identified and tested during the current project will take place thorough a partnership between four organizations - SIMPA, SPE, FHR and CECEM - as detailed in the SEED award application. The four organisations have well-defined roles, based on their competencies and experience.

SAPA INDIGENOUS MEDICINAL PLANTS ASSOCIATION (SIMPA)

Final approval for the establishment of SIMPA was obtained in mid-2006, in time for the first commercial harvesting of the *Elsholtzia* plants grown by approximately 30 farming households, primarily from the Dao, H'mong and Giay ethnic groups. The association was successful during 2006 in managing/coordinating the production of target plant species among member households, and organising harvesting and essential oil processing operations. SIMPA has established a small-scale essential oil extraction unit (based on steam distillation), which processed these plants into about 13 litres of pure essential oil. This oil is a unique product, produced nowhere else to our knowledge and SIMPA is actively marketing these oils in local markets in the Sapa area, especially to tourists. Alongside this, the association's members continue to cultivate and plant the other target species.

SIMPA is a legal entity that will benefit from ownership of the IP generated by the project. Income derived from royalties and licenses will

be placed in a social/conservation fund managed separately from the commercially-related income generated from the direct sale of the plants and their products.

The association has a draft business plan produced by a local Viet Namese NGO, CECEM, which specialises in supporting this type of organisation. As a result of collaboration with the project, CECEM became interested in contributing to the success of the association in the longer term, and provided management and leadership training in Ha Noi (free of charge) to association officers during 2006.

SAPA ESSENTIALS (SPE)

The MPI project coordinator position ceased in December 2005, at the same time as the collaboration with FFI ended. However, the project coordinator (Ms. Do Thi Thu Ha) has established a small business called Sa Pa Essentials, to continue to support the commercial activities of SIMPA. SPE will coordinate the national and international marketing of products produced by SIMPA, and (in agreement with SIMPA) will manufacture derived products such as balms and soaps for local markets, paying a royalty back to SIMPA for the use of the ethnic minority/plant conservation/traditional knowledge "story" for marketing purposes. Currently, SPE is working with FHR to identify international markets for these products, as well as process the legal registration of product licenses that are required in order to market these products within Viet Nam.

SPE also maintains the potential for providing advisory services in the field of the sustainable management of medicinal plants. With the advantage of an integral hands-on knowledge of the successful implementation of the project, combined with a highly adaptable project mechanism, SPE is now in a unique position to provide advisory services to anyone wishing to replicate similar project activities elsewhere in Viet Nam.

FOREST HERBS RESEARCH LTD

Forest Herbs Research Ltd. (FHR) is a natural products business that has successfully developed the Kolorex range of anti-fungal products from the horopito plant (*Pseudowintera colorata*) cultivated on an organic farm in Golden Bay, New Zealand. This approach permits the true value of the medicinal plant species to be realised, and unlocks the potential for combining income generation with biodiversity conservation.

FHR is working (on a non-profit basis) with the project stakeholders in Viet Nam in the implementation of the MPI project, contributing a knowledge of the international market for natural products, and management of the technical R&D process for these products. This includes conducting rigorous technical studies of the efficacy of active ingredients and their safety, and developing marketing plans that use branding to establish and protect the value of any intellectual capital owned by the ethnic minorities that the project may develop, including any value-added aspects of products generated during the course of the project.

FHR will continue to support SIMPA and SPE beyond the life of the current project through international marketing contacts and expertise, management of R&D as necessary for further product development, and management of IP negotiations with potential future commercial partners/investors, thanks to an agreement currently being negotiated with SIMPA.

CECEM

CECEM is a national NGO whose mission is "to add value to development programmes in Viet Nam by providing training and consultancy in the areas of training methodology, participatory project management and organisational development". CECEM's role within the partnership is to support the development of commercial and management skills within both SIMPA and SPE. Currently, both organisations require considerable support to bring them up to speed in several key commercial

areas. CECEM has many years of experience supporting this type of small rural organisation (including those involving ethnic minorities) and also sees potential for expanding the project model to other areas/communities in Viet Nam.

ACTUAL AND POTENTIAL SOCIAL IMPACT

A social impact study of the project was carried out in September 2006 by social scientists from the Institute for Family and Gender Studies in Ha Noi. While acknowledging that the impacts are still incipient, given the very recent development of commercial activities, the study did find that incomes have increased in the farming households involved in SIMPA (through plant cultivation and processing activities), but as yet only contributes a small percentage of total income. Money earned from sale of the medicinal plants was used to purchase house building materials, food, medicines, clothes, education etc. The project has also had a positive influence on women's position within households through their membership of SIMPA, including in leadership (chair and vice-chair) positions, acquisition of new skills such as medicinal plant cultivation and processing, and by making their own contributions to household incomes. Twenty additional households requested membership of SIMPA for 2007. However, the current market for the medicinal plant products is not yet sustainable, and more effort needs to be placed on the development of domestic and international markets before any widespread impact beyond these initial communities can be expected.

In conclusion, the study found that: "although the commercial activities have just begun, the local farmers have gained certain experience from the cultivation of three crops of medicinal plants, and they have earned remarkable income from some species of medicinal plants, especially *Elsholtzia penduliflora*, as well as from jobs created in the stages of extracting and processing essential oils. Benefits are also expected when rights are handed over to households, including male and female members of the families, and the organising and leading capacity of association leaders has been much improved recently. The project has also brought about more optimistic thoughts about a better life for the households".

FUTURE DEVELOPMENTS

The project has succeeded in identifying medicinal plants and products with commercial potential, and in establishing the organisations (SIMPA and SPE) required for equitable market-chain development. In order to build on these achievements and reach a commercially sustainable future, several elements remain to be developed in the newly established partnership, including:

- international clients for the essential oils and derived products: at this stage, the development of the business network is in the very early stages and market identification in the short-term is required to maintain momentum for project farmers;
- registration/labelling of essential oil products for sale in the domestic market: this important aspect is currently complicated by ongoing revisions within national legislation restructuring, and is likely to require legal representation.
- capitalisation of SPE and SIMPA to finance larger scale production and marketing activities, in line with expected demand: this element also will require careful management of production in order to meet demand, and the development of mechanisms to avoid any negative environmental impacts that increased demand may generate;
- capacity building for SIMPA and SPE in a range of areas: both simpa and spe are very young and will require a great deal of assistance in order to survive in the commercial market. Both require similar support, though perhaps at differing levels, such as: extensive business training (provided by cecem), accountancy training (or accountant hiring), product research and development, equipment acquisition (including shared offices), and improved production facilities.

- Fair trade and/or organic certification for these natural products/raw materials: accessing the fair trade and/or organic markets will require time, even though these principles have been incorporated into the project during development;
- Transfer of Stephania IP to SIMPA, and negotiation of commercial partnerships based on the R&D carried out to date (with involvement of FHR)

ROLE OF THE PRIVATE SECTOR IN THE MPI PROJECT AND PARTNERSHIP

FHR is a small New Zealand-based natural products company, which has successfully created an international market for added-value products from the native plant species *Pseudowintera colorata* (horopito). Research identified the active ingredients responsible for the effective anti-candida action of this plant, and led to the formulation of a range of products that assist the management of fungal infections. FHR has remained a small firm (with only three permanent staff), yet produces sufficient raw material from one farm to supply a global market for these products. FHR has achieved this through contracting out all R&D and all product manufacturing, while only maintaining in-house the:

- control of raw material supply (as the only producer of horopito with high concentration of active ingredients);
- management of R&D and quality control processes;
- supervision of production contracts for each added-value product; and
- market development and supply chain management with distributors and licensees.

FHR was open to non-profit involvement in the MPI project, using its expertise in the above areas to facilitate a similar process for selected indigenous Vietnamese plant species. It was willing to undertake this mainly because of the interest of the company owner/director (Peter Butler) in "giving something back" to society after being successful in establishing and growing his own business in New Zealand. Subsidiary benefits do also exist, namely the public relations value that comes from involvement in the project, for FHR's clients and distributors.

The benefits of FHR's involvement in the project have been:

- incorporation of relevant international market criteria into the species selection process;
- management of the R&D process for each selected species, using specific short-term contracts with selected universities and institutes in New Zealand and Viet Nam;
- input into the design and development of commercial arrangements in Viet Nam (farmer organisations, supply chain interactions etc);
- market intelligence and development for specific products resulting from the R&D process;
- management of intellectual property protection for the benefit of the Sapa ethnic minority community for discoveries made by the project;
- facilitating contacts with potential investors and IP licensees; and
- ensuring NZ taxpayer's money is spent efficiently and effectively.

We should also note that another small New Zealand business (Carol Priest Natural Cosmetics Ltd) has also provided services gratis to the project, including:

- formulation of recipes for products based on *Elsholtzia* essential oils, including balms/salves and soaps;
- advice on equipment and protocols for production at a batch scale; and
- initial market testing of some Viet Namese products in the company's own export markets.

This was made possible through the personal networks that exist among small businesses in the natural products cluster around Nelson, New Zealand.

Note that FHR is not taking any direct role in the supply chain for the products themselves, but has been and will be providing "services" for the supply chain based on SIMPA and SPE in Viet Nam. Many of these roles will be ongoing in the new partnership that follows on from the project as it nears completion. Thus, the MPI project is helping to create a potentially long-term relationship between the NZ natural products industry and similar enterprises in Viet Nam.

Thus, private sector involvement in the MPI project has been very different from that normally found in projects that involve the identification and commercial development of natural or pharmaceutical products from indigenous plant biodiversity. In our case, the main features can be summarised as follows.

- Private sector involvement was conducted on a non-profit basis, with no interest in IP ownership or in becoming a supply chain actor. However, there may be potential interest in becoming a service provider.
- Rapid identification was achieved of a few target species on which to focus R&D efforts, rather than indiscriminate screening of indigenous flora in general.
- There was a general openness to sharing in-house expertise freely;
- The participant was a small business from a small country, and was therefore non-threatening and found it easier to build trust locally (no hidden agendas).

CERTIFICATION ISSUES

The MPI project would greatly benefit from Fair Trade (including organic) or other ethical certification. In the natural product market arena certification, particularly for niche products, it is highly desirable and an efficient mechanism for product value-addition. Since the MPI project's inception in 2003, a strong theme for the project has been to conform to fair trade and organic standards, regardless of actually being certified. Actual fair trade activities have been ensured through the participation of local communities at every step of the project such that the current structure and operation of SIMPA could not exist without it; and organic production principles have been followed both because of the nature of the plant material being cultivated (medicinal plants) and regulations on potential access to international markets.

However, becoming certified is not an easy process because of time and financial constraints. Beyond the scope of the MPI Project, the initial financial outlay for certification for small-scale production, as is currently the case with SIMPA, appears inhibitory, and continued certification costly without guaranteed production expansion that would provide adequate economy of scale. Add to this the management aspects for certification monitoring assessment and we can easily see that for small-scale producers with little management capacity or capital, certification is unaffordable. To compound the issue, few local farmers within SIMPA have the capacity to appreciate the relevance of certification for their products.

In the case of SIMPA, Fair Trade labelling (FLO) is also impractical as standards have not yet been developed for the products currently under development. To sponsor the development of such standards is also cost-inhibitory. Marketing the product as 'ethical' is an option, and several international schemes provide possible routes to such labelling such as ETI - Ethical Trading Initiative - and IFAT – the global network of fair trade organisations.

But the sheer abundance of types of certification, certification bodies and fair trade schemes can be bewildering, especially for those with little experience in this field. Within the MPI project, those partners with access to such information are taking the lead to find the correct certification and the correct approach for the MPI project to continue to grow.

CONCLUSION

In May 2007, the partners involved in this initiative were informed that they were one of the SEED award winners for 2007. This very welcome outcome recognises the achievements of the project to date, and provides much needed support for the partnership in the transition to a commercially-oriented operation in the future. We look forward to the challenges that lie ahead.

SECOIN's Agarwood Product

Dinh Xuan Ba[1]

ABOUT AGARWOOD

Agarwood is a mystical and precious resinous wood formed in the heartwood of the *Aquilaria* tree, an archaic tropical evergreen tree native to the Gulf of Tonkin, Viet Nam and other countries in Southeast Asia. Among the 26 species of Aquilaria trees that can produce Agarwood, the most valuable species is *Aquilaria crassna Pierre*, whose cradle is located in Viet Nam's Ha Tinh province, where SECOIN HATINH (the Agroforestry Division of SECOIN) is located. Apart from the *Aquilaria* genus, there are six other genera that can probably produce Agarwood: *Gyrinops*, *Gonystylus*, *Aetoxylon*, *Phaleria*, *Wikstroemia* and *Enkleia*, of which, at least *Gyrinops* exists in Viet Nam.

The *Aquilaria* tree generally grows up to 40 meters high and 80 centimeters in diameter. When these wild trees become randomly infected with a parasite, fungi or mould, they begin to produce Agarwood in their heartwood as an immune response to the attacks. But this biologic process develops extremely slowly over several decades. Not all *Aquilaria* trees produce Agarwood, and only approximately 10 per cent of wild mature Aquilaria tree (above 20 years old and with a breast height of more than 40 cm diameter) can naturally produce the resin.

The ecological interaction between the host tree and the fungi and/or moulds in order to produce Agarwood is poorly understood. Other factors such as the age of the tree, differences in the tree caused by seasonal, environmental and genetic variations in *Aquilaria* trees may also play an important role in Agarwood formation. Newly created scientific achievements and trial treatments implemented by Robert Blanchette, Dang Ngoc Chau, Thai Thanh Luom, Nguyen Hong Lam, and Nguyen Quang Than have shown that Agarwood formation can occur in cultivated trees as young as four years of age by using inducement (or wounding/pathological) techniques. After 'wounding', the tree by making a drill hole in the trunk, a bio-agent consisting of special isolated fungi and biochemicals is introduced to the heartwood. After 20-24 months, a dark brown resinous wood part was observed around injury sites. Accurate estimations of the quality and yield of such Agarwood are still pending.

1 SECOIN Company Ltd.

AGARWOOD USES

Agarwood can be used in the following areas:

- Aroma industry: perfumes, cosmetics and cosmeceuticals, toiletries, flavourings, fragrances, incense, candles and aromatherapy preparations.
- Medicine: traditional Vietnamese medicine, traditional chinese medicine, tibetan medicine, ayurveda and aromatherapy, efficacious sedatives and aphrodisiac.
- Indoor air improvement and fumigation: air-revitalizing solutions made from agarwood help to improve indoor air quality and performances in the office.
- Religious practices and spiritual life: buddhism, christianity, islam, catholicism, hinduism, deep meditation and yoga.
- Other uses: ornamentation, bead strings, carvings, wines, teas, burials and cremations (grave-clothes, libation ingredients in funeral pyres), Prayer rugs etc.

Agarwood products include: Agarwood segments, splinters, chips and powders, Agarwood oils, Agarwood-based revitalising solutions, Agarwood-based perfumes, Agarwood incenses, Agarwood candles and soaps, Agarwood

concentrated juices and balms, Agarwood bead strings, Agarwood statues and carvings, Agarwood impregnated articles, Agarwood liqueurs and Agarwood teas.

SECOIN AGARWOOD

Through its projects, SECOIN aims to answer the following question: How can Vietnamese Agarwood products be developed for wellness, poverty alleviation and biodiversity conservation? Our Agroforestry Division was selected as a participant sponsored by UNCTAD/SIPPO under the Biotrade Programme. As part of this programme, SECOIN took part in the 2006 Vitafoods International Exhibition held in Geneva, Switzerland from May 9-11, 2006 (www.vitafoods.eu.com). During the fair, we gave a presentation at the Seminar Theatre entitled "Biodiversity preservation and poverty alleviation in Viet Nam: Agarwood and Aquilaria crassna Pierre", and our delegation was invited to take part in the Biotrade Business Roundtable organised by UNCTAD. We visited Spain (Madrid and Barcelona) from June 25 to July 6 to take part in two business forums organised by both the Spanish and Vietnamese Ministries of Trade, where we displayed Agarwood products, essential oils and medicinal herbs. In May 2007, we took part in the Foire de Tours (Tours Cedex1) in France, while from May 16 to July 27, 2007 we took part in the ASEAN Health & Wellness Exhibition held in Tokyo, Japan, where we displayed our Agarwood-based products for well-being.

As for Agarwood oils, SECOIN is currently selling about 25 kinds of Agarwood oils made of selected resinous wood parts from *Aquilaria crassna Pierre*, *A. malaccensis*, *A. sinensis* and *A. filaria*, of which *A. crassna* is native to Viet Nam. By combining the above wood parts using infusion or co-distillation techniques, we create oils with unique and seductive smells. Their price ranges from $1,311 per litre to $11,132 per litre. All oils are accompanied by Certificates of Analysis (COA) implemented by the Centre for Education & Development of Chromatography (EDC Center), Ha Noi University of Technology. Our main markets are Northeast Asia, the US, Europe and the Middle East.

We also produce an Agarwood-based revitalising solution that is a nice combination of Agarwood oil/extract and other aromatic essential oils like lavender, lavendin, eucalyptus, lemongrass, peppermint, spearmint, clary sage, citronella, jasmine, rose, orange, lotus and thyme. The easiest and simplest way of vapourising revitalising solutions for inhalation is to use aroma diffusers and/or air revitalisers/purifiers, which can generate negative ions and have great affect on removing bacteria and viruses, easing allergies caused by dust and air contaminants, repel insects, and relieve stress and fatigue.

As for Agarwood incense, SECOIN sells three incense types - sticks, coils and cones - comprising Agarwood powder and other aromatic ingredients in powder form. Our incense ingredient recipes are generally based on 'The Five Basic Elements' of Eastern philosophy: Metal - Hooker fil. (*Illicium verum*); Wood - Blanco Benth. (*Pogostemon cablin*); Fire - L. Merr. et Perry (*Syzygium aromaticum*); Water – Agarwood (*Aquilaria crassna Pierre*), *Santalum album* L. and *Pterocarpus santalinus*; Earth - L. Nash (*Vetiver zizanioides*), *Nardostachys grandiflora* DC., and L. & Maillefer (*Valeriana officinalis*). Our high-quality incense binders comprise Tallow laurel (*Litsea glutinosa* Lour. C.B.Rob.) and *Pouzolzia sanguiena* Bl. Merr. (*Pouzolzia viminea*).

Our Agarwood candles are made of soy wax, Agarwood-based fragrant oils and wick bought from Wedo, a famous German manufacturer.

We also produce Agarwood carvings and Agarwood-impregnated products such as bead strings, statues, prayer rugs, burial clothes and materials. We are in the process of conducting trial production of Agarwood liqueur, Agarwood teas and Agarwood balms (for sedatives, sleep disorder treatment, skin care, etc.).

PENDING QUESTIONS AND A CALL FOR COOPERATION

Taxonomic identification of Agarwood-producing genera and species currently existing in Viet Nam is essential for establishing priorities for conservation and sustainable use strategies. It is quite necessary to carry out serious scientific studies on this topic, including the correct selection of varieties from the *Aquilaria crassna* species.

Likewise, a *morphology study of the anatomy* of the *Aquilaria crassa* tree (trunk, leaf, flower, fruit and seed) would play an important role in the sustainable development of Agarwood in Viet Nam, including assisting in the cultivation, domestication and processing of finished products.

Scientific verification of the results of different inducement techniques currently applied in Viet Nam would also provide effective guidance in selecting good techniques that may be legally approved.

Japanese scientists have released an important research paper entitled "New sesquiterpene from Vietnamese Agarwood and its induction effect on brain-derived neurotrophic factors" (www.sciencedirect.com), which should be studied carefully, including its practical applications.

We are also looking for *advanced techniques* of distillation, extraction and decoction for diversifying Vietnamese Agarwood products originating from *Aquilaria crassna Pierre*.

THEME 9:
PRODUCTS

Great Stercutila (*Sterculia foetida* L.), the Status of Forest Resources, and Opportunities to Green Sandy Arid Wastelands and Generate Income for Local People in Ninh Thuan and Binh Thuan Provinces

Le Quoc Huy and Ngo Thi Thanh Hue[1]

SUMMARY

Natural reserves of *S. foetida* are in serious decline and the species is on the verge of extinction due to over-harvesting for gum and other inappropriate practices. There are only very few, small, scattered and poor natural stands of Sterculia left in remote regions of Ninh Phuoc, Ninh Thuan, Tuy Phong and Binh Thuan. Plantations of the species are facing a number of problems due to poor practices and management (i.e. wounded pruning, deep cutting, too much density, and tapping too early), leading to unstable low yields and low benefit productivity. This study found that the root of *S. foetida* acts as the water storage area of the plant, comprising as much as 75-78 per cent of its weight during the first two years of the plant's growth cycle. This would enable the plant to survive and grow well in sandy arid waste lands and provide a good way to green such severely arid areas.

Appropriate Sterculia cultivation models have found to be very beneficent, with a NPV of VND414,676,742 compared the VND310,893,448 of an improper practice model (40 year rotation CBA and a 10 per cent discount rate).

INTRODUCTION

Great Sterculia (*Sterculia foetida* L.), also called Indian Almond, Java Olive and Hazel Sterculia, belongs to the family of Sterculiacea (genus Sterculia) and is native to many tropical Asian countries such as Malaysia, the Philippines, Indonesia, Viet Nam, India and Australia, as well as eastern Africa. Seeds of the tree are used for medicines and foods and its seed oil can be used for lighting. The timber of Sterculia foetida is soft but not very durable and can be used for some types of cheap, temporary constructions. It grows well in arid and poor soil regions.

In Viet Nam, Sterculia is native and naturally distributed in the arid regions of Ninh Thuan and Binh Thuan provinces. The tree is a light-demanding and fast-growing species, growing rather well in both sandy and hilly degraded arid sites. *Sterculia foetida* is considered as important NTFPs tree of these regions in terms of economic value and ecological purpose. The tree provides a valuable gum in the range of 400-500kg per hectare per year, which can be sold for VND300.000-500.000 per kilo. It is commercially used in the beverage and medical industries and the seeds and timber of the tree are also used for minor products. Due to over-harvesting and improper practices among local people to generate livelihoods from the plant resources, the tree species is facing serious depletion and decline, giving rise to negative impacts on biodiversity and bringing the species to the verge of extinction.

In order to contribute to solving the above-mentioned problems facing the Sterculia and also to improve the livelihoods of local poor people, a project entitled "Research survey on the eco-physiological characteristics and planting

1 Centre for Biotechnology in Forestry, Forest Science Institute of Viet Nam

conditions of *Sterculia foetida* L. towards its forest plantation rehabilitation and conservation, and livelihood improvements among the local Cham people in Ninh Thuan and Binh Thuan provinces" has been implemented since 2006 by RCFEE. In the framework of the project, this paper addresses the initial findings and recommendations on the current status of forest resources, problems of over-harvesting, depletion and improper practices, and their impacts on gum production and forest resources.

PROJECT OBJECTIVES

General objective

To contribute to rehabilitating the forest systems of *Sterculia foetida* species in target areas and generate incomes and increase awareness among local people of Ninh Thuan and Binh Thuan provinces.

Specific objectives

1. To conduct a survey and assessment of the status of forest plantations, applied practices, eco-physiological characteristics and planting conditions of *sterculia foetida* l. in order to identify problems and site-species suitability and develop technical measures and guidelines.
2. To raise awareness among local communities about the role and significance of *sterculia foetida* and its forest plantations and appropriate management and technical practices towards sustainable management and utilization of the species.
3. To produce necessary recommendations for management and technical issues towards conservation and the sustainable development and utilisation of forest plantations of *Sterculia*.

PROJECT ACTIVITIES

- Field survey in Ninh Thuan and Binh Thuan provinces regarding the planting, technical and management status of forest plantations of *S. foetida* and its population and eco-physiological characteristics.
- Nursery experiments to determine the plant's eco-physiological characteristics such as light and nutrient requirements.
- Establish trial plantation plots.
- Growth analysis for quantitative indices and growth allocation including relative growth rate (rgr) (mg g-1 day-1), net assimilation rate (nar) (mg cm-2 day-1), leaf area rate (lar) (mm2 mg-1), leaf weight rate (lwr) and specific leaf area (sla) - the ratio between lar and lwr (mm2 mg-1).
- Cost Benefit Analysis (CBA) scenario development of plantation models of *S. foetida*.
- Technical guideline development for planting, tending and harvesting.
- Training local staff and farmers

METHODOLOGIES

- Field surveys of sampling plots using the quadrat method
- Nursery experimental method used for light and nutrient regime determination
- Growth analysis for quantitative indices: rgr, nar, lar, lwr, sla and growth allocation following noggle & fritz (2002) and hegazy and et al (2004).
- Calculation and analysis of these quantitative indices of plant growth using software entitled "a modern tool for classical plant growth analysis" (hunt et al., 2002).
- Cost Benefit Analysis (CBA) of plantation models of *S. foetida* through participatory approach, followed by a calculation and analysis of present value (NPV) and internal return rate (IRR) for two scenario plantations using excel software. exploring proper practice and improper practices of planting, tending, harvesting and managing.

FINDINGS AND RECOMMENDATIONS

Due to the time constraints involved in the implementation of the project, this paper will only focus on the contents of the present status of forest plantations of Sterculia foetida in the studied areas, the problems they face, and how these

problems impact on growth, yield, productivity and economical benefit (CBA). Following this, an exploration will be conducted on the possibility of greening sandy wasteland.

STATUS OF *S. FOETIDA* FOREST PLANTATIONS IN NINH THUAN AND BINH THUAN PROVINCES

Natural stands

The natural forest stands of *S. foetida* were once distributed and growing abundantly in the studied regions. They played an important role and acted as a significant livelihood source for a number of local Cham ethnic minority people by supplying excellent gum and seed products to generate income. Due to improper practices and over-exploitation for gum (deep cutting and burning the stem and bark, cutting down trees etc.), the natural stands of *Sterculia* have been exhausted and are in serious decline. Indeed, the species is on the verge of extinction in the wild and there are only very few small, scattered and damaged natural stands of the *Sterculia* left in the studied regions of Ninh Phuoc, Ninh Thuan and Tuy Phong, Binh Thuan. This situation has significantly affected the local Cham people, whose livelihoods were strongly dependant on the plant. As a result, a large majority of them shifted to other forest resources in further remote regions, which will lead to a more serious situation of deforestation and natural resource decline. Others were insisting on continuing to rely on the *Sterculia* for gum harvesting for their livelihoods, and were willing to travel long distances to do so. However with very limited, scattered and poorly grown natural stands left, this trend is bound to lead to the continuing decline of the few natural stands left. Only very few harvesters were engaging in innovative ideas and activities to explore alternative *Sterculia* farming practices, which still faced a number of problems in their technical and management approach.

Plantation stands

As mentioned above, some initial plantations of *S. foetida* had been established by pioneering farmers in Tuy Phong and Binh Thuan for six years. These plantations were showing rather good growth rates in both flat sandy and hilly areas and had started to benefit from gum harvesting. However, they also faced many problems in terms of management, tending and harvesting practices for effective productivity and sustainability, including:

- inappropriate wounded pruning, leading to seriously adverse impacts on growth, photosynthesis and gum production;
- premature tapping for gum production of three-year-old trees, which stops the growth and development of the plant and, after some years of exploitation, leads to a loss of gum production;
- too high density of stems, which leads to poor growth and lower productivity; and
- farmers lacking the experience and knowledge to select good varieties of *S. foetida* for the gum production as many trees experienced very good levels of growth but low productivity levels of gum. The farmers also had no experience and knowledge of site-species suitability and no proper technical guidelines for planting and plantation development, leading to low gum yields and productivity compared to normal harvesting. The CBA results show and explain the reasons behind the low productivity of their models (Annexes 1 & 2).

OVERALL PROBLEMS

1. Natural stands of the species were becoming exhausted and were in serious decline, leading the species to the verge of extinction due to improper practices and over-exploiting for gum (deep cutting, burning the stem and bark, etc.). there were only very few, small, scattered and damaged natural stands of the sterculia left in the studied regions of Ninh Phuoc, Ninh Thuan and Tuy Phong, Binh Thuan.
2. *Sterculia* plantation methods had been poorly practiced and managed, leading to unstable and low-yield productivity and low benefits through:

- inappropriate wounded pruning, leading to seriously adverse impacts on growth, photosynthesis and gum production;
- premature tapping for gum production of three-year-old trees, which stops the growth and development of the plant and, after some years of exploitation, leads to a loss of gum production; and
- too high density of stems, which leads to poor growth and lower productivity.

3. Farmers lacking the experience and knowledge to select good varieties of *S. foetida* for the gum production as many trees experienced very good levels of growth but low productivity levels of gum. The farmers also had no experience and knowledge of site-species suitability and no proper technical guidelines for planting and plantation development, leading to low gum yields and productivity compared to normal harvesting. The CBA results show and explain the reasons behind the low productivity of their models (Annexes 1 & 2).

POSSIBILITY OF GREENING SANDY WASTE LAND WITH *S. FOETIDA*

Some new trial plantations of the species established in 2005, both in hilly rocky and sandy wasteland areas, showed good potential for the rehabilitation of *Sterculia* forests, especially the possibility of greening sandy wasteland in arid regions. This would favourably support the diversification of crops and products and the biodiversity of these regions.

Sterculia farming development models have also found that specific cash crops such as onions and garlic can be grown under the canopy of Sterculia plantations for quick income generation.

The Growth Allocation Analysis shown below could provide very interesting results and initially explain how and why the plant can grow so well in the very sandy and arid wasteland (reddish sand area) regions.

Results of Growth Allocation Analysis

- Growth allocation analysis of the plant at different ages showed very interesting results - the length and fresh weight of the underground root part of the plant are always much bigger than the above-ground parts, but the dried weight of the root part was much smaller than that of the above-ground parts. Logically, it can be deduced that the root parts contain a lot of water, which can be stored and used for the plant over 11 months in very arid regions. This was a very important characteristic of the plant that allowed it survive and grow well in such challenging conditions.
- The root usually acts as a water retainer, providing a source of water for use throughout the year's 11 very dry months. At nursery stage (between one-to-three months), the Sterculia seedlings were supplied with sufficient conditions (water, nutrients, tending, etc.) and water was not a problem. It was only when they were planted in the field at six-months-old did they encounter water shortage problems, especially in the sandy arid wasteland regions of Ninh Thuan and Binh Thuan provinces. Naturally and biologically, the plants adapt for survival and growth in such severe conditions by developing their roots into water storers, the 'tanks of water' mentioned above. The results of the Growth Allocation Analysis in Table 1 showed that at six months, the fresh weight proportion was 53.17 per cent, and 59.2 per cent at 12 months and 24 months. The water proportion of the plant root was highest at 24 months (77.9 per cent compared to 14 per cent in trunks and 67.4 per cent in leaves). The development of their root system for the most optimal water storage would continue until they well adapted for normal growth and development in such sandy arid areas.

RESULTS OF COST BENEFIT ANALYSIS (CBA) OF TWO MODEL PLANTING SCENARIOS

- CBAs of two scenarios of improper practices and normally proper management, tending and

Table 1: Growth Allocation Analysis at different ages of the Sterculia plant

Plant age		Fresh weight				Dry weight				Mean (%)
		Leaf	Trunk	Root	Total (gr)	Leaf	Trunk	Root	Total (gr)	
1 month	Mean value (g)	2.87	3.13	3.20	9.2	0.67	0.50	0.56	1.7	
	%	31.14	34.06	34.80	100.0	38.85	29.01	32.14	100.0	
	Water (%)	76.58	84.01	82.67						81.2
6 months	Mean value (g)	6.56	9.58	18.33	34.48	1.86	2.12	3.08	7.06	
	%	19.03	27.79	53.17	100.0	26.39	29.98	43.63	100.0	
	Water (%)	71.63	77.93	83.21						80.9
12 months	Mean value (g)	121.1	283.4	586.0	990.5	51.5	214.3	153.8	419.5	
	%	12.2	28.6	59.2	100.0	12.3	51.1	36.7	100.0	
	Water (%)	57.5	24.4	73.8						57.7
24 months	Mean value (g)	273.8	645.0	1335.0	2253.8	89.3	554.5	294.5	938.3	
	%	12.1	28.6	59.2	100.0	9.5	59.1	31.4	100.0	
	Water (%)	67.4	14.0	77.9						58.7

Figure 1: Growth allocation of FRESH WEIGHT at different ages of S. foetida

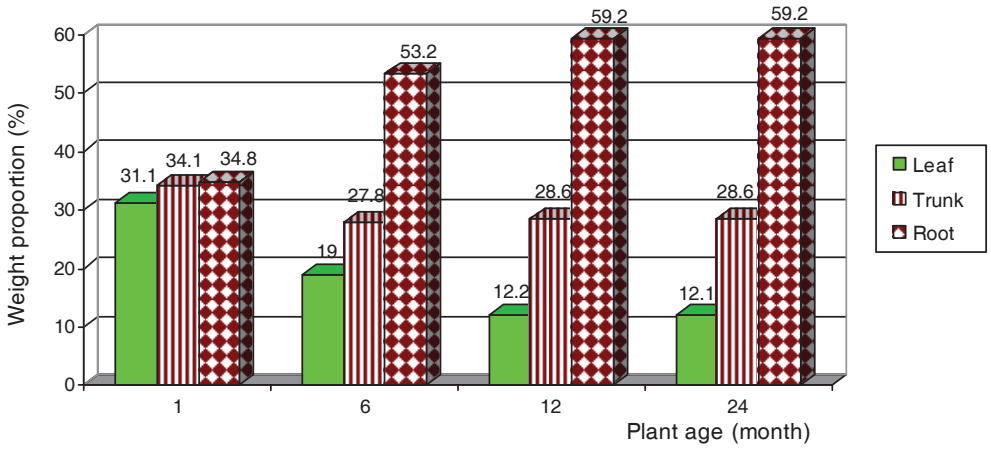


Figure 1: Growth allocation of FRESH WEIGHT at different ages of S. foetida

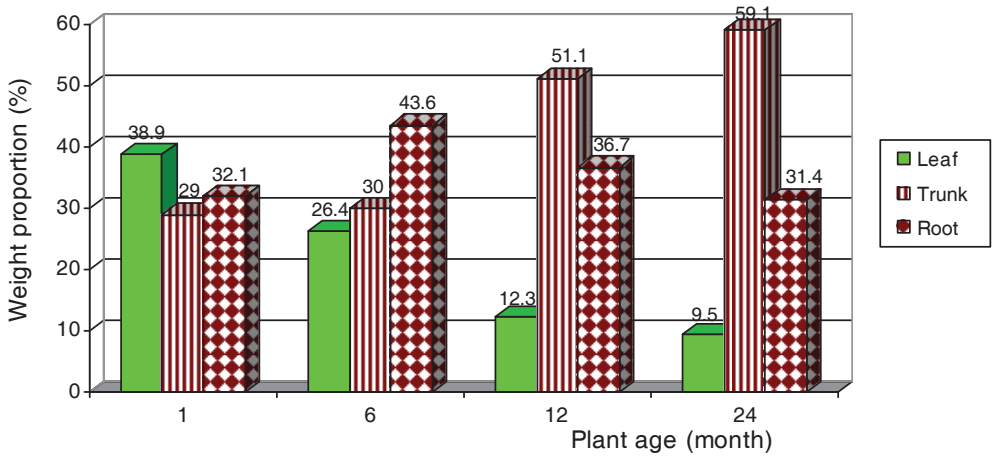
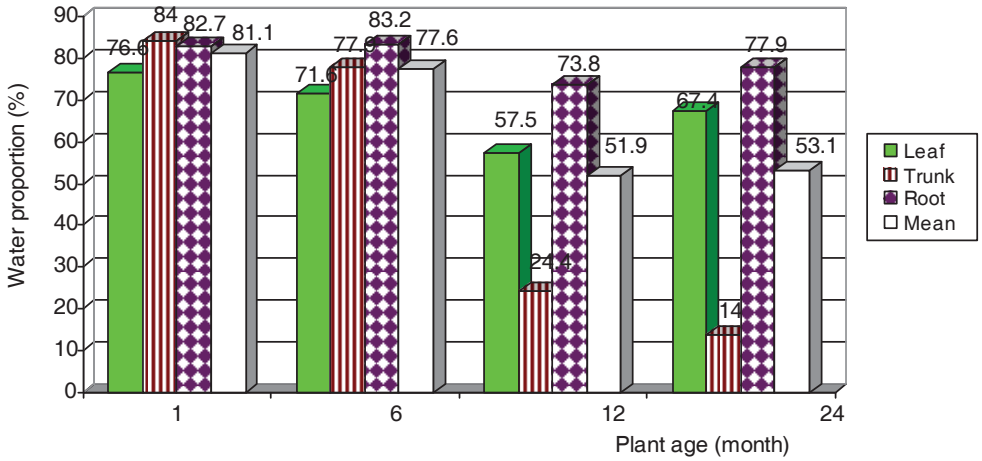


Figure 1: Growth allocation of FRESH WEIGHT at different ages of S. foetida



harvesting practices found significant differences. The CBA scenarios were analysed for 40-year rotation models of S. foetida. The NPV of the Proper Practice Scenario was much higher (VND414,676,742) than that of the Improper Practice Scenario (VND310,893,448) (Table 2). The higher the NPV of the analysed model, the more beneficial the model is.

- From the CBA results, it can be seen that both of models could be beneficial, but it is strongly advised that local farmers follow the Proper Practice Plantation Model for more productivity and benefits and more sustainability.
- Accordingly, the farmers should invest a specific amount of money for the initial establishment

Table 2: Cost Benefit Analysis (CBA) of 1 ha of Sterculia foetida plantation (40 year rotation)

Proper practice scenario

Year	Labour Cost		Cash Cost (VND/ha)	Total Cost (VND/ha)	Total gross income (VND/ha)	Total Net Benefit (VND/ha)	Cash flow (VND)
	Laborday	Amount (VND)					
A	1	2	3	4 = 2+3	5	6 = 5-4	7 = 5-3
	7,882	315,293,143	167,981,600	483,274,743	3,280,225,000	2,796,950,257	3,112,243,400
NPV 10%				74,002,857		367,136,747	414,676,742
Improper practice scenario							
	6,456	258,245,333	128,868,700	387,114,033	2,165,850,000	1,778,735,967	2,036,981,300
NPV 10%				67,569,123		266,823,885	310,893,448

NPV: Net Present Value of Cost and Benefit from year 1 to year 40 @ 10% of discount rate

and development on their own land through bank loans. This will lead to significant and sustainable benefits from year six onwards.

PRELIMINARY CONCLUSIONS

1. Natural stands of *S. foetida* have been seriously exhausted and the species is on the verge of extinction due to over-exploiting, harvesting for gum and improper practices. there are only very few, small, scattered and damaged natural stands of sterculia left in the studied regions of Ninh Phuoc, Ninh Thuan and Tuy Phong, Binh Thuan.
2. Some plantations of *S. foetida* have been established by local pioneering farmers that show good potential for development but still face a number of problems in terms of improper practices and management, leading to unstable low yields and low productivity and benefits.
3. The results of the growth allocation analysis of the plant and the fact that plantations have already been established, demonstrate the high possibility for the greening and rehabilitation of forest plantations in sandy arid wastelands in Ninh Thuan and Binh Thuan provinces,
4. The proper practice model of the *Sterculia* has found to be very productive and beneficial. From the CBA results, it is strongly advised that local farmers follow the proper practice plantation model for more productivity, more benefits and greater sustainability.

RECOMMENDATIONS

1. Selection and testing of right/good provenances regarding growth rate, productivity and product quality should be conducted.
2. Proper technical guidelines for all stages of the planting and application of the species should be developed from the initial planning stage to site selection, planting, tending and harvesting/ tapping.
3. Site-species suitability should be carefully taken into consideration during the planning stage. A participatory approach with relevant stakeholders, especially local farmers, is an important factor in this issue.
4. More research, experiments and trial plots on eco-physiological characteristics and intensive planting should be implemented.

5. More training and communication activities should be developed and initiated to improve local awareness, skills and knowledge.

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Annex 1.1: Cost-Benefit Analysis (CBA) of 1 ha of Sterculia foetida plantation (proper practice scenario)

Assumptions		
Planting density (3.4m x 4.0 m)	714	seedling/ha
Replanting rate	15%	seedling/ha
Price of seedling	2,000	VND/seedling
Price of bio-organic-fertilizer	1,500	VND/kg
Price of NPK fertilizer	2,500	VND/kg
Price of a labourday	40,000	VND/day
Price of Gum	200,000	VND/kg
Price of Seed (product)	25,000	VND/day
Product tax (%)	4%	
Special tax	3%	

Proper Practice Scenario	
Rotation	40 years
I R R	62.0%
N P V (10%) on Cashflow:	414,677 ,000 VND
N P V (10%) on T. Net Benefit:	367,137 ,000 VND

Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16-19	20	21-24	25	26-29	30	31-39	40
Input Quantities (manday)	82	42	41	34	24	58	92	117	134	145	153	159	169	186	200	834	232	966	252	1,046	267	2,396	259
Number of Seedlings	714	107																					
NPK fertilizer (kg)	71	143	143	143	143	143	143	143	143	143	214	214	214	214	214	857	214	857	214	857	214	1,928	214
Bio-organic fertilizer (kg)	71	143	143	143	143	143	143	143	143	143	214	214	214	214	214	857	214	857	214	857	214	1,928	214
Site preparation and planting (manday)	70	8																					
Tending, weeding and fertilizing (manday)	12	25	32	25	15	15	5	5	3	3	3	3	3	3	3	12.0	3.0	12.0	3.0	12.0	3.0	27.0	3.0
Patrolling for cattle, fire and other control		8	8	8	8	8	8	8	8	8	8	8	8	8	8	32.0	8	32.0	8	32.0	8	72	8
Pest and disease control and management		0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	2.0	0.5	2.0	0.5	2.0	0.5	1.8	0.5
Firewood collection (manday)																							
Gum tapping production (manday)						20	36	39	42	48	51	53	58	65	68	288	80	320	80	320	80	720	72
Seed collection (manday)						14	43	64	80	85	90	95	100	110	120	500	140	600	160	680	175	1,575	175
Cost of production ('000 VND)	5,094	2,545	2,291	2,011	1,611	3,883	6,105	7,353	8,251	8,966	9,727	10,082	10,725	11,755	12,529	52,207	14,397	59,467	15,337	63,227	16,042	144,268	15,402
Cost of seedlings	1,428	214																					
Cost of NPK fertilizer ('000 VND)	179	357	357	357	357	357	357	357	357	357	536	536	536	536	536	2,142	536	2,142	536	2,142	536	4,820	536
Cost of Bio- fertilizer	107	214	214	214	214	214	214	214	214	214	321	321	321	321	321	1,285	321	1,285	321	1,285	321	2,892	321
Cost of site preparation & planting	2,800	320																					
Cost for tending, patrolling, clearing & pes	480	1,340	1,620	1,340	940	940	540	540	460	460	460	460	460	460	460	1,840	460	1,840	460	1,840	460	4,032	460
Cost for gum tapping and seed collection						1,371	3,154	4,131	4,880	5,320	5,640	5,900	6,304	6,984	7,536	31,520	8,800	36,800	9,600	40,000	10,200	91,800	9,880
Product tax (4%).						900	1,740	2,010	2,240	2,515	2,670	2,765	3,004	3,354	3,576	15,020	4,180	17,000	4,320	17,560	4,425	39,825	4,105
Special tax																							
Cost for management and administration	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	400	100	400	100	400	100	900	100
Yield of products																							
Firewood (m3)																							
Sterculia gum (kg)						100.0	180.0	195.0	210.0	240.0	255.0	262.5	288.0	323.0	342	1,440	400	1,600	400	1,600	400	3,600	360.0
Sterculia seeds (kg)						100.0	300.0	450.0	560.0	595.0	630.0	665.0	700.0	770.0	840	3,500	980	4,200	1,120	4,760	1,225	11,025	1,225.0
Value of products (G. income) ('000 VND)						22,500	43,500	50,250	56,000	62,875	66,750	69,125	75,100	83,850	89,400	375,500	104,500	425,000	108,000	439,000	110,625	995,625	102,625
Income from firewood ('000 VND)																							
Income from gum production ('000 VND)						20,000	36,000	39,000	42,000	48,000	51,000	52,500	57,600	64,600	68,400	288,000	80,000	320,000	80,000	320,000	80,000	720,000	72,000
Income from seed collection ('000 VND)						2,500	7,500	11,250	14,000	14,875	15,750	16,625	17,500	19,250	21,000	87,500	24,500	105,000	28,000	119,000	30,625	275,625	30,625
Total net Profit ('000 VND)	-5,094	-2,545	-2,291	-2,011	-1,611	18,617	37,395	42,897	47,749	53,909	57,023	59,043	64,375	72,095	76,871	323,293	90, 103	365,533	92,663	375,773	94,583	851,357	87,223
C A S H F L O W ('000 VND)	-1,635	-528	-314	-314	-314	21,286	41,446	47,926	53,446	60,046	63,659	65,939	71,675	80,075	85,403	358,795	99,899	406,315	103,259	419,755	105,779	952,008	98,099

Annex 1.2: Cost -Benefit Analysis (CBA) of 1 ha of Sterculia foetida plantation (40 year rotation) (Proper practice scenario)

Year	Labour Cost		Cash Cost (VND/ha)	Total Cost VND/ha	Total gross income (VND/ha)	Total Net Benefit (VND/ha)	Cash flow (VND)
	Laborday	Amount (VND)					
A	1	2	3	4 = 2+3	5	6 = 5-4	7 = 5-3
Total 40 years							
	7,882	315,293,143	167,981,600	483,274,743	3,280,225,000	2,796,950,257	3,112,243,400
1	82	3,280,000	1,813,600	5,093,600		-5,093,600	-1,813,600
2	42	1,660,000	885,400	2,545,400		-2,545,400	-885,400
3	41	1,620,000	671,200	2,291,200		-2,291,200	-671,200
4	34	1,340,000	671,200	2,011,200		-2,011,200	-671,200
5	24	940,000	671,200	1,611,200		-1,611,200	-671,200
6	58	2,311,429	1,571,200	3,882,629	22,500,000	18,617,371	20,928,800
7	92	3,694,286	2,411,200	6,105,486	43,500,000	37,394,514	41,088,800
8	117	4,671,429	2,681,200	7,352,629	50,250,000	42,897,371	47,568,800
9	134	5,340,000	2,911,200	8,251,200	56,000,000	47,748,800	53,088,800
10	145	5,780,000	3,186,200	8,966,200	62,875,000	53,908,800	59,688,800
11	153	6,100,000	3,626,800	9,726,800	66,750,000	57,023,200	63,123,200
12	159	6,360,000	3,721,800	10,081,800	69,125,000	59,043,200	65,403,200
13	169	6,764,000	3,960,800	10,724,800	75,100,000	64,375,200	71,139,200
14	186	7,444,000	4,310,800	11,754,800	83,850,000	72,095,200	79,539,200
15	200	7,996,000	4,532,800	12,528,800	89,400,000	76,871,200	84,867,200
16	209	8,340,000	4,711,800	13,051,800	93,875,000	80,823,200	89,163,200
17	209	8,340,000	4,711,800	13,051,800	93,875,000	80,823,200	89,163,200
18	209	8,340,000	4,711,800	13,051,800	93,875,000	80,823,200	89,163,200
19	209	8,340,000	4,711,800	13,051,800	93,875,000	80,823,200	89,163,200
20	232	9,260,000	5,136,800	14,396,800	104,500,000	90,103,200	99,363,200
21	242	9,660,000	5,206,800	14,866,800	106,250,000	91,383,200	101,043,200
22	242	9,660,000	5,206,800	14,866,800	106,250,000	91,383,200	101,043,200
23	242	9,660,000	5,206,800	14,866,800	106,250,000	91,383,200	101,043,200
24	242	9,660,000	5,206,800	14,866,800	106,250,000	91,383,200	101,043,200
25	252	10,060,000	5,276,800	15,336,800	108,000,000	92,663,200	102,723,200
26	262	10,460,000	5,346,800	15,806,800	109,750,000	93,943,200	104,403,200
27	262	10,460,000	5,346,800	15,806,800	109,750,000	93,943,200	104,403,200
28	262	10,460,000	5,346,800	15,806,800	109,750,000	93,943,200	104,403,200
29	262	10,460,000	5,346,800	15,806,800	109,750,000	93,943,200	104,403,200
30	267	10,660,000	5,381,800	16,041,800	110,625,000	94,583,200	105,243,200
31	266	10,648,000	5,381,800	16,029,800	110,625,000	94,595,200	105,243,200
32	266	10,648,000	5,381,800	16,029,800	110,625,000	94,595,200	105,243,200
33	266	10,648,000	5,381,800	16,029,800	110,625,000	94,595,200	105,243,200
34	266	10,648,000	5,381,800	16,029,800	110,625,000	94,595,200	105,243,200
35	266	10,648,000	5,381,800	16,029,800	110,625,000	94,595,200	105,243,200
36	266	10,648,000	5,381,800	16,029,800	110,625,000	94,595,200	105,243,200
37	266	10,648,000	5,381,800	16,029,800	110,625,000	94,595,200	105,243,200
38	266	10,648,000	5,381,800	16,029,800	110,625,000	94,595,200	105,243,200
39	266	10,648,000	5,381,800	16,029,800	110,625,000	94,595,200	105,243,200
40	259	10,340,000	5,061,800	15,401,800	102,625,000	87,223,200	97,563,200
NPV 10%				74,002,857		367,136,747	414,676,742

Note:

NPV: Net Present Value of Cost and Benefit from year 1 to year 40 @ 10% of discount rate

Annex 2.1: Cost-Benefit Analysis (CBA) of 1 ha of Sterculia foetida plantation (Improper practice scenario)

Assumptions		
Planting density (3 m x 4 m)	833	seedling/ha
Replanting rate	15%	seedling/ha
Price of seedling	2,000	VND/seedling
Price of bio-organic-fertilizer	1,500	VND/kg
Price of NPK fertilizer	2,500	VND/kg
Price of a labourday	40,000	VND/day
Price of Gum	200,000	VND/kg
Price of Seed (product)	25,000	VND/day
Product tax (%)	4%	
Special tax	3%	

Improper Practice Scenario	
Rotation	40 years
I R R	76.9%
N P V (10%) on Cashflow:	310,893 ,000 VND
N P V (10%) on T. Net Benefit:	266,824 ,000 VND

Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16-19	20	21-24	25	26-29	30	31-39	40
Input Quantities (manday)	82	42	53	55	50	65	83	106	120	135	151	159	172	175	180	720	190	759	196	785	198	1,783	198
Number of Seedlings	833	125																					
NPK fertilizer (kg)	83	167	167	167	167	167	167	167	167	167	250	250	250	250	250	1,000	250	1,000	250	1,000	250	2,249	250
Bio-organic fertilizer (kg)	83	167	167	167	167	167	167	167	167	167	250	250	250	250	250	1,000	250	1,000	250	1,000	250	2,249	250
Site preparation and planting (manday)	70	8																					
Tending, weeding and fertilizing (manday)	12	25	32	25	15	15	5	5	3	3	3	3	3	3	3	12.0	3.0	12.0	3.0	12.0	3.0	27.0	3.0
Patrolling for cattle, fire and other control		8	8	8	8	8	8	8	8	8	8	8	8	8	8	32.0	8	32.0	8	32.0	8	72	8
Pest and disease control and management		0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	2.0	0.5	2.0	0.5	2.0	0.5	1.8	0.5
Firewood collection (manday)																							
Gum tapping production (manday)			12	21	27	29	36	43	50	57	64	64	69	69	69	274	73	293	73	293	69	617	69
Seed collection (manday)						13	33	50	58	67	75	83	92	95	100	400	105	420	112	447	118	1,065	118
Cost of production ('000 VND)	5,379	2,676	3,106	3,366	3,413	4,263	5,268	6,521	7,310	8,179	9,362	9,745	10,439	10,592	10,822	43,290	11,363	45,453	11,670	46,680	11,666	104,884	11,666
Cost of seedlings	1,666	250																					
Cost of NPK fertilizer ('000 VND)	208	417	417	417	417	417	417	417	417	417	625	625	625	625	625	2,499	625	2,499	625	2,499	625	5,623	625
Cost of Bio- fertilizer	125	250	250	250	250	250	250	250	250	250	375	375	375	375	375	1,499	375	1,499	375	1,499	375	3,374	375
Cost of site preparation & planting	2,800	320																					
Cost for tending, patrolling, clearing & pes	480	1,340	1,620	1,340	940	940	540	540	460	460	460	460	460	460	460	1,840	460	1,840	460	1,840	460	4,032	460
Cost for gum tapping and seed collection			480	840	1,067	1,676	2,762	3,714	4,333	4,952	5,560	5,893	6,410	6,543	6,743	26,971	7,126	28,503	7,392	29,570	7,476	67,286	7,476
Product tax (4%).			240	420	640	880	1,200	1,500	1,750	2,000	2,242	2,292	2,470	2,490	2,520	10,080	2,678	10,712	2,718	10,872	2,630	23,670	2,630
Special tax																							
Cost for management and administration	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	400	100	400	100	400	100	900	100
Yield of products																							
Firewood (m3)																							
Sterculia gum (kg)			30.0	52.5	80.0	100.0	125.0	150.0	175.0	200.0	224.0	224.0	240.0	240.0	240	960	256	1,024	256	1,024	240	2,160	240.0
Sterculia seeds (kg)						80.0	200.0	300.0	350.0	400.0	450.0	500.0	550.0	570.0	600	2,400	630	2,520	670	2,680	710	6,390	710.0
Value of products (G. income) ('000 VND)			6,000	10,500	16,000	22,000	30,000	37,500	43,750	50,000	56,050	57,300	61,750	62,250	63,000	252,000	66 ,950	267,800	67,950	271,800	65,750	591,750	65,750
Income from firewood ('000 VND)																							
Income from gum production ('000 VND)			6,000	10,500	16,000	20,000	25,000	30,000	35,000	40,000	44,800	44,800	48,000	48,000	48,000	192,000	51,200	204,800	51,200	204,800	48,000	432,000	48,000
Income from seed collection ('000 VND)						2,000	5,000	7,500	8,750	10,000	11,250	12,500	13,750	14,250	15,000	60,000	15,750	63,000	16,750	67,000	17,750	159,750	17,750
Total net Profit ('000 VND)	-5,379	-2,676	2,894	7,134	12,587	17,737	24,732	30,979	36,440	41,821	46,688	47,555	51,311	51,658	52,178	208,710	55,58 7	222,347	56,280	225,120	54,084	486,866	54,084
C A S H F L O W ('000 VND)	-1,891	-600	5,410	9,730	15,010	20,770	28,450	35,650	41,650	47,650	53,333	54,533	58,805	59,285	60,005	240,021	63,797	255,189	64,757	259,029	62,645	563,806	62,645

Annex 2.2: Cost -Benefit Analysis (CBA) of 1 ha of Sterculia foetida plantation (40 year rotation) (Improper practice scenario)

Year	Labour Cost		Cash Cost (VND/ha)	Total Cost	Total gross income (VND/ha)	Total Net Benefit (VND/ha)	Cash flow (VND)
	Laborday	Amount (VND)		VND/ha			
A	1	2	3	4 = 2+3	5	6 = 5-4	7 = 5-3
Total 40 years							
	6,456	258,245,333	128,868,700	387,114,033	2,165,850,000	1,778,735,967	2,036,981,300
1	82	3,280,000	2,099,200	5,379,200		-5,379,200	-2,099,200
2	42	1,660,000	1,016,300	2,676,300		-2,676,300	-1,016,300
3	53	2,100,000	1,006,400	3,106,400	6,000,000	2,893,600	4,993,600
4	55	2,180,000	1,186,400	3,366,400	10,500,000	7,133,600	9,313,600
5	50	2,006,667	1,406,400	3,413,067	16,000,000	12,586,933	14,593,600
6	65	2,616,190	1,646,400	4,262,590	22,000,000	17,737,410	20,353,600
7	83	3,301,905	1,966,400	5,268,305	30,000,000	24,731,695	28,033,600
8	106	4,254,286	2,266,400	6,520,686	37,500,000	30,979,314	35,233,600
9	120	4,793,333	2,516,400	7,309,733	43,750,000	36,440,267	41,233,600
10	135	5,412,381	2,766,400	8,178,781	50,000,000	41,821,219	47,233,600
11	151	6,020,000	3,341,600	9,361,600	56,050,000	46,688,400	52,708,400
12	159	6,353,333	3,391,600	9,744,933	57,300,000	47,555,067	53,908,400
13	172	6,869,524	3,569,600	10,439,124	61,750,000	51,310,876	58,180,400
14	175	7,002,857	3,589,600	10,592,457	62,250,000	51,657,543	58,660,400
15	180	7,202,857	3,619,600	10,822,457	63,000,000	52,177,543	59,380,400
16	180	7,202,857	3,619,600	10,822,457	63,000,000	52,177,543	59,380,400
17	180	7,202,857	3,619,600	10,822,457	63,000,000	52,177,543	59,380,400
18	180	7,202,857	3,619,600	10,822,457	63,000,000	52,177,543	59,380,400
19	180	7,202,857	3,619,600	10,822,457	63,000,000	52,177,543	59,380,400
20	190	7,585,714	3,777,600	11,363,314	66,950,000	55,586,686	63,172,400
21	190	7,585,714	3,777,600	11,363,314	66,950,000	55,586,686	63,172,400
22	190	7,585,714	3,777,600	11,363,314	66,950,000	55,586,686	63,172,400
23	190	7,585,714	3,777,600	11,363,314	66,950,000	55,586,686	63,172,400
24	190	7,585,714	3,777,600	11,363,314	66,950,000	55,586,686	63,172,400
25	196	7,852,381	3,817,600	11,669,981	67,950,000	56,280,019	64,132,400
26	196	7,852,381	3,817,600	11,669,981	67,950,000	56,280,019	64,132,400
27	196	7,852,381	3,817,600	11,669,981	67,950,000	56,280,019	64,132,400
28	196	7,852,381	3,817,600	11,669,981	67,950,000	56,280,019	64,132,400
29	196	7,852,381	3,817,600	11,669,981	67,950,000	56,280,019	64,132,400
30	198	7,936,190	3,729,600	11,665,790	65,750,000	54,084,210	62,020,400
31	198	7,924,190	3,729,600	11,653,790	65,750,000	54,096,210	62,020,400
32	198	7,924,190	3,729,600	11,653,790	65,750,000	54,096,210	62,020,400
33	198	7,924,190	3,729,600	11,653,790	65,750,000	54,096,210	62,020,400
34	198	7,924,190	3,729,600	11,653,790	65,750,000	54,096,210	62,020,400
35	198	7,924,190	3,729,600	11,653,790	65,750,000	54,096,210	62,020,400
36	198	7,924,190	3,729,600	11,653,790	65,750,000	54,096,210	62,020,400
37	198	7,924,190	3,729,600	11,653,790	65,750,000	54,096,210	62,020,400
38	198	7,924,190	3,729,600	11,653,790	65,750,000	54,096,210	62,020,400
39	198	7,924,190	3,729,600	11,653,790	65,750,000	54,096,210	62,020,400
40	198	7,936,190	3,729,600	11,665,790	65,750,000	54,084,210	62,020,400
NPV 10%				67,569,123		266,823,885	310,893,448

Note:

NPV: Net Present Value of Cost and Benefit from year 1 to year 40 @ 10% of discount rate

Annex 3: Growth allocation analysis of S. foetida plant at different ages

Plant age		Fresh weight				Dry weight				% total water
	Sample No.	Trunk	Root	Leaf	Total (gr)	Trunk	Root	Leaf	Total (gr)	
1 month	1	4.89	2.22	3.59	***10.70***	0.77	0.32	0.91	***2.00***	81.31
	2	3.41	1.84	2.50	***7.75***	0.42	0.26	0.54	***1.22***	84.26
	3	3.12	2.83	3.43	***9.38***	0.43	0.40	0.78	***1.61***	82.84
	4	3.92	3.25	2.64	***9.81***	0.62	0.72	0.61	***1.95***	80.12
	5	3.51	4.08	4.24	***11.83***	0.51	0.58	0.96	***2.05***	82.67
	6	2.87	2.73	2.86	***8.46***	0.45	0.45	0.63	***1.53***	81.91
	7	2.78	4.59	3.24	***10.61***	0.58	0.76	0.81	***2.15***	79.74
	8	2.61	3.65	2.12	***8.38***	0.50	0.77	0.51	***1.78***	78.76
	9	2.22	3.23	1.92	***7.37***	0.41	0.67	0.45	***1.53***	79.24
	10	2.01	3.60	2.11	***7.72***	0.32	0.62	0.51	***1.45***	81.22
	Mean (gr)	**3.13**	**3.20**	**2.87**	***9.20***	**0.50**	**0.56**	**0.67**	***1.73***	
	%	**34.06**	**34.80**	**31.14**	***100.00***	**29.01**	**32.14**	**38.85**	***100.00***	
	% water	**84.01**	**82.67**	**76.58**						**81.21**
6 months	1	20.47	35.92	15.88	***72.27***	5.71	7.45	5.53	***18.69***	74.14
	2	10.00	22.61	4.15	***36.76***	1.69	3.36	1.09	***6.14***	83.30
	3	12.18	19.69	8.67	***40.54***	2.44	2.78	1.69	***6.91***	82.96
	4	4.13	7.30	3.25	***14.68***	0.75	1.15	0.84	***2.74***	81.34
	5	4.76	9.38	4.10	***18.24***	0.82	1.21	1.08	***3.11***	82.95
	6	5.95	15.09	3.32	***24.36***	1.28	2.52	0.94	***4.74***	80.54
	Mean (gr)	**9.58**	**18.33**	**6.56**	**34.48**	**2.12**	**3.08**	**1.86**	**7.06**	
	%	**27.79**	**53.17**	**19.03**	**100.00**	**29.98**	**43.63**	**26.39**		
	% water	**77.93**	**83.21**	**71.63**						**80.87**
12 months	1	483.6	756.4	195.1	***1435.0***	322.0	245.0	82.0	***649.0***	54.8
	2	232.2	638.0	105.8	***975.9***	265.0	88.0	44.0	***397.0***	59.3
	3	241.2	578.0	121.3	***940.5***	162.0	143.0	48.0	***353.0***	62.5
	4	176.5	371.8	62.3	***610.6***	108.0	139.0	32.0	***279.0***	54.3
	Mean (gr)	**283.4**	**586.0**	**121.1**	**990.5**	**214.3**	**153.8**	**51.5**	**419.5**	
	%	**28.6**	**59.2**	**12.2**		**51.1**	**36.7**	**12.3**		
	% water	**24.4**	**73.8**	**57.5**						**57.7**
24 months	1	1100.0	1720.0	440.0	***3260.0***	804.9	515.8	142.0	***1462.7***	55.1
	2	530.0	1460.0	240.0	***2230.0***	700.3	156.0	77.0	***933.3***	58.1
	3	550.0	1320.0	275.0	***2145.0***	425.9	257.8	88.0	***771.7***	64.0
	4	400.0	840.0	140.0	***1380.0***	287.0	248.4	50.0	***585.4***	57.6
	Mean (gr)	**645.0**	**1335.0**	**273.8**	***2253.8***	**554.5**	**294.5**	**89.3**	***938.3***	
	%	**28.6**	**59.2**	**12.1**		**59.1**	**31.4**	**9.5**		
	% water	**14.0**	**77.9**	**67.4**						**58.7**

The Role of NTFPs in Poverty Alleviation and Biodiversity Conservation

Nguyen Van Trung

Ladies and gentlemen,

It is my great honour to participate in this important event. I would like to first wish you all good health and the very best success for this conference.

My name is Nguyen Van Trung, and I am a bamboo-rattan handicraft artist and Director of the Hoa Son Handicraft Company, which is located in a traditional bamboo handicraft village in Phu Vinh, Phu Nghia commune, Chuong My, Ha Tay province.

As agreed with the conference organisational committee, I would like to discuss two main issues related to economic development and poverty alleviation that are closely linked to NTFPs.

Firstly, there are hundreds of different NTFPs species that grow very fast in Viet Nam and are suited to our tropical climate. Each species has its own connection to different activities and creates abundant material resources for those engaged in NTFPs business production in Viet Nam. At this important conference, I would like to present some issues that relate to bamboo, rattan, leaves and grass, as they are the main materials I use in my career.

Ladies and gentlemen, bamboo, rattan, leaves and grass are NTFPs that may not attract a great deal of attention from many of you, including those of you working in the forestry sector and forest enterprises. However, the value of these species is calculated to be approximately VND50,000 per square metre of land. According to our own experience and calculations, the value of NTFPs may be higher compared with some other species, including timber-producing species, as their roots, branches and leaves all constitute harvestable products (e.g. mai, met, buong, vau etc.) that can be exploited for commercial purposes. These species are increasingly becoming rare in Viet Nam, in particular bamboo and rattan. At the same time, the value of NTFPs is rising in the face of material shortages and increasing demand for NTFPs products in almost all markets in the world. In short, supply is insufficient and does not meet demand.

So what are the causes behind this situation? One key reason is the fact that we have not paid due attention to formulating appropriate NTFPs management and work plans. Most enterprises working in the sector only focus on exploiting NTFPs without carrying out other activities to maintain and conserve these important resources. As a consequence, NTFPs resources are being drained to the point of exhaustion. To develop and meet the increasing demands of the market, it is crucial that the following actions be implemented.

First, I would like to urge state agencies to develop a material planning zone for NTFPs species so that they can meet the requirements of the processing sector while being exploited sustainable. In addition, authorities should develop incentive policies and support mechanisms for enterprises that invest in this material zone in order to promote its establishment and development.

Second, forest product producers should develop effective, long-term closed-cycle projects to attract both national and foreign investors, as production of NTFPs species can be done in a highly efficient manner that provides quick capital returns with little or no risk involved. State and relevant agencies should organise a forum with the participation of forest enterprises, investors and consumers so as to build confidence among investors in the sector.

NTFPS PRODUCTS AND POVERTY ALLEVIATION

Since the transition of the subsidy economy towards a market-oriented system, the number of bamboo, rattan, leave and grass consumers has increased sharply. NTFPs consumption is now no longer limited to particular provinces, as was previously the case, but is now spread all over the country. There are now thousands of small and medium enterprises directly involved in NTFPs production and import-export activities, creating employment for millions of rural and mountainous labourers. Many areas have become traditional handicraft communes and villages.

The key advantage of many NTFPs is that they produce valuable materials quickly that regenerate fast and do not depend on the cultivation of exotic species. Furthermore, many products do not require advanced processing technology. The harvesting of high-value NTFPs products also does not require a workforce with specific qualifications, health, age or other characteristics – almost anyone can participate in NTFPs production. Indeed, to meet increasing demand, we need to have more workers involved in NTFPs production so that we can gradually increase our market share of these products in large markets such as Japan, Europe, the US and other countries.

Ladies and gentlemen, in light of such favourable potential outcomes, we need to create an integrated cooperation system that results in more effective impacts for development through:

- cooperation between producers and forest product enterprises;
- cooperation between producers and forest product processing researchers; and
- cooperation between producers and state administration agencies.

State authorities could assist in this process by helping to facilitate the organisation of a NTFPs forum and workshops. These activities would establish closer cooperation among different stakeholders and increase information-sharing so as create favourable conditions for labourers. A NTFPs forum would also increase confidence among customers and potential investors in NTFPs development and products.

There are many other issues related to NTFPs and I have only mentioned two issues that are crucial for the bamboo, rattan leaves and grass production sectors. We look forward to more attention being paid to NTFPs and the important contribution they can make to economic development.

May the conference be a great success and thank you for your attention.

Palms as Non-timber Forest Products in Viet Nam

Andrew Henderson[1] **& Ninh Khac Ban**[2]

INTRODUCTION

Interest in Non-Timber Tree and Forest Products (NTFPs) has increased over the years, particularly in their sustainable use and management as a resource for local people living in or near forest areas. In recent years, NTFPs have been accorded an international priority in contrast to their previous categorization as "minor forest products". This heightened attention results from the recognition of their increasing economic, ecological and socio-cultural importance and the consequent need for sustainable use of the resource.

The palm family (Palmae or Arecaceae) is one of the larger families of monocotyledons. It is widely distributed throughout tropical and subtropical areas of the world, and is particularly diverse and abundant in lowland and mountain tropical moist forests. The family comprises 189 genera (Uhl & Dransfield, 1999) and approximately 2300 species.

The palm family is one of the most economically important families of plants for man (Balick & Beck, 1990), ranking third after grasses and legumes in its usefulness. The three major economic crops are the date, coconut and oil palm. Many other species are important on a local or regional scale as NTFPs, particularly rattans.

CURRENT STATE OF TAXONOMIC KNOWLEDGE OF VIET NAM PALMS

The first treatment of Viet Namese palms was that of the Italian botanist Odoardo Beccari. His Palme dell'Indo-China (Beccari, 1910) included the present-day countries of Cambodia, Lao and Viet Nam. Activity during the French colonial period, from approximately the middle of the 19th century to the middle of the 20th, resulted in the treatment of the Palmae for the Flore Générale de l'Indo-Chine (Gagnepain & Conrard, 1937). Another contribution from this period was Magalon's doctoral thesis on the palms of Viet Nam (Magalon, 1930). Both Magalon (1930) and Gagnepain and Conrard (1937) have been criticised by Evans et al. (2002). Evans (2002) described Gagnepain and Conrard's (1937) treatment of the Palmae as 'rather poor'.

Recent botanical activity has resulted in the collection of many specimens of palms from previously uncollected areas in Viet Nam (e.g., *Guihaia grossifibrosa*, Averyanov et al., 2005) and the description of new species of *Rhapis* (Averyanov et al., 2006), *Daemonorops* (Dransfield, 2001) and *Calamus* (Evans & Tran Phuong Anh, 2001). However, the palm flora of Viet Nam is still poorly known, especially in relation to the neighbouring countries of Thailand (Dransfield et al., 2004), Laos (Evans et al., 2001, 2002) and China (Pei et al., 1991). There is no recent, specimen-based taxonomic treatment, and the only work on all Viet Namese palms is the semi-popular, non-specimen-based work of Pham-Hoang Ho (1993), which is still widely used in Viet Nam. Pham-hoang Ho states there are 104 species of palm in Viet Nam, but this figure includes cultivated species. Excluding cultivated species, and taking into account recent taxonomic changes, current estimates are that the country contains approximately 20 genera and 56 species of palm. However, this number of species is likely to increase as new ones are still being discovered. Many of these species are used by local people in one way or another, and palms are considered one of the most important NTFPs in Viet Nam.

NON-RATTAN PALM SPECIES AS NTFPS IN VIET NAM

Although rattans are usually considered the most important NTFPs in Viet Nam, there are several other important palms, especially from the genera *Livistona*, *Licuala*, and *Rhapis*.

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Livistona is a relatively large genus of palms. Three native species occur in Viet Nam, although others are cultivated. Leaves of *Livistona* are commonly used for thatching, although in some areas in Viet Nam the leaves are used to manufacture hats. *Livistona jenkinsiana*, locally known as co, occurs throughout central and northern mountainous areas of Viet Nam and is one of the most commonly used species. *Livistona saribus* is less often seen, but is cultivated in parts of central Viet Nam, and also used extensively for thatching.

One of the most characteristic sights of Viet Nam is the conical hats worn by women throughout the country, known as non. These hats are made from the leaves of a palm, *Licuala*, commonly known as la non. The taxonomy of *Licuala* in Viet Nam is in particularly bad shape. Some species are dioecious, and also sexually dimorphic. This means that the inflorescences of male plants can look different from those of female plants, even though they are the same species. This situation has not been appreciated, and in some places male plants have been referred to as one species, and female plants as another. One of the most commonly used species from central Viet Nam is probably undescribed, and there appears to be several other undescribed species in the country. We are currently carrying out research on the genus *Licuala* in Viet Nam, and trying to straighten out the taxonomy of the genus.

The third genus of economic importance is *Rhapis*. This genus contains 10 species, seven of which occur in Viet Nam, where they are commonly known as lui or cay lui. Species of *Rhapis* are commonly grown as ornamentals, and they are seen in gardens throughout Viet Nam. A visit to Ha Noi's Hoang Hoa Tham street reveals a thriving trade in ornamental palms. Although many of the palms being sold are exotics, at least two native species of *Rhapis* are commonly sold - *R. laosensis* and *R. excelsa*. There is one newly described species from Viet Nam of great ornamental potential, *R. vidalii*, and we have recently discovered another potentially ornamental species in central Viet Nam. As far as we know, most plants sold in the nursery trade are taken from wild populations.

Rattans

Most rattans come from the large genus *Calamus*, but species from other smaller genera are also used (e.g., *Daemonorops*, *Ceratolobus*, *Korthalsia*, *Myrialepis*, *Plectocomia*, *Plectocomiopsis*). All these genera, except *Ceratolobus*, are found in Viet Nam. Rattans are found in a wide variety of different soil types and geological substrates, and under a range of different light environments. Most rattans, however, are vigorous climbers and require periodic canopy gaps for optimal growth and development.

Rattan cane forms the basis of a thriving international industry, currently worth about $6.5 billion a year (ITTO, 1997). Most of the cane entering world trade originates from South East Asia, and is collected, with few exceptions, from wild populations. Although Indonesia and Malaysia are the largest commercial producers of rattan (Manokaran, 1990), several countries in the Asian region are major contributors to the rattan market. Viet Nam, Laos, and Myanmar, for example, have all exported over a $1 million worth of rattan every year during the last decade (INBAR, 2004).

In spite of the economic value and widespread occurrence of these plants, very little is known about the rattans of the Asian region. In many of the constituent countries, even a basic understanding of the diversity and taxonomy of local species is lacking. The last systematic treatment of the rattans of Myanmar, for example, is that of Kurz (1874), and no recent, specimen-based treatment of rattans is available for either Viet Nam or Cambodia (Evans, 2002). Notable exceptions are Evans et al.'s (2001) excellent treatment of the rattans of Laos, and Hodel's (1998) popular work on the palms of Thailand that includes rattans. The rattans of China are covered by Pei et al. (1991) in their treatment of the Palmae in the Flora of China.

The lack of basic taxonomic information on local rattans is a critical problem given the current rate of habitat destruction, over-exploitation, and depletion of wild populations in the Asian region. Recent reports suggest that wild rattan stocks are almost exhausted in Viet Nam (Evans, 2002), are seriously depleted in mainland China (Zeng et al.,

1999), and are declining in Laos, Cambodia, and Myanmar (FAO, 2002). As far as can be determined with the existing data, the Asian region contains at least 10 species of rattan that are threatened or endangered (IUCN, 1998).

The full socio-economic potential of rattan has not yet been realised. So far, few quantitative estimates of its true value are available. Domestic trade and subsistence use of rattan create benefits estimated at $3 billion per annum and another $4 billion is generated through global exports. Additional benefits may accrue from intervention in the sector to systematise best practices in the resource use, management, marketing and processing of rattan.

Furthermore, today, only a small portion of the approximately 600 species of rattan found is used for commercial purposes. If more of the presently under-utilised and lesser-known species are added to this list, the benefits could be wide ranging. Rattan is almost entirely collected from natural forests and rattan gardens. However, in recent years, uncontrolled harvesting and deforestation have led to resource exhaustion of the desired species in many rattan-producing countries in Asia.

Although Asia is the dominant player in the rattan trade, it accounts for only about 58 per cent of the world trade in rattan activity, the remaining 42 per cent being held by industrialised countries that import Southeast Asian rattan. Compared with the total world trade in furniture ($80-100 billion), rattan furniture trade represents less than 4 per cent. However, in Asia the output of the rattan furniture industry represents well over 25 percent of all furniture industry output, and it is growing dramatically.

The rattan industry is highly fragmented with over 90 per cent of all factories employing less than 50 people, i.e. cottage and small-scale enterprises. In general, rattan furniture manufacturing is highly labour-intensive, employing well over one million people in Asia, of whom about 500,000 work in the manufacturing sector and another 700,000 are involved in the collection (and primary processing) and transportation of raw material (a majority on a seasonal basis). The average investment per worker in a modern rattan factory is about $2,000, whereas it is 10 times that much in a conventional furniture plant.

The world export statistics on rattan for the 2001-2004 period show that the rattan trade was valued at $186,476,950, with an annual average of $46,186,592. Viet Nam is a major contributor to the rattan market and exports about $7,000,000 worth of rattan each year (INBAR, 2004). For the 2000-2003 period, Viet Nam exported $6,467,000 worth of rattan, accounting for 2.9 per cent of the total world trade in exported rattan. This share of exported rattan for Viet Nam would be higher if the data for 2004 were taken into account.

Viet Nam holds sixth place among countries in terms of imported rattan (3.5 per cent, or more than $7 million). Once Viet Nam's data regarding imported rattan is made available on the UN database, it is projected that the country's consumption of the world's rattan market will be higher, as will its value in dollar terms.

The most important rattan species in Viet Nam are: *Calamus tetradactylus Hance* (small diameter) in the north; *Calamus tonkinensis Becc*. (small diameter) and *Calamus rudentum Warb*. (small diameter) nationwide; song mat (*Calamus platyacanthus Warb*.) (large diameter) in the north and *Calamus poilanei Lour*. (song bot) (large diameter) in the south. Species like *Calamus tetradactylus Hance* (may nep), *Calamus tonkinensis Becc*. (may dang) and *Calamus amarus Roxb*. (cay mai) have been domesticated in home gardens.

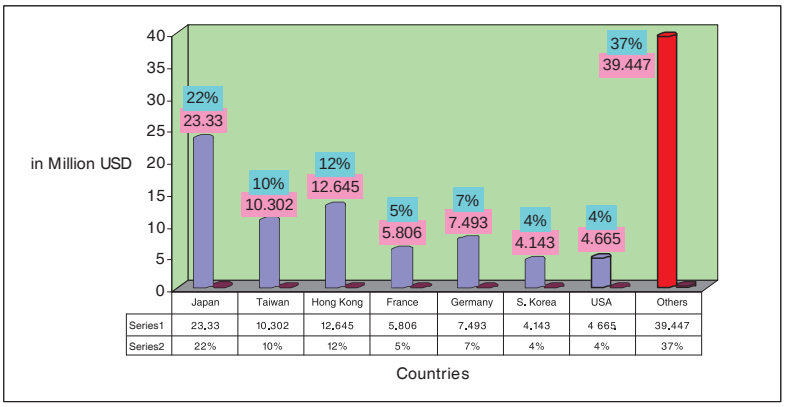
Uncontrolled rattan harvesting for many years has led to the near extinction of rattan resources across Viet Nam. To support the growing handicraft industry, the government is encouraging the cultivation of rattan among various stakeholders. In Thai Binh, Hai Duong, Ha Tinh and Nam Ha provinces, rattan has been planted in home gardens for centuries as a multipurpose tree. Annually, farmers can produce some 1,500 to 2,000 tonnes from home gardens across the country. Nowadays, rattan markets have been liberalised and are operated by private traders, primary processing factories and exporters, along with State-controlled export

companies. Few secondary processing activities are conducted in Viet Nam for the local market and in general most of the exported products are in the primary processed form. The secondary processing in furniture and other home appliances is usually done by the importing countries. Each year some 20,000 to 40,000 people are involved in rattan exploitation and processing, which makes the industry an important contributor to Viet Nam's employment.

In the 1970s and 1980s, most rattan from Viet Nam was exported as finished products to the former Soviet Union. With the collapse of USSR, this market was lost and the emphasis was shifted to the export of raw material and semi-processed materials to neighbouring countries like Thailand, Taiwan, Hong Kong, China and Japan. From 1993 to 1995, raw rattan exports declined as a result of Decree 90, which is a government regulation forbidding the export of raw and semi-processed rattan materials, in order to stimulate the nation's processing industries. The regulation was proclaimed in 1992, but trade in these products continued until 1995.

Following the ban, the rattan sector in Viet Nam experienced numerous problems, owing largely to a lack of processing technology and skilled craft people. However, since 1996, the Viet Namese rattan-processing industry has progressed. The export of finished products has continued to increase, partly as a result of Viet Nam's economic reforms. As such, new export markets such as Germany and the US are gaining importance.

Table 1. Bamboo and Rattan Exports by market by the year of 2004



Source: Viet Nam Trade Promotion Agency, December 2004

Table 1 shows that Japan is the most important market for bamboo and rattan exported from Viet Nam. The Japanese market takes 22 per cent (or $23.23 million), while Taiwan and HongKong are the second and third largest markets for Viet Namese rattan and bamboo producers. Rattan and bamboo handicrafts and furniture are important export products and the export value of bamboo and rattan products combined is estimated to exceed $100 million. Demand for rattan is expected to continuously rise as a result of growing markets, thereby gaining more importance than ever before.

Statistics show that rattan is currently an important raw material for the handicraft industry, which employs at least 2-3 million people in Viet Nam. According to a 2005 report from the Ministry of Rural Development (MARD), each $1 million earned from handicraft exports can generate jobs for roughly 3,000 to 4,000 workers in handicraft villages. The main destinations for finished handicraft products made from rattan are Japan, China, Hong Kong, Taiwan, the United States, and Denmark.

Table 2. Viet Nam rattan exports in the 2001-2003 period

Period	Trade Flow	Trade Value	Percentage of major countries
2001	Export to	$2,124,000	World (50%); Spain (24.9%); Singapore (12.5%); China (6.2%); Italy (3.1%); Hong Kong (1.4%); Philippines (0.8%); Thailand (0.8%; Japan (0.3%)
2002	Export to	$2,562,000	World (50%); Spain (13.8%); Singapore (11.7%); Philippines (8.3%); China (7.2%); Japan (2.7%) ; Laos (1.1%); Germany (0.9%); France (0.9%); Switzerland (0.9%); Denmark (0.4%); Hungary (0.4%); S. Korea (0.3%); Portugal (0.3%); Malta (0.2%); Australia (0.2%); Other Asian NES (0.2%); Russia (0.2%); Hongkong (0.2%) UAE (0.1%); UK (0.1%)
2003	Export to	$1,790,000	World (50%); Spain (18%); Philippines (2.8%); Singapore (12%); China (9.2%); Italy (6.5%); Thailand (0.6%); Japan (0.4%); Hong Kong (0.4%)
Total Viet Nam rattan Exports = $6,476,000 for the period of 2001 - 2003			

Source: COMTRADE database, UN statistics

Table 2 shows that the total value of Viet Nam's rattan exports for 2001 was estimated at $2,124,000; $2,562,000 for the 2002; and $1,790,000 for 2003. When viewed in terms of Viet Nam's percentage of rattan exports over the period, the country's major rattan trading partners are Italy, China, Singapore, Japan and Spain. The total value of Viet Nam's rattan exports amounts to $6,476,000, accounting for 2.9 per cent of the total world trade value in exported rattan.

Table 3. Value of Viet Nam Rattan Imports in recent years

Period	Trade Flow	Trade Value	Percentage of major countries
2000	Import from	$144,000	World (50%); Indonesia (50%)
2001	Import from	$3,986,000	World (50%); Laos (40.9%); Indonesia (3.9%); Philippines (3.2%); Singapore (1.6%); Myanmar (0.4%)
2002	Import from	$1,558,000	World (50%); Laos (40.8%); Philippines (5.5%); Singapore (2.1%); Indonesia (1.6%)
2003	Import from	$2,186,000	World (50%); Laos (21.5%); Philippines (15.2%); Singapore (10.7%); Indonesia (2.6%)
Total Viet Nam rattan imports = $7,730,000 for the period of 2001 – 2003			

Source: COMTRADE database, UN statistics

Table 3 summarises the total value of Viet Nam's rattan imports in the period 2000-2003. During this time, total rattan imports were valued at $7,730,000. In 2000, Viet Nam had to import half of its raw rattan materials from Indonesia from a total value of $144,000. However, from 2001 onwards, Laos seems to be the largest trading partner in terms of exporting rattan to Viet Nam with rattan imports accounting for 40.9 per cent in 2001 and 40.8 per cent in 2002. However, the Philippines has gradually become the most important export partners for Viet Nam as the value of imported rattans has increasing over the 2001-2003 period.

CONCLUSIONS AND RECOMMENDATIONS

There is an urgent need for an up-to-date, specimen-based, palm flora of Viet Nam study. Given the increasing interest in conservation, sustainable use, and management of Vietnamese palms, we emphasize the importance of a stable and reliable taxonomic basis. The development of rattans in particular requires a stable and reliable taxonomy. In many cases the same species are referred to by different names in literature, while different species are known by the same name. Vernacular names are even more confusing, but are commonly used in the rattan trade. To compound the problem, the taxonomic literature is written in an obscure scientific manner which the layman finds difficult to understand, and the taxonomic literature is almost impenetrable to the non-specialist. In our current research we are attempting to produce a 'user-friendly' field guide to all palms of Viet Nam, following the highly successful format of the Field Guide to the Rattans of Lao PDR by Evans et al. (2001). This guide will be useful for all those interested in rattans, be they foresters, growers, traders, botanists, managers or conservationists.

There is an urgent need for work on the conservation, management, and sustainable use of rattans in Viet Nam. The Asian region represents an extreme situation, a worst-case scenario in which very valuable and important forest species are disappearing before they can be catalogued and studied. Rattans can be managed *in situ* or grown in small-scale community gardens or large-scale plantations to supply commercial and subsistence needs, but not without knowing the name of the species in question and its basic habitat requirements. Similarly, conservation plans can be developed for rare and endangered species, but not without information about the structure and regeneration of wild populations and an understanding of the geographic distribution of different species. There is an urgent need to sort out the taxonomy of the rattan flora of the Asian region, to assess the condition of wild rattan populations, and, perhaps most importantly, to develop more sustainable ways of exploiting these invaluable forest resources.

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Closing Remarks

Closing Remarks

Dr. Trieu Van Hung, National Director of the NTFPs Project Phase II and Director of the Department of Science & Technology, MARD

Dear distinguished guests,

On behalf of the Ministry of Agriculture and Rural Development (MARD) and the Conference Organisation Board, I would like to express our sincere thanks to all distinguished guests, especially international participants, who actively participated in the conference and contributed to the success of this event.

During the last three days, 31 reports and research papers have been presented, generating hundreds of comments among the 170 participants at this conference, which included 75 international guests. Inputs focused on nine main themes under the overall question of how to promote NTFPs role in poverty reduction, natural resources and biodiversity conservation?

These nine themes were:

1. Impacts of NTFPs on poverty: How can NTFPs help to alleviate poverty? What are the crucial gaps that need to be solved so that NTFPs can practically contribute to poverty allivation?
2. Communication and networks: How can information on NTFPs, including methodologies, markets, and impacts on biodiversity and poverty, be effectively communicated? How do institutions and organisations currently share information on NTFPs, and what developments, (e.g. an NTFPs network), would be useful?
3. Policy and strategy: What policy and regulatory framworks can promote an enhanced role of NTFPs in poverty alleviation and encourage the sustainable management of forest resources?
4. Medicinal plants: What is needed for the sustainable management of medicinal plants? Can medical plants contribute to poverty alleviation?
5. NTFPs models: What are the successful elements of NTFPs models? How can we use these models and build on these experiences?
6. Sustainable harvesting: Can products be harvested sustainably? Which ones? How can we ensure that this benefits the poor?
7. Methods: What methods have been the most successful in contributing to poverty alleviation? How can such methodologies contribute to biodiversity conservation and how can we bring them together?
8. NTFPs business: What are the elements for success in NTFPs business? Which successful NTFPs business examples can be replicated and how can we apply the lessons learnt?
9. NTFPs products: Which NTFPs products provide benefits to local people and have the potential for development? Which examples of successful NTFPs products can be replicated and how can we apply the lessons learnt?

We hope that through this conference, every participant has had the opportunity to attain needed information, lessons learnt or establish a new partnership that can be useful for our future work.

For MARD, this conference has been very important in providing more information to complete the NTFPs National Action Plan 2007-2010, as well as providing input for the Pilot Project to Support NTFPs 2007-2010, especially in developing a policy framework to promote NTFPs-related activities, in which conservation is linked with development, socialisation and international integration.

The Conference Proceedings consisting of all presentations and recommendations will be published and disseminated to all participants and interested people.

On behalf of the MARD, I would like to thank the Netherlands Government and the Royal Netherlands Embassy, who have paid special attention and provided effective support for Viet Nam in the sustainable use of natural resources in general and of NTFPs in particular.

Our thanks also to the World Conservation Union (IUCN) and the IUCN Country Group for Lao, Cambodia and Viet Nam. As a technical support agency, IUCN has provided effective assistance and has been instrumental in having NTFPs recognised as a focus of the National Forestry Development Strategy by 2020. We expect that MARD and IUCN will continue our close collaboration, especially in the implementation of the recently developed IUCN Strategic Framework 2007-2010 under the theme "Finding balance in a changing world". Our special thanks to Dr. Katherine Warner, head of the IUCN Country Group One in Lao, Cambodia and Viet Nam, who exerted great efforts in the preparations for the conference and sucessfully facilitated the event.

We are also very grateful to the international organisations who have cooperated in this conference, including the German Technical Cooperation (GTZ), the Netherlands Development Organisation (SNV), CARE International, Worldwide Fund for Nature (WWF), the Training Centre for Community Forest in Asia-Pacific (RECOFTC) and the Sweden Import Promotion Programme (SIPPO).

Our sincere thanks to the Viet Namese participants, especially leaders and representatives from the Departments of Agriculture and Rural Development in various provinces. We hope that the information and experiences from this conference will be taken into account in the development of NTFPs plans linked to poverty alleviation and biodiversity conservation.

Many thanks to the Organisation Board, the facilitators of discussion groups and supporting staff behind the scenes that contributed to the success of the conference. We are also grateful to all the media agencies for your participation and coverage of the event.

I wish the very best of health, happiness and success to you all.

Thank you very much.

Annexes

Annex 1: INTERNATIONAL CONFERENCE The Role of Non-timber Forest Products (NTFPs) in Poverty Alleviation and Biodiversity Conservation

11 – 14 June 2007, Sofitel Plaza, 1 Thanh Nien, Ha Noi, Viet Nam

AGENDA

Monday, June 11th

Critical Elements for Successful NTFPs Initiatives

8:00	Registration	IUCN -MARD

PLENARY: Opening and Keynotes

8:30	Introduction	Dr. Trieu Van Hung Director Department of Science and Technology National Director of NTFPs Project Ministry of Agriculture and Rural Development (MARD)
8:40	Opening Speech	Mr. Hua Duc Nhi Vice Minister MARD
8:50	Welcoming Remarks	Dr. Vu Van Trieu IUCN Viet Nam Country Representative
9:00	Viet Nam Overview	Dr. Pham Duc Tuan Vice Director, Department of Forestry, MARD
9:20	International Overview	Dr. Katherine Warner IUCN Country Group Head, Cambodia, Lao PDR and Viet Nam
9:40	NTFPs Sub-Sector Support	Dr. Le Thanh Chien Project Phase II Deputy Director of the NTFPs Project, Viet Nam

Coffee Break: 10:00 - 10.30

PLENARY: Session 1: Making the Link: NTFPs Impacts on Poverty

Co-Chairs: Dr. Trieu Van Hung – MARD and NTFPs Project
Dr. Katherine Warner – IUCN

10:30 NTFPs Impact Poverty, National Development and Biodiversity Conservation by Creation of Livelihood Assets
John Raintree, Nguyen Thi Nghia and Bui Thi An – NTFPs Sub-Sector Support Project Phase II

10:50 Community Initiatives on NTFPs Enterprise for Poverty Alleviation and Biodiversity Conservation: Multi stakeholder Perspectives on Effectiveness and Enabling Environment
Nitaya Kijtewachakul - Walai Rukhavej Botanical Research Institute (WRBRI), Mahasarakham University

11:10 The Importance, Role and Value of Non-Wood Forest Products for Laotian Food Security, Nutrition and Livelihoods
Vongvilay Vongkhamsao - National Agriculture and Forestry Research Institute (NAFRI) - Lao

11:30 Understanding and Supporting NTFPs Market Requirements: Managing Risk, Creating Success
Aaron Becker and Mark Barmett

LUNCH: 12.00 – 13.30

PLENARY: Session 1: Making the Link: NTFPs Impacts on Poverty (continued)

13:30 NTFPs/MAPs Management's Contribution to Livelihoods Improvement of Rural Poor and Lesson Learnt of Churia Programme; An experience of CARE Nepal-Rajendra Khanal and Krishna Bhujel – CARE International in Nepal

13:50 Discussion Groups:
Key questions: How can NTFPs Help to Alleviate Poverty? What are the crucial gaps?

Coffee Break 14.45 – 15.00

PARALLEL AFTERNOON SESSIONS 2 and 3

Theme 2: Making the Link - Communication and Networking

15:00 Viet Nam NTFPs Network: Looking Ahead
Nguyen Huy Phon – Viet Nam NTFPs Network, and Nguyen Thi Yen – IUCN Viet Nam

15:20 A Cross-Country Exchange Workshop on Non-timber Forest Products (NTFPs) Enterprise Development for Poverty Alleviation, Vientiane, Laos, 24-27 April
Joost Foppes – SNV Laos

15:40 An innovative approach to information sharing of research on Non Timber Forest Products: Some experiences from the IUCN NTFPs Sub Sector Support Project in Viet Nam
Sharon Brown – The University of Queensland, Fernando Potess, NTFPs Sub-Sector Support Project Phase II

16:00 Discussion Groups:
Key questions: How can information on NTFPs, methodologies, markets, and impacts on biodiversity and poverty be effectively communicated? How do institutions and organizations currently share information on NTFPs, and what developments, e.g. an NTFPs network, would be useful?

Theme 3: Policy and Strategy

15:00 NTFPs Policy on Non-Timber Forest Products in Viet Nam
Pham Xuan Phuong – Ministry of Agriculture and Rural Development

15:20 Placing conservation and sustainability before marketing, the situation of NWFP management in Bhutan Marianne Meijboom – SNV Bhutan

15:40 Discussion Groups:
Key Question: What policy and regulatory frameworks can promote an enhanced role of NTFPs in poverty alleviation and encourage sustainable management of forest resources?

Welcome Reception at the Sofitel Plaza: Trade Fair / Poster Session

17:00 Reception, Trade Fair and Poster Session

Tuesday, June 12th:
Critical Elements: Products, models, and methods

PLENARY: Overview

8:30 Review of Day 1 (discussion group reports)
Introduction to the programme for Day 2

PARALLEL MORNING SESSIONS 4 and 5

Theme 4: Medicinal Plants

9:30 Community - based Enterprises and Market Development for Medicinal and Aromatic Plants (MAPs) in the Greater Himalayan Region
Dyutiman Choudhary – ICIMOD-MAPPA

9:50 Formulating a Model for Developing Medicinal Plants in Allocated Forest with the Participation of Local Community in the Buffer Zone of Bach Ma National Park
Le Thi Dien & Tran Nam Thang - Hue University of Agriculture and Forestry

Coffee Break: 10:15 – 10.30

10:30 Conservation and development of the two valuable and rare medicinal plants of *Clerodendron Infortunatum* and *Holarrhena antidysenterica*
Le Cong Luong – Alliance of Associations for Science and Technology of Ha Tinh

10:50 Discussion Groups:

Key Questions: What is needed for the sustainable management of medicinal plants? Can medicinal plants contribute to poverty alleviation?

Theme 5: NTFPs Models

9:30 Plantating medicinal plants under the forest canopy: solutions for poverty reduction and conservation of medicinal plant resources in Son La Province.
Dinh Thi Hoa – Northwest University, Son La Province

9:50 Initial Achievements in Planting Amomum Longiligulare in Quan Chu Commune, Dai Tu District, Thai Nguyen Province
Nguyen Van Tap – Institute for Medicinal Materials

Coffee Break at 10:15-10:30

10:30 Development of special-fruit trees models from the three species: Pimela alba, Castanopsis boisii and Anise
Hoang Le Minh – Forestry Nursery Enterprise in the North-east Region

10:50 Discussion Groups:

Key Questions: What are the successful elements of NTFPs Models? How can we use these models and build on these experiences?

LUNCH 12:00 – 13:30

PARALLEL AFTERNOON SESSIONS 6 and 7

Theme 6: Sustainable Harvesting

13:30 Sustainable Wild Collection and NTFPs – the International Standard for Sustainable Wild Collection of Medicinal and Aromatic Plants (ISSC-MAP).
Thomas Osborn – TRAFFIC Greater Mekong Programme

13:50 Some gaps in O Duoc conservation at Cam Xuyen district, Ha Tinh province.
Tran Thi Kim Lien – NTFPs Sub-Sector Support Project Phase II

14:10 Sustainable harvesting of NTFPs in natural tropical forests of India: Challenge ahead for livelihood security of forest dependent Tribal Communities
R.K. Pandey – Madhya Pradesh State Forest Research Institute, Jabalpur (M.P.), India

14:30 Documentation and Trial of a Participatory Methodology to Sustainably Harvest Non Timber Forest Products
Mike Dine – NTFPs Sub-Sector Support Project Phase II

14:50 Working Groups: Key Questions: Can products be harvested sustainably? Which ones?
How can we ensure that this benefits the poor?

COFFEE BREAK 15:30 – 15.45

Theme 7: Methods

13:30 Market Analysis and Development: Process, methods, and tools for developing community based enterprises
Katherine Warner (other authors: Isabelle Lecup and Ken Nicholson) – IUCN Country Group 1: Viet Nam, Cambodia, Laos

13:50 A Documentation Strategy to Develop the Potential of NTFPs as a Source of Livelihood Diversification for Local Communities in the Batang Toru Orangutan Conservation Programme
Jusupta Tarigan – World Agroforestry Centre-ICRAF, South East Asia Regional Office

14:10 The Participatory methodology for production of NTFPs training materials: an achievement of NTFPs project
Nguyen Viet Khoa – NTFPs Sub-Sector Support Project Phase II

14:30 How Can the Poor Benefit from NTFPs Enterprise Development? An Exploration by CARE International's CEFM Project in Cho Don District, Bac Kan Province, Viet Nam
Nguyen Anh Thinh and Fiona Percy – CARE International in Viet Nam

14:50 Working Group Session:
Key Questions: What methods have been most successful in contributing to poverty alleviation? How can methodology contribute to biodiversity conservation? How can we bring them together?

COFFEE BREAK 15:30 – 15.45

WORKING GROUP WRAP-UP

16:00 Circle Sharing

Wednesday, June 13th:

Critical Elements: The Business of NTFPs

8:30 Review of Day 2 and Introduction to Day 3

PARALLEL MORNING SESSIONS 8 and 9

Theme 8: Business

9:00 NTFPs Business in Viet Nam
Nick Shirra – Wood & Agri-Business Services Ltd. (Viet Nam)

9:20 Community-based Enterprise of Malva nut juice in Eastern Thailand
Somjai Srimongkontip – RECOFTC

9:40 Bridging the Gap – Medicinal Plants Innovation in Viet Nam
Chris Wheatley – Forest Herbs Research Ltd

10:00 SECOIN's Agarwood Product
Dinh Xuan Ba – Secoin Co., Ltd.

Theme 9: Products

9:00 Great Stercutila (*Sterculia foetida* L.), forest resources status and opportunities to green sandy arid waste lands & to generate incomes for the local poor in Ninh Thuan and Binh Thuan provinces
Le Quoc Huy - Center for Biotechnology in Forestry, Forest Science Institute of Viet Nam (FSIV)

9:20 The Role of NTFPs in Poverty Alleviation and Biodiversity Conservation
Nguyen Van Trung – Hoa Son Art Ltd. Co.

9:40 Palms as Non-Timber Forest Products of Viet Nam
Andrew Henderson – New York Botanical Garden

Parallel Morning Discussion Groups

10:40 Elements for successful NTFPs Initiatives
Key Questions: What are the elements for successful NTFPs initiatives in terms of Biodiversity Conservation? Poverty alleviation? Where do they come together?

10:40 Critical Gaps
Key Questions: What are the critical gaps in our understanding of NTFPs in terms of research? Materials for different audiences? Communication? How can we close these gaps?

Closing Plenary

Co-Chairs:	**Dr. Trieu Van Hung – MARD and NTFPs Project** **Dr. Kadi Warner – IUCN**
12:00	Reports from Discussion Groups
12:30	Closing Remark MARD
12: 45	Conclusion IUCN
LUNCH	**13:00 – 14:00**

Field Trip

14:00	Meet at Sofitel Plaza lobby and depart for Quang Ninh
19:00	Arrive in Van Don – Viet My Resort
19:30	Dinner at Viet My Resort with members of the Van Don Economics Division

Thursday, June 14th:

Field Trip in Quang Ninh Province

7:00	Breakfast
7:30	Depart for Field Site Visits: **Van Yen HCC:** Visit the medicinal Plant of HCC **Dai Mo Village:** mushroom model + processing Linh chi mushroom, Visit Ba kich model plantation, Enrichment Forest model (rattan + 3 NTFPs species) **Dai Lang Villages:** Tre mai planation, Ba kich plantation model + Enrichment by rattan, visit model Enrichment by rattan
11:30	Lunch in Van Don
12:00	Depart for Ha Noi – Short rest stop in Ha Long City

Annex 2: LIST OF CONFERENCE PARTICIPANTS

No	Name	Organization
1	Mr. Alexander, Lindsay	Manager Advisor, NTFPs Organization, Cambodia
2	Mr. An Van Bay	FSIV
3	Mr. Becker, Aaron	Independent Consultant
4	Mr. Bepler, Stefan	Programme Coordinator, DED
5	Mr. Berlow, John	Volunteer
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7	Ms. Bowling, Tari	CARE Laos
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68	Mr. Le Thanh Son	Nat'l Institute of Medicinal Materials, MoH

69	Mr. Le Thanh Y	Science & Development Newspaper
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119	Mr. Nguyen Xuan Thuy	DoST Ha Tinh
120	Ms. Nguyen Thi Yen	IUCN Viet Nam Forest Programme Manager
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Non-Timber Forest Products (NTFPs) play an important role in the livelihoods of the poor, providing a source of food, medicine, construction materials and income. An estimated 60 million people live in highly forested areas of Latin America, West Africa, and Southeast Asia, with an additional 400 to 500 million people directly dependent on the natural products sourced from within these regions.

The international conference entitled "The Role of Non-Timber Forest Products in Poverty Alleviation and Biodiversity Conservation" was organised in Viet Nam during June 2007. Participants from Asia and other regions shared information and experiences, exploring key questions related to achieving successful pro-poor and pro-biodiversity NTFP initiatives.

The conference was an initiative of the NTFP Sub-Sector Support Project Phase II, with support from the World Conservation Union (IUCN), and held in partnership with the Swiss Import Promotion Programme (SIPPO), The Regional Community Forestry Training Centre for Asia and the Pacific (RECOFTC), the Netherlands Development Organisation (SNV), World Wildlife Fund (WWF), CARE International, and the Ministry of Agriculture and Rural Development of Viet Nam (MARD). The project and conference were made possible through support from the Netherlands Government, while this publication was produced with support from the German Technical Cooperation (GTZ).

The conference proceedings presented in this publication incorporate the themes of the conference within a range of international contexts and the case studies cover various aspects of NTFP development including: communication and networking, poverty alleviation, policy and strategy, medicinal plants, sustainable harvesting, project and business models, and products made from NTFPs.

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