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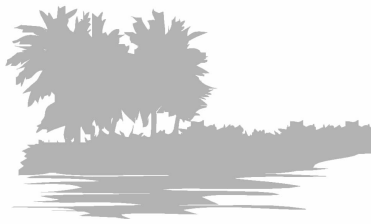
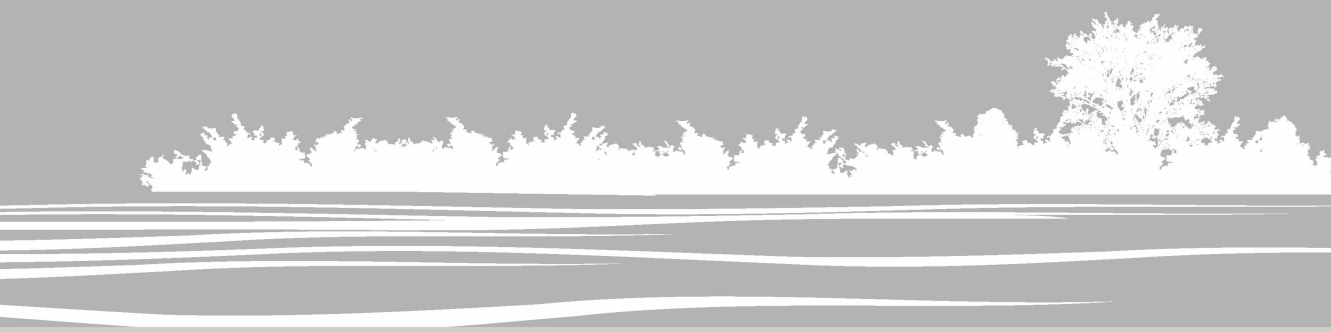


ROLES OF FOREST RESOURCE MANAGEMENT IN THE GREATER MEKONG SUB-REGION

Asia-Pacific Network for
Sustainable Forest Management and Rehabilitation



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Preface

As part of its capacity building program, the Asia-Pacific Network for Sustainable Forest Management and Rehabilitation (APFNet) together with Mekong Institute (MI) organized a workshop on the Roles of Forest Resources Management in the Greater Mekong Sub-region (GMS). In July 2012,25 participants from the six member economies (Cambodia, China, Lao People's Democratic Republic, Myanmar, Thailand and Viet Nam) met in Kunming, China to exchange best practices and lessons learned on how to improve watershed management through better forestry. They discussed ways to adopt integrated and comprehensive approaches and also explored opportunities to develop and implement regional demonstration projects.

Some of the challenges which must be overcome to improve watershed management in the GMS are significant: vast distances between users, many diverse stakeholders and conflicting objectives over land use—encroachment of watershed and forestland and expansion of agriculture, among others. In addition, there are a lot of overlapping administrative functions at municipal and provincial levels over the management of a single watershed.

Workshop attendees provided many valuable insights during discussions which APFNet is pleased to share by making this compilation of reports available. We hope that readers will find the information helpful in terms of improving their domestic situation. Last but not least, we would like to thank all participants for their important contributions. Their message is clear: the decline in forest area at a time when demand for their products is surging calls for urgent action. A combination of sound policies, effective regulations, efficient enforcement, education and approaches which combine both biophysical and social dimensions will reverse these trends over the long term.

Executive Director
APFNet Secretariat

Content

Approaches to Watershed Management in Cambodia

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Abstract

Sustainable forest-based integrated watershed management faces a number of challenges in Cambodia, including poverty alleviation, sustainable livelihoods, economic development, climate change, biodiversity conservation, conflicts over land use, weak collaboration, insufficient knowledge and capacity, forest degradation, and suitable management models. To tackle these problems, the Forestry Administration is employing robust tools and approaches to use and manage forests in a balanced manner, including forest demarcation, law enforcement and governance, community forestry, reforestation, establishment of protected forests, participatory land use planning, capacity building and REDD (reducing emissions from deforestation and forest degradation) initiatives. Implementation requires the participation of multi-stakeholders: domestic and local government, communities, non-governmental organizations (NGOs), donors, international partners and the private sector.

Forest legislation, policies and regulations have been adopted to manage the sector and this framework is producing significant achievements. For instance, community forestry has been successfully implemented in all provinces, in collaboration with villages, NGOs, local authorities and forestry officials at all levels. Community efforts to protect forests and participate in land use planning are also yielding good results. Moreover, the *Domestic Forest Program* (*2010 – 2029*) guides sustainable forest management, including through the use of traditional knowledge, to ensure that these resources provide multiple benefits: social, cultural, economic and environmental.

1. Background

1. 1 Watershed management

Cambodia is rich in water resources but depends on them heavily for agriculture, fisheries and, to a much lesser extent, hydro power. Although watershed management is a relatively new concept, awareness of the impacts of upstream activities on downstream areas is increasing—declining fish stocks or land/forest degradation from chemical fertilizers used in agriculture. Thus, the need to establish mechanisms and procedures for stakeholders to participation in watershed management became clear. *A Royal Decree on Watershed Management* (December 1998) highlights the importance of protecting natural

resources in watersheds and instructs government to institute sub-decrees.

A key issue in watershed management is loss of forest cover—about 70,000 ha per year between 1973 and 1993, and 180,000 ha per year between 1993 and 1997—mostly due to demand for fuelwood, encroachment for agriculture and land development. Unless this situation is reversed, important watershed functions will be impaired. In this regard, efforts are underway to improve understanding of the institutional framework, policy and regulations on watershed forest management in Cambodia and to adopt the best options for addressing the challenges associated with achieving sustainable watershed forest management for social and economic benefits.

1.2 Ministerial mandates

As signatory to several international conventions related to watershed management, including the *Convention on Biological Diversity,* the *Framework Convention on Climate Change and* the *Convention on Wetlands of International Importance,* government has assigned responsibility for implementation to the Ministry of Environment (MOE), the Ministry of Agriculture, Forestry and Fisheries (MAFF) and the Ministry of Water Resources and Meteorology (MWRM). Although domestic policies and laws on the management of watersheds have been drafted, weak collaboration among these and other stakeholders (e.g., the Ministry of Land Management, Urbanization and Construction, the Ministry of Rural Development, international and non-government agencies) is hindering the development of a comprehensive legal framework.

2. Institutional and Legislative Framework

2.1 Legislation/policies governing forest management

A number of policies, legislation and regulations govern the sustainable use and management of forest resources to safeguard their contributions to poverty alleviation, livelihoods, economic growth, health of the environment, conservation of biological diversity, cultural heritage and traditional way of life. Programs include forest demarcation, classification and registration, management and conservation, law enforcement and governance, community forestry, research and development, and sustainable financing. Moreover, laws call for the establishment of forests to protect watersheds, regulate water and prevent soil erosion. Forest protection is also linked to soil fertility, water quality and quantity, surface runoff, replenishment of the water table; and mitigation of flash floods.

Despite such measures, enforcement is weak and responsibilities overlap. Furthermore, recent development activities which led to changes in land use have degraded forests and will likely have a negative impact on watersheds in the long run.

2. 2 Domestic, regional and local mechanisms

Numerous regional and local committees of line ministries and agencies are in place to collaborate in the development, conservation and sustainable management of forests and watersheds. Working groups consisting of government agencies, international donors and NGOs also have been established to deal with forest and environmental issues in a coordinated and participatory manner. A council of ministers and the prime minister have issued orders to provincial authorities and the police to cooperate with forestry officials to combat crime and settle land disputes.

3. Issues

3. 1 Forestry's contribution to poverty alleviation, livelihoods and the economy

Efforts are being made to optimize the contributions that forests make to poverty alleviation and economic development through better forest management and technology. Most Cambodians rely on forest products, especially for food, fuelwood, timbers and poles, resins, fodders, traditional medicines and spiritual purposes. Thus, the right of local people to access and sustainably use forest resources is fundamental. The issue is to generate revenue from the extraction of forest and non-forest products as well as to capture the full values of biodiversity conservation and environmental services.

3. 2 Climate change and forest-based livelihoods

Global warming is expected to affect sea levels and the productivity/sustainability of Cambodia's agriculture and fisheries sectors. Uncertainties surrounding the effects of climate change on forests, agriculture, grasslands and other land areas call for prevention, mitigation and adaptation strategies to maintain healthy natural forests so that they continue to be productive, provide important environmental services and withstand pressure from high population numbers.

3. 3 Land-use planning

The absence of integrated long-term planning has resulted in overlapping claims on forest land, a situation which highlights the need for close collaboration among ministries and institutions which are in charge of other sectors that influence or are influenced by forestry—agriculture, mining and economic and infrastructure development, for example. Large land concessions which were recently allocated will require careful monitoring to ensure that activities promote sustainable rural development whilst maintaining ecosystem services and realizing the Millennium Development Goals of 60% forest cover.

3. 4 Illegal activities and weak collaboration

Open access to public resources, coupled with weak law enforcement and governance, have resulted in a lack of transparency, unclear roles and responsibilities and large areas of unmanaged forest land. Conflicts have arisen, areas are being logged illegally and encroachment/land grabbing is a serious issue. The fact that most of the forest estate has never been clearly demarcated adds to the problem because it is subjected to unsustainable shifting cultivation and conversion to other land uses.

3. 5 Forest-based conflicts

Conflicts in forest areas is a major development issue, often characterized by power disparities, competing interests in the use and management of resources, weak governance and disregard of human rights. Many times, rural and forest-dependent people fall victim to those who wield a lot of political influence and their desperation causes conflicts to escalate into vicious acts which seriously undermine sustainable forestry.

3. 6 Low capacity and insufficient knowledge

Low technical capacity of individuals, weak institutional capacity and lack of public awareness of the importance of the sector hinder implementation of the Domestic Forest Program. In particular, insufficient knowledge of operations and inadequate transfer of knowledge from new graduates impede sustainable forest management.

3. 7 Forest degradation

A reduction in the quality of forests and their capacity to regenerate has led to a decrease in the socio-economic and environmental services that these resources provide. Forest degradation also causes the loss of habitat and biodiversity, both of which significantly diminish the richness of Cambodia's forests and reduce their value. The challenge is to maintain healthy forest ecosystems and conserve endangered species.

3. 8 Suitability of management models

Large tracts of former forest concessions are now unattended and current management models can be much improved. Testing new practices in an organized and professional way, assessing their effectiveness and applying lessons learned to replicate them more widely remains a daunting challenge.

3. 9 Financing

Revenue from forestry is limited and not reinvested into the sector. Therefore, opportunities to modernize and to create sustainable operations are few. The forests of Cambodia can significantly contribute to the domestic economy but only if they are seen as a good source of revenue and a sound investment and if financing is secure over the long term.

4. Approach

4. 1 Community forestry and protected forests

Recognizing the importance of participatory natural resource management, the Royal Government of Cambodia enacted the *Forestry Law* and the *Sub-decree on Community Forestry*. Subsequently, projects were piloted in a few provinces where communities successfully co-managed forest resources. A domestic working group coordinated stakeholder involvement and promoted participatory processes. In this regard, it provided a forum for interested people and organizations to exchange experiences and work together to support community forest management. In addition, Community Protected Forests have been established within Permanent Forest Reserve.

4. 2 Participatory land use planning

Participatory land use planning was introduced to Cambodia in 1999 as a tool to achieve sustainable resource management. Experiments, mostly sponsored by NGOs and bilateral partners, were undertaken in various locations. Government recognizes ownership under communal land titles and has further plans to distribute land to needy people.

4. 3 Kbal Chhay Watershed

With assistance from the Danish International Development Agency (DANIDA) , the Forestry Administration and Sihanoukville municipality are improving resource management in the Kbal Chhay Watershed to better meet the demands of many groups and individuals — from poor rural households to well-off private investors. Since the area's surface and ground water are crucial for Sihanoukville's present and future supply, the watershed is recognized as being of regional importance.

4. 4 Capacity building

For years, the Japan International Cooperation Agency (JICA) has been the main donor for strengthening the sector's capacity to achieve sustainable forest management. As part of its support, it helped to carry out an assessment of the training needs of the Forestry Administration's officials, which was then used to develop a curriculum for them.

4. 5 Demarcation

The Forestry Administration, in partnership with stakeholders at provincial, district, commune and community levels, are demarcating Cambodia's permanent forest reserve. This task is considered a priority to ensure the best use of forestland, reduce forest clearance and minimize the number of disputes.

4. 6 Law enforcement and governance

Armed law enforcement teams are patrolling in and around protected forest areas to crack down on crime, prevent forest clearance and deter illegal activities. Since patrols began, incidents have declined remarkably.

4. 7 Planting and rehabilitation

Every year, the Forestry Administration plants trees and rehabilitates degraded forests. His Royal Majesty, the King, attends annual celebrations on Arbor Day to promote tree planting by people from all walks of life. Apart from this event, provincial forestry officials have established nurseries and distribute free seedlings to communities in an effort to promote agroforestry. To encourage reforestation, NGOs and development partners also jointly establish small and large scale community nurseries.

4. 8 Establishment of protected forests

The Forestry Administration has set aside more than 1. 5 million ha of protected forest in the Cardamom Mountains in the northern and eastern plains of Cambodia. Doing so has significantly helped to protect watershed areas and regulate water for the benefit of local communities in terms of fisheries, drinking water and hydropower generation. This forest also plays a crucial role in maintaining the ground water table to sustain a supply of water for irrigation. In addition, plans have been drafted and consultations have been held to protect about another 1. 5 million ha.

4. 9 Development of forest management plans

Each division of the Forestry Administration is required to develop a management plan for their territory to ensure that the best land use options under their competency are identified and coordinated. These plans are used in the review of proposed development projects and to determine the most appropriate zoning for protected forests, taking into account the location of communities to avoid conflict and overlapping areas of wildlife and biodiversity.

4. 10 REDD mechanism

REDD is a new mechanism to help curb deforestation and protect forests by issuing carbon credits to compensate for lost revenue. It also provides an incentive to sustainably manage resources as a means to mitigate the effects of climate change. In this regard, the Forestry Administration has developed a road map, with the support of the UN-REDD Programme. Stakeholders were consulted prior to its finalization, and pilot projects have been initiated in the protected forests of the eastern plains and Cardamom Mountains and in community forests in the northwest.

5. Lessons Learned

- Community forestry is considered a viable option to achieve sustainable forest management in Cambodia. Experience indicates that local communities fully participate and are willing to establish more sites near their villages. However, coordination and follow-up need to be improved to ensure that regular contact with forestry officials and other stakeholders is maintained.
- Forest protection is an excellent way to manage watersheds sustainably and to provide social, economic and environmental benefits to communities which rely on timber and non-timber forest products for their well-being. Conservation schemes and livelihood improvement programs have reduced dependence on forest resources and promoted the participation of local communities in the conservation and sustainable development of watersheds, including in the Cardamom Mountains, where forests play a crucial role in regulating water, preventing soil erosion, and ensuring a sufficient supply of water to irrigate and generate electricity.
- The demarcation of Cambodia's permanent forest reserve has reduced forest clearance and encroachment and has won the support of other donors who are interested in providing funds for this purpose. JICA and DANIDA are working closely with the Forestry Administration to achieve targets. The installation of cement poles provides a clear message to communities and others that the forestland belongs to the state and cannot be cleared for agriculture or any other purpose.
- Economic development requires large amounts of land for industrial crops and concessions continue to degrade forestland and have a negative impact on watershed management and biodiversity conservation.

6. Challenges and Opportunities

- The Government of Cambodia is committed to achieve 60% forest cover and to carry out forest sector reform. The Domestic Forest Program (2010 – 2029) incorporates a range of initiatives to meet these goals and to manage watersheds sustainably. Moreover, the NFP outlines strategies to strengthen collaboration with other government institutions, local authorities, communities and development partners who provide much needed financial and technical support.

- REDD credit schemes to offer incentives to conserve resources. In Cambodia and elsewhere, the revenue generated is expected to support forest management and improve rural livelihoods.
- Fees collected from an increasing number of tourists entering protected forest areas can provide additional financing for forest management and protection. Due to high forest cover, rich biodiversity, the presence of endangered wildlife species and scenic landscapes, it is thought that ecotourism in Cambodia could be profitable, especially in the Cardamom Mountains.

7. Future Collaboration

In the context of ASEAN, Cambodia should pursue trans-boundary agreements with its neighbours to share data in a timely manner to curb illegal trade of wood and wildlife. Information systems at border crossings, seaports, and airports should be linked to ensure timely intervention in the fight against crime.

Integrated Forest /Watershed Management in Cambodia

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1. Background

Cambodia is rich in water resources but depends on them heavily for agriculture, fisheries and, to a much lesser extent, hydro power. Although watershed management is a relatively new concept, awareness of the impacts of upstream activities on downstream areas is increasing—declining fish stocks or land/forest degradation as a result of chemical fertilizers used in agriculture. Thus, the need to establish mechanisms and procedures for stakeholders to participation in watershed management became clear. A *Royal Decree on Watershed Management* (December 1998) highlights the importance of protecting natural resources in watersheds and instructs government to institute sub-decrees.

Forests cover approximately 10.7 million ha or 59% of Cambodia's land area (FA, 2007). The estimated net annual rate of deforestation was 0.5% between 2002 and 2005/2006, a significant decrease compared to earlier figures. In the context of the Millennium Development Goals, Cambodia aims to achieve 60% forest cover by 2015. However, insecure title over forest land and unclear rights associated with open access to forest resources mitigate efforts to maintain current cover, improve livelihoods or contribute to rural eco nomic growth. Additional issues include lack of coherent rural land management policies, weak capacities of line agencies at the local level, poor service delivery, marginal involvement of users in natural resource management and lack of balance between the social and economic aspects of development.

Forest management in Cambodia has been a challenge since the 1950s, moving from a focus on timber to the inclusion of non-timber forest products and environmental services. For the past 10 years or so, tourism, recreation and benefit sharing between domestic and local economies have been additional considerations.

The Forest Administration (FA) is the main agency responsible for Cambodia's forest estate(except protected forests) but other institutions are also involved, depending on how the forest is classified. Additional stakeholders include forest-dependent rural communities, development partners, investors and international and domestic non-governmental organizations (NGOs).

2. Forest Regulations

The *Land Law* (2001) and *Forestry Law* (2002) guide the classification and management of land in Cambodia. The first classifies land into four categories.

State Public Property: land that carries a public interest and is held by the state in public trust. It cannot be sold or transferred and includes protected areas and waterways.

State Private Property: state land that does not carry a public interest and can be sold and transferred, including degraded forest and all land under economic land concessions.

Indigenous Land: land where indigenous communities have established residence and carry out traditional agriculture. They must register this land with the Ministry of Interior in order to be granted collective ownership.

Private Land: the government, along with partner organizations, are working over the long term to provide secure land tenure to urban and rural Cambodians, the majority of whom do not hold title.

The *Forestry Law* (2002) applies specifically to forested areas and sets out the responsibilities of the Forestry Administration. Under this law, all forest is part of the permanent forest estate (being either permanent forest reserve on state property or private forest on private property). The permanent forest reserve is further divided into three categories.

Production Forest: the forest which are areas of degraded forest, primarily for the sustainable production of timber and non-timber forest products.

Protection Forest: the forest which has the primary function to protect forest ecosystems, conserve biodiversity and regulate water and soil.

Conversion Forest: the forest which has not yet been classified.

Areas of high biological significance, a sub-division of protection forests, fall under the jurisdiction of the Ministry of Environment (MOE).

3. Forestry Issues

The unique history of Cambodia, its rapid development and the challenges associated with land tenure, governance and technical capacity require careful consideration and study of the Cambodian context for project planning.

3. 1 Forest loss and economic land concessions

The annual loss of primary forest is one of the highest in the world. Originally, the FAO placed Cambodia with the highest rate of deforestation between 2000 and 2005 but later ranked it third. Although it is difficult to identify the drivers, illegal logging, small scale clearing for farming and expansion of towns and semi urban areas are all likely contributors. However, the most significant cause is land clearance for small and large scale economic land concession activities: agriculture (food crops, rubber and oil palm) , mining (bauxite, gold and possibly oil) and forest plantations such as acacia.

3. 2 Forest management

Although a legal structure to manage forests is in place, the institutions responsible for forest management and enforcement face a number of challenges.

3. 2. 1 *Lack of clear boundaries between forest types*

Many of the maps were drawn up in Phnom Penh, with limited field surveys to validate the boundary lines between the forest categories. Lack of financial and technical capacity to do mapping is also an issue, as is political interference. Borders placed on maps within ministries in Phnom Penh have been often not translated into meaningful borders for people living in the area. As the World Bank (2009) states in a briefing note entitled Justice for the Poor, mapping is a technology of power, which has often been used by the powerful in Cambodia to dominate the powerless—those who depend on natural resources. FA, MOE and the Ministry of Land Management, Urban Planning and Construction are currently reviewing and using field surveys to re-demarcate forest zones but only in a few provinces.

3. 2. 2 *Lack of capacity to manage and monitor forest zones*

As FA was only set up in 2004, it has limited experience in forest management. Most of its budget comes from foreign NGOs and donors and it heavily depends on foreign technical advisers and staff. Like all institutions in Cambodia, it also has a limited staff and budget.

3. 2. 3 *Conflicting laws and lack of precision*

Cambodia's *Land Law* contains many inconsistencies, especially with regard to

forest classification. The ADB (2008) states in its document for the land titling project that, ″as is standard Cambodian legal practice, laws primarily consist of general principles that lack sufficient detail for application″. In the case of forests, the situation is no different—a lack of sub-decrees to specify the mechanisms for classifying and managing land has often led to the re-interpretation of vague laws by political elites.

3.3 Land tenure

The withdrawal of a major donor in a land tenure project is an indication of the problematic state in the Cambodia. In a report on the project in 2009, the Land and Housing Working Group of Cambodia stated that, despite the fact that this program committed more than US$ 30 million to improve tenure security, many observers suggest that the land crisis has actually worsened during implementation. In particular, urban development which forced the removal of residents, often amid legal uncertainty to do so, has drawn significant international criticism. In 2003, the government committed to tackling urban land tenure by granting social land concessions in four sites where urban poor people could share land. Since then, three of the four areas were leased or sold to commercial developers. Hundreds of families who did not have access to titling were violently evicted (CCHR, 2009).

In 2009, the NGO Forum in Cambodia reported that land alienation was increasing in severity in Ratanakiri Province and leading to a ″disintegration of the social fabric of indigenous communities″. Similar statements have come out of research from Mondulkiri Province about the Bunong and Cham communities (Frewer, 2009; Diokno, 2008). Land tenure has been of great concern to indigenous communities who are vulnerable to illegal evictions and land sales which alienate them. So far, the *Land Law* (2001) has not provided an adequate system of land tenure for Indigenous communities.

4. REDD in Cambodia

In 2009, Cambodia became an official observer of the UN-REDD Programme (hereinafter referred to as the Programme) which focuses on preparing it for REDD and implementing a number of pilot projects. Before this, Cambodia developed two carbon storage projects: the Oddar Meanchey Project and the Seima Project in Mondulkiri. However, both initiatives operate within the voluntary carbon market and were initiated before UNFCCC drafted comprehensive procedures and guidelines for REDD projects. Cambodia is

looking to initiate another project in the southern Cardamoms.

4.1 REDD legislation

Although the government is committed to preparing Cambodia for REDD, its recent inclusion in the Programme means that no comprehensive legal framework is yet in place for REDD projects. However, previous pilot projects have set an important precedent for the way funds and benefits will be managed. Probably the most important outcome of REDD activities in Cambodia is *Government Decision* (*GD*) *699 of the Council of Ministers* (hereinafter referred to as the *GD 699*). During development of the Oddar Meanchey Project, NGOs, donors and the head of FA who initiated the project successfully lobbied high ranking politicians, including the Prime Minister, to allow FA to manage project funds. The decision also stipulates that at least 50% of the net revenue from REDD projects must go to the community. It further states that revenue from carbon sales will be used to improve the quality of the forest, maximize the benefits to local participating communities and to study potential sites for new REDD projects. Apart from being an important first step in developing REDD legislation, *GD 699* also reassures potential carbon buyers of the government's commitment. However, ambiguity around this decision remains. Some interpret it as applying only to the Oddar Meanchey project while the FA interprets it as applying to all REDD projects. The role of other ministries and departments in forest management is also unclear and no mechanism exists for distributing funds to forest managers.

4.2 Oddar Meanchey project

The Oddar Meanchey project is the most relevant to the development of a benefit distribution system within REDD but it can only serve as a coarse guide for future REDD projects because it operates in the voluntary carbon market (as opposed to the UN system), was designed before extensive procedures and protocols were developed, and does not provide clear benefit-sharing mechanisms.

The project involves 13 community forestry groups, comprising 58 villagers and 67,853 ha of forestland. A major strength of the project is that it operates in community forests that have already been established. However, based on the Project Design Document and the PACT on "Communities and Carbon, Establishing a Community Forestry REDD Project in Cambodia"—both drafted in 2009—some issues are apparent.

- The technical criteria under the voluntary carbon market conflict with the

political and social criteria of the UN-REDD Programme.

- Insufficient attention is given to capacity building and technology transfer. The project depends on a foreign firm which takes a large share of the revenue. Both documents note that, as the entity in charge of ecological assessments and monitoring, it is entitled to a percentage of the credits but does not specify a figure.
- Fluctuations in the price of carbon determine the financial benefits that community forestry groups will receive. Coupled with a lack of understanding of how global carbon markets work, their expectations could be unrealistically high.
- An advisor to the Prime Minister had access to his office and made a persuasive case for the FA to be designated the official seller of carbon credits (*GD 699*) and to direct the majority of funds to forest communities. The agency for future REDD projects should be based on a systematic evaluation of what is best for Cambodia rather than on the ability of an individual to influence high level decision makers. This precedent will likely affect all other REDD projects.
- A positive aspect of the project is that communities were granted tenure more quickly. However, some groups are still waiting, yet the project has gone ahead. There is also an issue where the application for tenure from communities involved in REDD projects may receive preferential treatment over those not involved — urban areas where land tenure remains the most uncertain, for example.

5. Watershed Management Legislation

Watersheds began to be managed when the King endorsed the approach in 1999. These areas are under the care of the FA and the MAFF, while water management is under the Ministry of Water Resources and Meteorology (MOWRAM). The FA has been working with many agencies such as the Cambodia Domestic Mekong River Committee (CDMRC) and MOWRAM to classify watersheds according to the level of management they require. For the most part, watersheds have been well managed in that most catchments are designated as either protected areas or protection forest.

Mining in the forest areas of upper water catchments is of concern because untreated waste is dumped into rivers and can affect the health of people downstream. Few measures have been taken to monitor activities. Coordination among ministries is also a problem. For example, the Ministry of Industry, Mines

and Energy allowed a company to assess the feasibility of mining in forest areas but the firm started digging and clearing forests without informing the FA. In other instances, companies start to mine even though their permits only allow research.

5. 1 Legislation of the Ministry of Agriculture, Forestry and Fisheries

5. 1. 1 *Sub-decree on Organization and Functions*

The *Sub-decree on the Organization and Functions of MAFF* (2000) gives it authority over the agricultural sector in Cambodia, including important development and conservation areas for forests and fisheries. The Sub-decree contains no specific language that authorizes MAFF to manage watersheds, although Article 3 provides for the MAFF to improve the living standards of citizens, participate in the preparation of policies on land use and land reform, and preserve natural resources—all of which are linked to watershed management.

5. 1. 2 *Royal Decree on Watershed Management*

Although the *Royal Decree on Watershed Management* contains only 9 Articles, it defines a watershed and spells out the basis and directives for forested areas. Article 7 grants clear authority over management of forested areas to MAFF, in cooperation with other ministries, organizations and civil society. Article 3 states that forest areas within watersheds should be defined and managed to protect watersheds from soil erosion, reduce run-off, stabilize recharge areas, protect soil fertility, keep water resources and quality in a pristine state, protect biodiversity and maintain environmental equilibrium.

This legal document is obscure and much less important since passage of the *Forestry Law* (2002). However, it recognizes watershed management issues and clearly states that MAFF has responsibility over the management of forest resources within watershed areas: the Forestry Administration over the permanent forest reserve and the Fisheries Administration over mangroves and forest areas which are inundated during the rainy season. This Decree was originally drafted within MAFF and is most likely unconstitutional since it is a regulatory document issued by the King who does not have regulatory authority. That is not to say that the document does not serve a useful purpose since agencies within MAFF, such as the Forestry Administration, can point to it to clarify their authority over forest resources in watersheds when dealing with other ministries.

5. 1. 3 *Forestry Law*

The *Forestry Law* (2002), enacted after the *Royal Decree*, is important in the realm of watershed management for several reasons. It stipulates which government agencies have authority over which forest resources: the Forestry Administration for private forests and state public forest lands (the permanent forest reserve), except protected areas which are under MOE and flooded forest areas which are under the Fisheries Administration.

Within the permanent forest reserve, Article 10 provides for the establishment of protection forests to regulate water and protect watersheds, for example. Article 22 allows MAFF to make such a proposal to the RGC and to have it designated in a sub-decree which details the type of protection forest and the activities allowed. Upon approval, Article 23 calls for the Forestry Administration to create a management plan which the Minister of MAFF approves in a proclamation (Prakas).

Finally, the *Forestry Law* requires an environmental and social impact assessment for any activity that risks causing significant adverse outcomes, consistent with the *Law on Environmental Protection and Natural Resources Management*. Though not clearly spelled out, impacts on watersheds should be included in this assessment. Other than these provisions, the *Forestry Law* is silent on watershed management in Cambodia.

5. 2 Legislation of the Ministry of Environment

5. 2. 1 *Sub-decree on Organization and Functions*

Article 2 of the *Sub-decree* on the *Organization* and *Functions of MOE* (1997) assigns MOE the broad mandate to deal with environmental issues in Cambodia. Like MAFF's Sub-decree, no specific language gives it authority over watershed management but many of their responsibilities could fall within this category: formulating policies on sustainable development, creating domestic and regional environmental action plans, initiating and reviewing environmental impact assessments, advising ministries on the conservation, development and management of natural resources, managing protected areas, reporting on the state of the environment and controlling pollution such as water pollution.

5. 2. 2 *Law on Environmental Protection and Natural Resources Management*

The Law on Environmental Protection and Natural Resources Management

(1996) contains provisions and outlines procedures for developing domestic and regional action plans based on environmental priorities, conducting and reviewing environmental impact assessments, consulting other ministries on the protection of natural resources, monitoring and controlling pollution or other activities that could harm the environment or public health, and creating mechanisms for public participation, including access to information in these areas.

This law serves as a general directive upon which other rules and regulations are drafted, such as the *Sub-decrees on Water Pollution Control and on Environmental Impact Assessments*. It does not set out standards or procedures, substantive sections comprise only four pages and no direct reference is made to watershed management or to penalties. Moreover, it is unclear how these provisions are enforced through the judicial system.

5. 2. 3 *Sub-decree on Water Pollution Control*

This sub-decree aims to prevent and reduce pollution in public water areas (defined in Article 3) for the protection of health and conservation of biodiversity. It prohibits certain discharges (solid waste, garbage, hazardous materials) and sets standards for effluent discharges that require a permit and for water quality to protect biodiversity and public health. It also stipulates requirements and procedures for the issuance of permits, for monitoring and record keeping by MOE, and for inspection by enforcement officials. In addition, it specifies the penalties for violations.

Though this sub-decree states it addresses all sources and activities that cause water pollution, it only focuses on point sources of a largely industrial nature. Because Cambodia lacks an industrial base, this piece of legislation is not very useful for watershed management. In addition, there is little evidence that MOE has ever enforced it. However, it does provide benchmarks for assessing water quality in the receiving bodies—a provision which is helpful for tracking signs of degradation.

5. 2. 4 *Proposed Law on Protected Areas*

This proposed law covers current and future protected areas under the jurisdiction of MOE but does not provide a comprehensive guide on how to manage them. At this point, it appears that this draft piece of legislation will not be enacted into law, but rather as a sub-decree which does not require lengthy passage through the Domestic Assembly.

The stated objectives of the draft law are to:

- Define the jurisdiction and responsibilities of MOE in the management of the domestic protected areas system, including for the conservation of biodiversity and the sustainable use of natural resources;
- Determine the standards and procedures for management of the domestic system;
- Provide the mechanisms and procedures to establish protected areas or to modify their category;
- Define the responsibilities and involvement of communities and the public at large in the management of the system;
- Implement regional and international conventions, protocols and agreements pertaining to the protection of biodiversity and ecosystems inside the domestic protected areas system.

With regards to provisions dealing with watershed protection, they are similar to the provisions for the creation of watershed protection forests in the *Forestry Law*. The proposed law sets up 11 categories of protected areas, including Ramsar Site, Tonle Sap Biosphere Site and—most importantly from a watershed perspective—the designation of wetlands, protected watershed and coastal areas for management and conservation (Article 8).

Because language on watershed management is limited and protected areas under the authority of MOE only encompass a small portion of the watersheds, the current draft will provide little in the way of a comprehensive framework for watershed management in Cambodia.

5. 3 Legislation of the Ministry of Water Resources and Meteorology

5. 3. 1 *Sub-decree on Organization and Functions*

Article 2 of the *Sub-decree on the Organization and Functions of MOWRAM* (1999) assigns it clear responsibility for watershed management throughout Cambodia. Article 3 outlines the functions and roles which include a mandate to:

- Define policies and strategies for water resources to meet the needs for their sustainable exploitation, development and conservation, consistent with the policies and programs of the RGC;
- Study and research the potential of water resources, including surface, underground and atmospheric;
- Prepare short, medium and long term plans for the sustainable exploitation, development and conservation of water resources;

- Manage and supervise all direct and indirect exploitation of water resources;
- Draft laws and regulations related to the management of water resources;
- Support and give technical advice to the private sector, organizations and communities on the improvement and exploitation of water resources;
- Participate in project implementation within the Mekong Basin, consistent with the mandate of MOWRAM.

Article 11 names the Department of Water Resources Management and Conservation within MOWRAM as the entity responsible for managing watersheds and ensuring the sustainable exploitation and conservation of water resources.

5. 3. 2 *Law on the Management of Water Resources*

The *Law on the Management of Water Resources,* approved by the Council of Ministers in April 2002, has the stated purpose of fostering the effective management of water resources for socio-economic development and the welfare of the Cambodian people. Article 1 stipulates that this shall be done by determining the rights and obligations of water users; setting out the principles of water resources management; identifying the institutions in charge of implementation and enforcement; and promoting the participation of users and their associations in the sustainable development of water resources. As with most laws in Cambodia, this one outlines broad directives and authorities which are supplemented by sub-decrees.

While Article 2 defines key terms such as water and water resources, groundwater, and aquifer, it does not define watershed. This omission is particularly troubling since it defines a ˝basin˝ as being ˝a geographical area determined by the watershed limits of a system of waters˝. The final version of this law should contain such a definition.

5. 4 Conclusions

The current legislative framework for watershed management in Cambodia is fragmented at best and virtually non-existent at worst, due to the lack of enacted legislation within MOWRAM. Institutional and management structures within MAFF and MOE fit well into their respective mandates, so the focus on developing new legislation needs to be placed on MOWRAM.

The *Royal Decree on Watershed Management* grants authority to MAFF to manage forest resources within watersheds. The *Forestry Law* takes this provision a step further by outlining which government entities have what

authority. The *Forestry Law* also sets up the mechanisms for establishing watershed protection forests within the permanent forest reserve.

According to the proposed law on protected areas, MOE can establish them primarily for watershed management. This provision is most likely to entail a reclassification of existing protected areas since it is not likely that any new areas will be brought under MOE's jurisdiction. In addition to this proposed law, the *Law on Environmental Protection and Natural Resources Management* and the *Sub-decree on Water Pollution Control* cover aspects of watershed management. Unfortunately, the latter focuses on point sources of pollution and does not address non-point sources — an aspect which would probably be better suited to watershed management legislation within MOWRAM.

As the government agency which has primary responsibility over watershed management in Cambodia, MOWRAM needs to strengthen its legal framework so that it can effectively discharge its mandate.

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Yunnan's Participation in Biodiversity Conservation in the Greater Mekong Sub-region from the Perspective of Eco-tourism Development

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Abstract

The Greater Mekong Sub-region (GMS) Economic Cooperation Program aims to bring benefits and prosperity to the people in the region. Members are Cambodia, Lao PDR, Myanmar, Thailand, Viet Nam and two provinces in China: Yunnan and Guangxi Zhuang Autonomous Region. The Biodiversity Conservation Corridors Initiative (BCI)—a flagship activity of the GMS Core Environment Program—is to build corridors to link the economies which run north-south, east-west and along the south coast. Moreover, the GMS harbors globally important and irreplaceable biodiversity. As such, it is critically important that economic development strategies take into account the need to maintain healthy natural ecosystems.

Yunnan Province, the most southwestern region of China which borders Viet Nam, Lao People's Democratic Republic (PDR) and Myanmar, has abundant wildlife and colorful ethnic cultures. Over the past 20 years, under the GMS Economic Cooperation Program, Yunnan has been active at regional and global levels in fields such as trade, transportation, education, tourism, agriculture and the environment. To protect and utilize the natural resources of the area, GMS partners are collaborating to conserve biodiversity and are exchanging experiences on matters related to nature reserves and eco-tourism development.

This report describes ecotourism in Jinping County of Yunnan Province, a site along the Kunming-Hanoi economic corridor. The challenge for governments and policy makers is to use natural wealth to generate growth and alleviate poverty while sustaining the capacity of these ecosystems to produce benefits over the long term. This paper outlines Yunnan's participation in the BCI from a government perspective and suggests measures to promote the joint development of the natural environment and the economy.

1. Participation in GMS-BCI and Eco-tourism to Preserve Nature

This year marks the 20th anniversary of Yunnan's participation in the GMS Economic Cooperation Program which aims to improve the livelihoods of people living in the province and in neighboring economies. Infrastructures along the

economic corridors have been built and several new highways link Yunnan with Myanmar, Lao PDR, Thailand and Viet Nam. With regard to the BCI, China has designated three areas to pilot implementation: Xishuangbanna (Yunnan), Diqing (Shangri-La, Yunnan) and Jingxi (Guangxi).

Nature reserves are protected areas which provide the habitat for wild animals and plants. How to enhance their development while protecting biodiversity is an issue to consider. China has in recent years adopted a more open and transparent approach to regional cooperation on matters related to the environment.

Situated in the southwest of China, Yunnan Province has 50% forest cover—about 364 million ha of forestland—and 16 domestic nature reserves. Of nearly 30,000 species of higher plants in China, some 17,000 (56.67%) are found here, giving it the reputation of being a Kingdom of Plants. Many types of forests flourish here, including tropical, monsoon, and virgin. A full range of tropical, subtropical, temperate, and frigid plants grow here, many of which are rare species and unique to the province. In addition, Yunnan has more than 300 varieties of cash crops such as tea, rubber, oil palm, anise, tung tree, cinnamon and coffee. More than 2,000 species of medicinal herbs grow throughout the province, of which 1,250 are commonly used. More than 400 are ingredients in traditional Chinese prescriptions and in pharmaceuticals. Yunnan is also renowned for a wide variety of spices.

In recent years, forest-based eco-tourism has brought the province an average of RMB 3.2 billion per year. Jinping County in Honghe Prefecture, located just north of Viet Nam, is endowed with abundant natural resources and ethnic cultures. This industry can not only help local economic development, but also strengthen regional cooperation.

2. Regulations Governing Nature Reserves

2.1 Regulations of the People's Republic of China on Nature Reserves

The above-noted regulations were adopted in September 1994 during the 24th Executive Meeting of the State Council. They aim to strengthen the establishment and management of nature reserves and protect the environment and natural resources. In this regard, state and local governments are called upon to implement policies and measures favorable to the development of nature reserves and to incorporate such plans into domestic economic and social development strategies. In addition, all units and individuals have the obligation to protect the environment and natural resources within nature

reserves and they are obliged to report on or file charges against those who destroy or encroach on them. Moreover, autonomous regions and municipalities under the central government can decide, according to the specifics of each locality, on the establishment of nature reserves and on the administrative responsibilities of relevant departments in the people's governments at or above county level.

The regulations set out the following requirements for a nature reserve:

- Areas that are representative of natural ecosystems or similar areas where the natural ecosystems are damaged but can be restored through proper protection;
- Areas that have a natural concentrated distribution of rare and endangered wild animal or plant species;
- Areas that have a special protection value—marine and coastal regions, islands, wetland, internal water bodies, forests, grassland and deserts, for example;
- Areas that contain natural remains of scientific or cultural value, such as geological structures, karst caves, fossils, glaciers, volcanoes and hot springs;
- Other natural regions that require special protection, with the approval of the State Council or the people's governments of provinces, autonomous regions or municipalities directly under the central government.

Firstly, the regulations stipulate that, if the people's government which approves the establishment of a nature reserve deems it necessary, a certain area surrounding it is protected as well. By not fixing a firm boundary, this optional measure closely follows the law of nature. Secondly, the regulations call on the relevant administrative departments under the State Council to formulate domestic technical criteria and standards for the management of nature reserves and to submit them for the record to the department responsible for environmental protection. In this way, the authority to manage each nature reserve is clear and the methods they use are site specific.

2. 2 Efforts of the Forestry Department in Yunnan Province

Yunnan's Forestry Department has issued several provincial laws and regulations governing various aspects of nature reserves: forests and wild animals, the protection of rare trees, and general administrative provisions, among others. It also formulated a liability system for people working in nature reserves as a means to improve management. More than 20 nature reserves have each completed a plan. In 1997, the province launched a three-year survey of the wild animals, wild plants and wetlands in nature reserves and, in doing

so, paved a solid foundation for the future protection of biological diversity.

Thanks to the efforts of the Forestry Department, such rules and regulations not only help to protect nature reserves, but also improve forest management. However, with the development of tourism, especially eco-tourism, new regulations are needed to sustain nature reserves and maintain biodiversity.

2. 3 International cooperation for environmental protection

Since the 1990s, Yunnan Province has been collaborating with international organizations and bilateral agencies to protect biological diversity, establish nature reserves and improve management capacity. As part of development plans, tourism enterprises have been set up in more than 15 reserves, some of which are yielding benefits: Jade Dragon Snow Mountain, Bita Lake, Gaoligong Mountains, Xishuangbanna and Lugu Lake, for example. However, regulations are still lacking to balance economic considerations with sustainable development and the protection of biological diversity. This situation causes damage to the environment as a result of not being able to adequately accommodate the high number of tourists.

3. Eco-tourism in Jinping County

3. 1 Overview

Jinping County, in southern Yunnan, borders Viet Nam to the southeast. It is rich in tourist attractions: Mengla Hot Springs, Fenshuiling National Nature Reserve, Jinshuihe port, the Butterfly Valley of Ma'andi, Martyr Cemetery, Xilong Mountain, to name a few.

Fenshuiling National Nature Reserve, on the China-Viet Nam border in southeastern Yunnan, is an important passageway to access other ASEAN economies. It was established in 2001, covers 42, 000 ha and stretches across 18 km—China's largest area of protected mountain mossy evergreen broad-leaved forest in its original state. For centuries, the indigenous people, including Lahu, Hani, Yao and Miao, have utilized and conserved natural resources and biodiversity during their long history of interacting with the environment.

The town of Jinshuihe in Jinping County is a domestic port, 18 km from Phong Thô county in Viet Nam, 580 km away from its capital Hanoi and 231 km away from Phongsali Province in Lao PDR. The borders of Jinping County extend over 502 km and cross-border trade posts are located in Dixibei (Ma'andi Town),

Reshuitang (Shilicun Village) and Nafa (Jinshuihe Town) to handle the prosperous business arising from 66 passageways. Communication and exchanges between borders are close and occur frequently.

Ma'andi is southeast of Fenshuiling National Natural Reserve and northwest of Hekou, the domestic port. Forest cover is about 70%, including the virgin forests which are found on most of Wutaishan Mountain. Wild plants which are classified as national first-grade and second-grade are located here as well, in addition to many rare orchids, herbs, ferns, fungus and bamboo. With such an abundance of plants and animals, Ma'andi is known as a ˝gene pool of nature˝. It is also named Butterfly Valley and contains many beautiful waterfalls. The colorful customs of the Yao, Hani, Miao, Yi and Han people who live harmoniously on this land attract many tourists. Its borders stretch 156 km, with Viet Nam to the east, south and west. For centuries, people from both sides have traded with each other and married.

Xilong Mountain which links Yunnan with Viet Nam is part of a ridge of mountains that marks the boundary. It is covered with virgin forests and this ecosystem, with its ecological diversity, is well conserved.

3. 2 Management of Fenshuiling National Nature Reserve

- A series of plans guide the management of Fenshuiling National Nature Reserve, including aspects related to eco-tourism, enforcement, monitoring and evaluation.
- Training is also conducted to improve staff qualifications. Since 1996, 62 people have taken courses on environmental protection.
- With regard to monitoring regulatory compliance, the nature reserve is divided into 16 patrol lines along 239 km. These lines are further divided according to the frequency of patrols—monthly, quarterly and yearly. Monitoring is also divided into 15 lines based on specific categories—wildlife, human activity, religion, ancient cultures, tourism and remnants of glaciations from the Quaternary Period.
- Efforts have been made to improve the income of villagers and the means to make them prosper. Planting techniques were introduced which were tailored to the unique circumstances of each individual. This change resulted in a rise in living standards and reduced dependency on the reserve's natural resources. Illegal logging and poaching were almost eliminated and humans and wildlife now live in harmony.

However, because wild tea is a major source of income, the tea trees in the nature reserve are under threat. The traditional collection of herbs in the virgin

forests by villagers who are mostly ethnic minorities causes damage as well.

4. Challenges and Opportunities for Eco-tourism in Jinping County

- As noted earlier, the proximity of Jinping County to Viet Nam and the fact that it is a domestic port have certain advantages. The development of the Butterfly Valley in Ma'andi and of tourist spots in the virgin forests also brings benefits. If cross-border eco-tourism can be developed, it will increase regional cooperation. However, different domestic laws and regulations are significant obstacles to the development of any joint ventures.
- A corridor from Fenshuiling National Nature Reserve to the Butterfly Valley of Ma'andi (which can also extend to Jinshuihe, the domestic port), would enhance the diversity of the area and promote regional economic development. However, because most of the territory is pristine, priority must be given to protecting the environment, the ecological diversity and the local culture if such a corridor were to be established.
- The colorful ethnic customs in Jinping and the many minority groups living along the borders would help to protect cultural diversity, safeguard the environment and increase trade within the region—all of which will significantly strengthen future collaboration.
- The design and plan of the corridor should be comprehensive and consist of separate sites to grow cash crops, to develop tourism and to house the nature reserve so as to protect the wildlife, conserve the ecosystem and increase incomes so that villagers would require fewer resources from the nature reserve. However, before introducing new cash crops, a careful account of the entire ecological system must be made to avoid damages to the virgin forests.

5. Conclusions

It is possible to establish an ecological and economic corridor from Fenshuiling National Nature Reserve to the Butterfly Valley of Ma'andi and to build sub-corridors within it for nature reserves, cash crops, herb cultivation, research on rare wildlife, educational purposes and eco-tourism.

Moreover, several measures could be taken to move biodiversity conservation forward in the GMS region:

- Make relevant laws and regulations consistent in all GMS economies, while respecting differences;
- Establish an agency to coordinate and manage protection efforts;
- Organize annual meetings of forestry officials and other relevant departments to collaborate with the northern regions of Lao PDR, Thailand and Viet Nam — similar to the mechanisms which Yunnan currently has in place;
- Increase awareness of the importance of BCI and encourage public participation.

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Upland Arbor Tea Cultivation in Natural Forest of Bulang People Mangjing Village, Lancang County, Yunnan Province, China

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Abstract

Yunnan is one of the most important tea producing areas in China and is well known for its large repository of tea germplasm and wide diversity of tea plants. The ethnic groups in the province have a historical and close relationship with tea. The Lancang—Mekong river basin is a famous production area where Pu'er tea originates. Here, the Bulang people and other ethnic groups explored a unique system for cultivating upland arbor tea trees in the natural forest. The method they use is based on mutual adaptation to the surrounding ecological environment. Their system has resulted not only in outstanding landscapes, globally significant biodiversity, indigenous knowledge and resilient ecosystems but, above all, in the sustained provision of multiple goods and services, food and livelihood security and quality of life. This paper explores how the Bulang people in Mangjing Village, Lancang County, Yunnan Province succeed in cultivating tea trees in the natural forest while managing forests in a sustainable manner.

1. Background

Yunnan is one of the most important tea producing areas in China and is well known for its large repository of tea germplasm and wide diversity of tea plants. The ethnic groups in the province have a historical and close relationship with tea. They created a rich and colourful tea culture as part of their social development via domesticating and cultivating tea tree, picking tea leaves, and making, drinking and trading tea, and integrating it into their exchange system, weeding ceremony, and traditional religious rituals. The Lancang—Mekong river basin in Yunnan is a famous production area where Pu'er tea originates. Here, the Bulang people and other ethnic groups explored a unique system for cultivating upland arbor tea trees in the natural forest. The method they use is based on mutual adaptation to the surrounding ecological environment. Tea cultivation is not only an important source of income for Bulang people but also encompasses unique agricultural and production systems; includes cultural, religious, ethical, ecological and environmental concepts; incorporates experiences of resource utilization and management; and influences customs

of daily life—from tea planting, production and processing to gift exchanges, drinking and sales.

The model for cultivating upland arbor tea trees in the natural forest reflects the harmonious relationship that the ethnic groups in the area have with nature in terms of the values they held and the behaviour they display. Throughout their history, they accumulated experience as well as traditional knowledge and they integrated sustainable agricultural systems within the ecosystem. This paper explores how the Bulang people in Mangjing village, Lancang County, Yunnan Province succeed in cultivating tea trees in the natural forest while managing the natural forest in a sustainable manner (Figure 1).

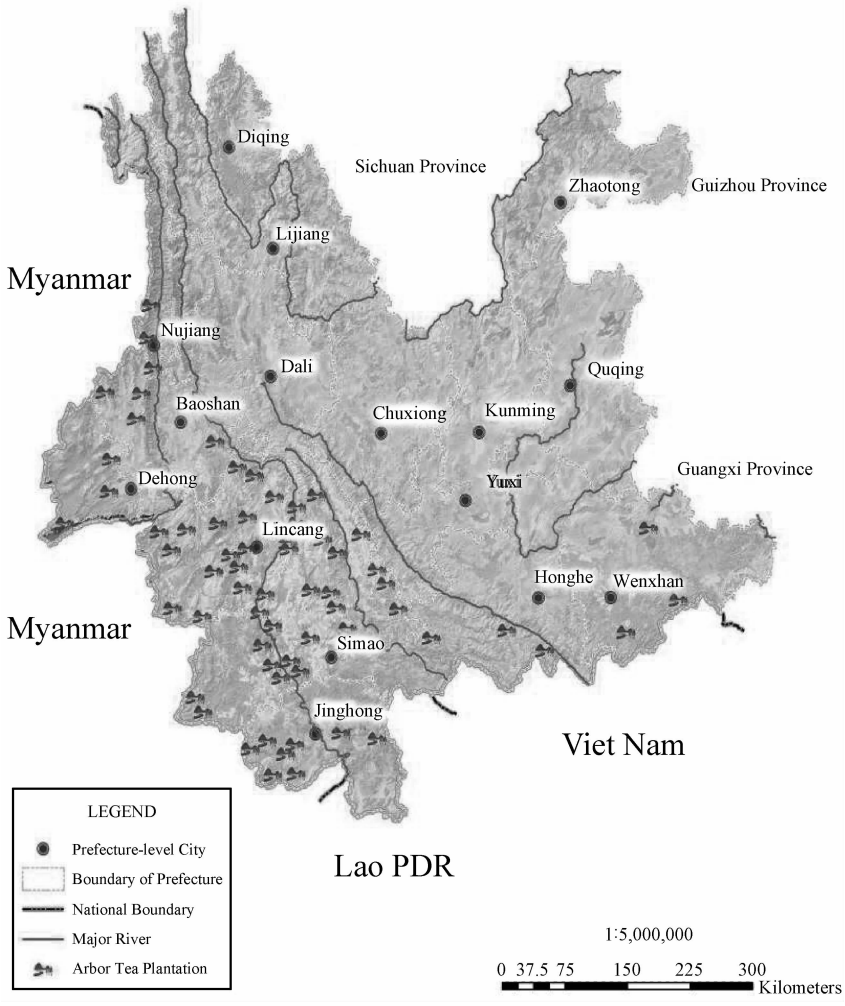

Figure 1 Tea trees cultivating areas in Yunnan Province

2. The Study Site

Mangjing administrative village is situated in the Lancang-Mekong river basin in the southwest of Yunnan Province. It borders Menghai County to the west and Myanmar to the east. Its precise location is 22°08′14″ – 22°13′32″N, 99°59′14″ – 100°03′55″E and its altitude varies between 1250 and 1550 m. Climate is subtropical mountainous monsoon, with distinct wet and dry seasons. Temperature averages 18℃ and annual rainfall is about 1800 mm. The native vegetation in this area was once subtropical monsoon evergreen broad-leaved forest but most was destroyed and replaced with secondary forest, arbor tea gardens and terraced tea gardens (Figure 2).

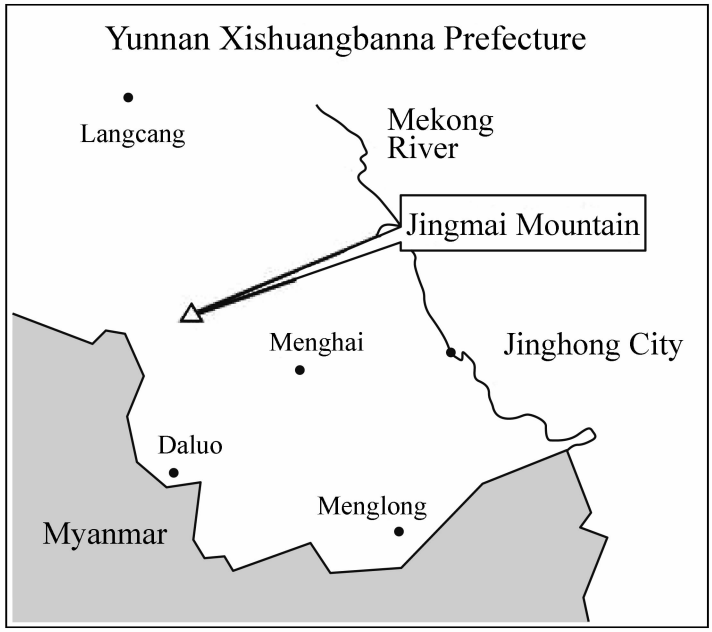

Figure 2 **Map of study site**

Mangjing is one of six poor villages in Jingmai Mountain in the township of Huimin, Lancang County. Population numbers 2,645 and consists of 639 farmer households, 90% of which is Bulang people who earn their living by cultivating tea. Total land area of the village is 102 km^2 and 491 ha of farm land.

The village was formed 1800 years ago, about the time of the Eastern Han Dynasty. For more than 1200 years, it has been known as the cradle of planted tea from domesticated arbor trees in natural forests. Presently, the village

contains 726 ha of tea plantations: 293 ha in the natural forest and 433 ha on terraces. Due to extensive management, the diameter of arbor trees in the tea garden ranges from 30 cm to 200 cm. In contrast, tea trees grown in terraced gardens are managed using more refined techniques. The sale of tea products accounts for roughly 80% of a farmer's income.

Large-scale cultivation of arbor tea in Jingmai Mountain dates as far back as AD 1139 when an important tea market was established. With Pu'er tea gaining in reputation, the tea of Mangjing was exported to Myanmar, Thailand and other Southeast Asian economies.

3. Research Methods

- Anthropological fieldwork;
- Participatory surveys;
- Sample-plots;
- Measurement;
- Other.

4. Traditional Arbor Tea Cultivation

The Bulang people are known as´the people of tea´because legends describe their involvement in tea cultivation from ancient times and this activity forms part of their culture, even today. They call arbor tea plantations in natural forests ˝Gucha˝(the Ancient Tea) . The variety belongs to Yunnan Large Leaf Tea, *Camellia sinensis* var. *assamica* . It is noticeably different from wild tea, including in terms of quality, because the Bulang people selected, domesticated and cultivated it for a long time. The wild tea taste bitter and acerbic but the arbor tea cultivated in natural forests is fragrant, without the bitterness. The market price is therefore quite a bit higher because of the excellent quality.

4. 1 The worship of tea trees

The Bulang people choose a beautifully shaped tea tree in the garden, with spreading branches, as a living representation of the tea soul which exists in their mind. It is called ˝A-bela˝which means ˝the king of tea trees˝and ˝tea soul˝. Every spring, they perform a ritual of sacrifice before any leaves are

picked and organize a great festival to honour their ancestors. Cutting down trees where the tea garden is located is forbidden and people can only pick tea leaves in their own garden.

4. 2 Use of seeds and seedlings

Bulang ancestors collected and bred seeds from wild tea trees and this sexual reproduction is the traditional way of cultivating tea. The life cycle using this method spans more than 1000 years, in contrast to today's asexual reproduction which grafts plants for the cultivation of tea on terraces. The life cycle, in this case, is only 40 – 60 years.

The villagers in Jingmai Mountain choose forest land which is close by and they transplant seedlings at intervals of approximately 2 m. They control the quantity of tea trees by modifying the vegetation structure to form a contiguous arbor tea garden.

4. 3 Tea garden management

The villagers of Mangjing manage their arbor tea garden by using simple methods — mostly weeding and rarely trimming. They do not apply chemical fertilizers or sprays. From December to January of the next lunar calendar, they weed, repair fences and sweep away fallen branches. They pick tea leaves in March to make Spring Tea and in October to make Autumn Tea. The arbor tea garden is then left to recover for the rest of the year.

4. 4 Forest conservation

Bulang people living in the natural forest found wild tea trees so they have not changed the growth pattern. Rather, they protect these forests. In upland arbor tea plantations in natural forests, undergrowth is always intercropped with hundreds of species and plants such as sweet-scented *Osmanthus, Camphor, Crataegus,* alders, banyan trees and pear trees. Various birds and insects are also found in these areas. This system resulted in a better food chain for the biological control of insect and pests. Moreover, the fallen leaves from many trees produce a good organic fertilizer so that the arbor tea has these characteristics. Thus, it has a higher market value because its cultivation does not harm the environment, given that no chemical fertilizers or pesticides are used.

5. Plant Diversity in Arbor Tea Plantations in Natural Forests

Traditional agricultural systems in upland arbor tea plantations in natural forests are notable for their rich biodiversity, especially the genetic and landscape diversity of plants and animals at different levels. These plantations are less labor intensive and require less technology to reduce losses caused by natural disasters, to maintain productivity and to maximize benefits. This model also provides a diversified diet through other non-timber forest products. In addition, the variety of tea cultivated in natural forests is unique and native. The Bulang people selected the best production traits and domesticated it over thousands of years, producing a variety that better withstands natural disasters, due to its higher genetic heterogeneity, than modern hybrids.

A survey of the sample plot revealed 254 species of vascular plants which belong to 83 families and 205 genera (see Annex 1 for the list). It includes 10 families, 14 genera and 18 species of pteridophyta and 73 families, 191 genera and 236 species of seed plants.

Flora characteristics in the plot are:

- The distribution of 91 genera and seed plants can be divided into 13 types and 9 variants—an indication that the ecosystem's flora has a high level of diversity;
- Some 148 genera (85.06% of the total) have tropical and subtropical characteristics;
- Seven monotypic genera were uncovered—an indication of the origin of ancient flora in the ecosystem. This finding also shows the urgent need to conserve this ecosystem.

In addition, a large number of rare and endangered plants, invasive plants, epiphytic plants, parasitic plants, and plants of economic value were found in the sample plot, showing that biodiversity in arbor tea plantations is slightly lower than in natural forests but much higher than in terrace tea plantations.

6. Carbon Stock Assessment in Arbor Tea Plantations

A study was conducted in Mangjing village to measure and compare the capacity of arbor tea plantations to store carbon under two different cultivation systems: in natural forests and in terraces. (Calculations were made on non-tea arbor trees, tea trees, tea saplings, ground cover, and soil.) The purpose was to identify which practices yielded a higher carbon gain and to identify the

management strategies needed to move from lower to higher carbon storage.

Results show that the capacity to store carbon is much higher in arbor tea plantations than in terrace tea plantations. Carbon density is lightly disturbed (470. 83 Mg/ha) to heavily disturbed (350. 81 Mg/ha) in arbor tea plantations and 239. 99 Mg/ha in terrace tea plantations. The obvious difference in arbor tea plantations comes from the non-tea arbor trees and the old tea trees. Tea saplings and ground cover are of little importance in terms of carbon density but are significant with regard to ecosystem restoration and biomass.

7. Threats and Challenges

The survival of agroforestry systems, including the cultures and biodiversity on which they are based, are being threatened by today's rapid changes in technology, societies and economies. Innovation that villagers practiced for centuries is being stifled and this situation is leading to unsustainable practices, overexploitation and declining productivity. It is also resulting in agricultural specialization and in the use of exotic domesticated species. These factors pose a severe risk of genetic erosion, loss of associated knowledge systems and cultures, and gaps in the transmission of important global heritage—all of which can drive communities into a vicious cycle of poverty and socio-economic destabilization.

Economic development in Yunnan Province in the 1980s failed to recognize the real value of traditional upland arbor tea plantations in natural forests, considering them only as extensive low-yielding tea gardens in hills. Many sites were reclaimed and eventually became mono-culture plantations of a single crop variety. The Bulang people, along with other ethnic groups, started to use chemical fertilizers, pesticides and other modern techniques for tea cultivation. These changes not only have a negative impacts on the environment, but also increase labor and capital inputs (expenses which reduce a farmer's net income) in order to maintain high production levels. The knowledge, technology and cultures associated with the traditional cultivation of arbor tea plantations in natural forests thus face the threat of extinction.

The lack of understanding among local authorities, communities and villagers of the characteristics and value of traditional arbor tea plantation in natural forests and their landscape does not favor its protection, management, use, inheritance and development. Therefore, it is vitally important to enhance their awareness of such aspects. These complex ecosystems, their agricultural biodiversity and

landscapes can only be conserved and managed sustainably if a holistic approach is taken—one which involves all stakeholders and builds on local knowledge and experience.

8. Conclusions

- Ethnic groups achieved sustainable forest management and utilization by applying their traditional knowledge, techniques and abundant experience with maintaining crop diversity and practicing agroforestry. The local knowledge system should be protected as a valuable treasure and a unique method of sustainably managing forest resources which are so important to the ethnic groups in this mountainous region. Their traditional cultures also play an important role in effectively utilizing forest resources and safeguarding the local ecosystem. Therefore, reference to some of their traditional methods should be made for forest management at present.
- The upland arbor tea ecosystems and landscapes have been created, shaped and maintained by generations of villagers based on diverse natural resources and locally adapted management practices. Building on local knowledge and experience, these ingenious agricultural systems reflect the evolution of humankind, the diversity of its knowledge, and its profound relationship with nature. These systems have resulted not only in outstanding landscapes, maintenance and adaptation of globally significant biodiversity, indigenous knowledge systems and resilient ecosystems but also, above all, in the sustained provision of multiple goods and services, food and livelihood security and quality of life.
- Compared with artificial terraced tea gardens, arbor tea plantations are rich in plant diversity and have a high conservation value because traditional management practices are combined with better conditions in terms of water and heat.
- Conservation policies should be implemented to prevent the destruction, over-ex ploitation or mismanagement of current arbor tea plantations. Pasturing, the introduction of exotic species and the lighting of fires inside or close to tea plantations should be prohibited as well. In addition, farmers should be given guidelines on appropriate spacing of plants, the canopy required, the timing and level of harvest, pest control and use of fertilization, for example. They should be based on scientific understanding of the species and the ecosystem, and their implementation should be accompanied by

public education. Farmers should also be provided with financial incentives to improve practices, and funding should be increased to support research institutes and management authorities to enhance research on tea, techniques on its cultivation and production, and its industrial development. These financial resources should not only come from county governments, but also from prefecture and provincial levels.

Annex 1

Findings in the sample plots

Class	Family	Genus number	Species number
Pteridophyta	Selaginellaceae	1	2
	Gleicheniaceae	1	1
	Lindsaeaceae	1	1
	Pteridiaceae	1	1
	Pteridaceae	1	1
	Hypodematiaceae	1	1
	Aspleniaceae	1	1
	Blechnaceae	1	1
	Davalliaceae	2	2
	Polypodiaceae	5	7
Dicotyledon	Annonaceae	2	2
	Lauraceae	4	6
	Lardizabalaceae	1	1
	Piperaceae	2	3
	Violaceae	1	2
	Polygalaceae	1	1
	Caryophyllaceae	3	3
	Polygonaceae	1	5

(Continued)

Class	Family	Genus number	Species number
	Chenopodiaceae	1	1
	Amaranthaceae	3	3
	Basellaceae	1	1
	Oxalidaceae	1	1
	Balsaminaceae	1	1
	Onagraceae	1	1
	Thymelaeceae	1	1
	Passifloraceae	1	1
	Cucurbitaceae	2	3
	Begoniaceae	1	1
	Caricaceae	1	1
	Theaceae	2	2
	Myrtaceae	1	1
	Melastomaceae	1	1
	Hypericaceae	1	1
	Clusiaceae	1	1
	Tiliaceae	1	1
	Malvaceae	2	2
Dicotyledon	Euphorbiaceae	11	12
	Rosaceae	4	5
	Caesalpiniaceae	2	2
	Mimosaceae	2	2
	Papilionaceae	2	3
	Fagaceae	1	1
	Ulmaceae	1	1
	Moraceae	1	1
	Urticaceae	7	7
	Celastraceae	1	1
	Loranthaceae	1	1
	Vitaceae	2	2
	Rutaceae	1	1
	Sapindaceae	3	3
	Anacardiaceae	3	3
	Juglandaceae	1	1
	Apiaceae	3	4

(Continued)

Class	Family	Genus number	Species number
Dicotyledon	Araliaceae	2	2
	Ebenaceae	1	1
	Myrsinaceae	2	2
	Loganiaceae	1	1
	Oleaceae	1	1
	Asclepiadaceae	1	2
	Rubiaceae	8	10
	Asteraceae	21	27
	Plantaginaceae	1	1
	Lobeliaceae	1	1
	Solanaceae	1	3
	Convolvulaceae	1	1
	Scrophulariaceae	3	7
	Gesneriaceae	2	2
	Acanthaceae	2	2
	Verbenaceae	3	3
	Lamiaceae	10	12
Monocotyledon	Commelinaceae	3	3
	Musaceae	1	1
	Zingiberaceae	2	2
	Cannaceae	1	1
	Liliaceae	3	4
	Smilacaceae	1	2
	Araceae	5	6
	Stemonaceae	1	1
	Dioscoreaceae	1	5
	Pandanaceae	1	1
	Orchidaceae	5	7
	Cyperaceae	6	8
	Poaceae	17	21
Total	83	205	254

Watershed Management in Lao PDR: Development of a Domestic System of Forest Protection

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Abstract

Lao PDR is still primarily forested and, to this day, forests are a major source of income across the nation. In many rural communities, they support livelihoods, provide food and materials, and act as safety nets in times of difficulty. Therefore, it is critically important to manage these resources in a sustainable way to ensure benefits over the long term.

Regulations define three categories of forest: protection forest, domestic protected areas and production forest—all of which play a key role in achieving the targets established in the *Domestic Socio-economic Development Plan*. In the past, most attention was given to production forests and biodiversity conservation areas. However, the *Forestry Strategy 2020* and the *Decree No.333* (19 July 2010) stress the importance of protection forests, including in terms of the need to identify, delineate and manage them well. In addition to setting out the principles, procedures and management objectives, the *Decree No.333* calls for 8. 2 million ha of protection forest by the end of 2020.

The *Forestry Law* and the *Decree No.333* clearly state the purpose of protection forests and their expected functions. They then dictate the parameters for selecting these areas, mostly based on physical criteria: steepness of slope, altitude and topography. Other factors such as rainfall, soil type and length of slope can also be considered but reliable data is not always available to inform the decision-making process.

1. Background

The landscape of Lao PDR is still primarily forested and these resources comprise an estimated 25% of export revenues. In many rural communities, they support livelihoods, are a major source of food and materials, and provide a safety net in times of difficulty. Therefore, it is critically important to manage these resources in a sustainable way to ensure benefits over the long term, as set out in the *Forestry Law No. 06/NA* (December 2007) and the *Forestry Strategy 2020*. Regulations define three categories of forest: protection forest, domestic protected areas and production forest—all of which play a key role in achieving the targets established in the *Domestic Socio-economic Development Plan*.

In the past, most attention was given to the 3.1 million ha of production forests and the 4.7 million ha of biodiversity conservation areas. However, the *Forestry Strategy 2020* and the *Decree No. 333* (19 July 2010) (hereinafter referred to as the *"Decree"*) stress the importance of protection forests, including in terms of the need to identify, delineate and manage them well. Moreover, the Decree defines them as forest and forestland located at the source of water, in watershed areas, along river banks and roadsides, in and around towns and the capital, sacred sites, cemeteries and dipterocarp forest. The Decree also sets out the principles, procedures and management objectives for protection forests, in addition to calling for an increase from the current 4.7 million ha to 8.2 million ha by the end of 2020. This target represents the area which a joint study① identified in Class 1 catchments as being a priority for protection to maintain ecological services. Although some of these forests may be gazetted as domestic protected areas and some may be created outside these catchments, this figure was the best estimate available to government when the *Forestry Strategy 2020* and other documents were prepared. Again, consistent with the *Decree,* the Sustainable Forest Management and Rural Development Project developed management plans which covered 3.1 million ha (16 production forests) for harvesting and rehabilitation activities.

These areas provide services that are vital to domestic sustainable development. For example, they protect the environment, regulate water flow, prevent soil erosion, decrease the number and severity of natural disasters, reduce damage from flash flooding to communities, agricultural land, infrastructure, hydropower operations, mines and roads, and are strategic points for domestic security. On a global scale, forests mitigate the effects of climate change by storing carbon—a significant contribution as climate becomes increasingly unpredictable and weather events is more extreme.

The management of production forests is regulated under the *Forestry Law* and guided by the *Forest Strategy 2020*. In addition, *Decree No. 59* governs the establishment of this type of forest and *Decrees No. 0204* and *001* (31 January 2012) address how benefits will be shared from the sale of logs from these areas.

2. Institutional and Legal Frameworks

The legislation in Lao PDR is in line with international norms and all the functions that protection forests perform at the global level are also relevant in

① Conducted by the Department of Forestry and the Mekong River Commission, with technical assistance from the University of Berne.

the domestic context.

2. 1 Protection forests

The Domestic Assembly is now considering a draft decree on the establishment of protection forests submitted by the Ministry of Forest Resource and Environment Management and forestry officials are preparing guidelines for their management. Although their importance is well recognized, there are significant differences in where protection forests are or should be located and in the functions they perform (Box 1) .

Box 1 Protection forests in Lao PDR

1. Catchments for existing or proposed dams for hydropower.
2. Along river banks: research indicates that forests should be at least 200 (100 +100) m wide on water course levels 1–4 (Mekong down) . Where this is not feasible, narrower areas should be considered for inclusion.
3. Along roadsides: forests should be at least 50 m wide and up to 500 m on steep inclines. They should also be present around major infrastructures and in mountainous areas.
4. Dry Dipterocarp forest: although the Decree defines this type of forests, Department of Forestry (DOF) should draw a map of the ones that remain and seek formal endorsement to protect them.
5. Karst (limestone) landscapes: these areas need protection because of their unique hydrology and ecosystems and because most fall within Class 1 catchments. DOF should map out karst landscapes so that protection forests can be designated outside priority catchments as well.
6. Point sources of rivers, if not already included in select catchments.
7. Forests that are important for protecting seed sources.
8. Forests in or around towns.
9. Sacred forests or forests of cultural value that are outside domestic conservation areas.

2. 2 Increase in the number of protection forests

The establishment of protection forests is complex because requirements differ, depending on the level of protection requested. At present, several hundred areas are at various stages in the process. Discussions which the Department of Forest Resource and Environment Management held with

district and provincial forestry authorities, provincial land management authorities, and district and provincial governors in 2010 led to the designation of an additional 47 protection forests in provinces throughout Lao PDR. The government now estimates the total area at 7,700,000 ha.

3. Looking Ahead

3.1 Next steps to gazette protection forests

In order to reach 8.2 million ha of protection forest by 2020, DOF's Division of Protection Forests should prepare comprehensive domestic and provincial maps that show:

- Current protection forest;
- Current domestic protected areas;
- Current production forest;
- Unallocated forestland;
- Areas meeting the proposed criteria for protection forest;
- Areas provisionally agreed with provinces;
- Any conflict between areas that meet the criteria for protection and current land designation.

Where priority areas identified for new protection forest are:

- In domestic protected areas, management for the purpose of protecting biodiversity should also ensure that key forest functions are maintained;
- Part of the production forest, it is better to prepare new management plans which ensure that key environmental services will not be compromised, rather than go through the lengthy process to de-gazette it as production forest and re-gazette it as protection forest;
- In undesignated forestland and covered under agreements with provincial governors, they should be immediately taken to the next stage of the approval process;
- In undesignated forestland but not covered by provisional agreements with provincial governors, their importance should be documented to inform the next round of provincial discussions;
- In a location designated under another land use, discussion should be held with the Domestic Land Management Authority as to the value of the area

according to domestic socio-economic development under different land use options.

Because it is important that protection forests should be managed in a way that contributes to a number of government priorities, including poverty eradication, socio-economic aspects should be assessed before areas are gazetted or management plans are prepared. In addition, the DOF needs to either develop regulations that would ensure the principles of the *Forestry Law* and those decrees are upheld or formulate guidelines to help managers develop and obtain approval for management plans for each protection forest.

3. 2 Management models

Most of the world's forests are owned by the state but arrangements for their management vary considerably. For example, communities or commercial enterprises can be contracted the rights over production forests and protected areas can be co-managed by government and either a community or a non-government conservation organization. In other cases, responsibility for forest management has been decentralized, in whole or in part, to communities or to local forestry authorities.

- Co-management with rural communities: people living in or near forests, especially in less developed economies, depend on them for a range of goods and services. As government increased its control over the management of these resources, disagreements arose over the restrictions placed on traditional practices, often with no compensation to users. To minimize such conflicts and reduce costs, governments are entering into co-management schemes with communities. In general, this approach is proving effective but implementation requires both financial and technical support.
- Decentralization: although decentralized management can be more responsive to local conditions and community requirements, inadequate capacity to effectively carry out tasks remains a major issue. If domestic agencies have only limited capacity, there is usually even less at the provincial or district level.

In Lao PDR, the target to reach 8. 2 million ha of protection forest by 2020 is ambitious, especially given that these areas will need to be effectively managed once they are established. Since much of the proposed new forest is currently under community management and since government capacity to take on additional responsibilities is limited, one solution may be for it to consider co-management schemes. This approach would likely attract more funding and could achieve both environmental and social benefits.

As many of the proposed protection forests are rich in biodiversity, co-management could be arranged with conservation organizations. The government could also test the feasibility of entering into agreements with commercial enterprises in areas that provide crucial services to infrastructure projects, such as hydropower, as a means for the new areas to be well managed sooner.

3. 3 Restoration

As the DOF moves toward better management of Lao PDR' s forests, restoration of these resources has become a priority. Since focus to date has been on production forests and protected areas, current and newly established protection forests are likely the most in need of attention. In this regard, an assessment has to be made to identify where degradation is significantly affecting the forest's ability to protect priority areas, including those which are vulnerable due to slope, rainfall, and soil type and those which are at high risk because of their reduced functionality—for example, where the forest protects communities or infrastructures.

Once areas for restoration are identified, the most appropriate interventions will have to be determined: whether simply reducing pressure will allow natural regeneration or whether active restoration will be required to deal with invasive species, such as a high density of bamboo. In some instances, recovery of the forest's protective functions may be too slow, even with new planting, so that interim measures need to be undertaken—for example, the erection of temporary barriers to reduce soil erosion.

3. 4 Management costs

For protection forests to provide the functions outlined in this report to their maximum, they need to be actively managed. This new task for the Department of Forestry entails a number of start-up costs such as GIS and topographical mapping as well as mapping of vegetation, fauna and soil. It also calls for planning in terms of land use, zoning, demarcation, restoration, erosion control, infrastructure development and capacity building, all of which are in addition to on-going costs for patrolling, community liaison and monitoring.

Although detailed budgets have not been prepared and costs can be phased in, the establishment of new protection forests runs an estimated US$ 5 per ha per year for the first 5 years. Expenses include surveys and assessments of the areas, management plans, capacity building, infrastructure development and restoration. After these initial investments, costs would drop to about US$ 1 per

ha. However, the current operating budget for the 12 staff members of DOF's Division of Protection Forests equates to approximately US$0. 05 per ha—an amount which is insufficient to manage the existing area, let alone the proposed expansion.

As a result of this shortfall, forests are degrading. They are less efficient at regulating the flow of water, with less available in the dry season and flooding in the wet season. Soil erosion and a shortage of clean water are also problems. In addition, extreme weather events are likely to cause more damage to infrastructures and communities than if forest quality was better. However, it is not currently possible for the domestic government to increase resources to the sector because of other funding priorities.

3. 5 Investment requirements

Assuming that government meets its target of 8. 2 million ha of protection forest by 2020 and that the above-noted costs are of the right order of magnitude, it would take 10 years to effectively manage the protection forest estate. Management costs in newly declared areas would probably increase to US$0. 50 before plans are developed and implemented.

3. 6 Possible funding sources and mechanisms

Although it is hoped that the critical need to manage and restore protection forests will convince decision-makers to give these activities priority within domestic budgets, it is unlikely that the level of support required will come from this source alone.

However, in many parts of the world, including the Mekong region, the private sector is beginning to understand that, if government is not in a position to adequately fund forest protection, it is in the best interest of businesses to do so because costs to them will be far less than if forests continue to degrade. Thus, there is now a tendency for the beneficiaries of the ecological services of forests to pay for their protection rather than government. For example, the Da Nhim hydropower station in Viet Nam realized it would incur an additional US$ 3. 75 million/year in operating and plant costs if the pine forests above it were lost or converted. The plant was receiving approximately US$ 10 per ha in water management services and saw that paying approximately 30% of this amount to maintain the forest was a sound investment.

Views on the benefits and the appropriate level of payment vary considerably around the world but estimates are frequently in the order of US$3. 50 to US$ 10 per ha or 5% – 8% of revenues from businesses which benefit from the

services. Payments are sometimes contracted as payments for environmental services or are included under revenue or benefit-sharing schemes. In any voluntary negotiations, business must take into account the risk of losing the services if no payment scheme was in place and the potential impact of their loss, especially under a changing climate.

Lao PDR piloted a scheme by which a hydropower plant was charged 1% of estimated export revenues which then was used to pay US$2 per ha to manage the forest. This test helped to inform policy and to draft Article 31 of the *Decree* which stipulates that 1% of revenues from projects that impact on or profit from the functions provided by protection forests (hydropower plants, mining and tourism, for example) go toward the costs of forest development and management. This figure is a significant improvement over current government allocations and would cover on-going management costs. However, the amount is less than that is likely to be needed for the optimum management of protection forests. Other sources of funding, including for climate mitigation and adaptation, are likely to be required.

3. 7 Contributions of protection forests

3. 7. 1 *Forest strategies*

The *Forestry Law* and the *Forestry Strategy 2020* clearly identify the need for protection forests and outline their functions. Reaching 8. 2 million ha by 2020 will both safeguard these valuable assets and allow communities to continue benefiting from the goods and services they provide.

3. 7. 2 *Environmental strategies*

Putting the strategy on protection forests into operation would assist Lao PDR to fulfill its commitments to a number of multilateral environmental agreements, such as the *Convention on Biological Diversity* , because many of the proposed new areas are rich in biodiversity. Some areas under consideration also contain dry Dipterocarp forests and, if approved, would increase this type which is globally under threat. In addition, the inclusion of protection forests in the protected area system would improve connectivity in the landscape and thus add value. Better management of these forests would strengthen implementation of the *Convention on International Trade in Endangered Wild Flora and Fauna* (CITES) as it is believed that hunters and/or buyers of endangered wildlife target many of these areas to supply international markets. The effective management of forested catchments not only bring benefits at a local and domestic scale but also at the regional level as well, especially within the catchments

of key tributaries in the Greater Mekong Sub-region.

3. 7. 3 *Climate mitigation and adaptation strategies*

The establishment and effective management of protection forests in Lao PDR will significantly contribute to all aspects of the government's strategy to address climate change by increasing the capacity of forests to store carbon through restoration activities and through efforts to reduce emissions and maintain healthy ecosystems. As a result of these interventions, the role of protection forests in mitigating the effects of extreme weather events will be enhanced, for example, by minimizing flooding and providing affected communities with a key source of food and materials following a natural disaster.

3. 7. 4 *Poverty Reduction*

Lao PDR's forests, including areas to be incorporated into the protection forest estate, supply food, materials and the means to earn a living. In fact, many communities depend on them, especially when disasters strike. For this reason, it is important to not only maintain forests but also to ensure that policies build on this aspect.

3. 7. 5 *Sustainable Economic Development*

Forests are not only essential for the survival of rural communities. They also safeguard water supplies and support agriculture, hydropower, mining and infrastructure development—all of which play key roles in domestic economic development.

Sustainable Forest Management and Participatory Community Development in the Emerald Triangle Protected Forests Complex, Thailand

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Abstract

The Emerald Triangle Protected Forests Complex is made up of forests along Thailand's borders with Cambodia and Lao PDR. They are classified into three types: dry evergreen, dry dipterocarp and mixed deciduous. The pilot site in Thailand, called Phatam Protected Forests Complex (PPFC), covers 2,934 km^2 and is located in Ubon Ratchathani Province in the northeast. It consists of five protected areas, namely the Phatam Domestic Park, Kaeng Tana Domestic Park, Phu Jong Nayoi Domestic Park, Yot Dom Wildlife Sanctuary and Bun Thrik-Yot Mon Proposed Wildlife Sanctuary—all of which contain important watersheds that supply hydropower to Sirinthorn and Pak Moon.

Factors affecting livelihoods in the PPFC include pressure from a growing population, conversion of land for additional cash crops, establishment of tourism ventures and infrastructure development. As a result of these changes, more people encroached into protected forest areas and demand for forest products increased.

The project aimed to strengthen local participation in the rehabilitation and conservation of natural resources as a means to support environmentally friendly businesses, in particular eco-tourism. In this regard, a joint task force chose six villages to take part in the pilot and each was given 50,000 Baht to use as seed money to pilot activities (bamboo handicrafts, home-stay, food bank/planting of fruit trees and tissue culture of wild orchids). Selection of the communities was based on their efforts to rehabilitate and conserve natural resources and their commitment to exchange experiences with others.

A meeting was held in each village to prepare proposals for the piloting and funding of activities. A committee to oversee the project was also elected at that time. Some community members were later given training on eco-tourism management and on the development of local products. Indicators to measure the achievement of each pilot activity were also identified and, in December 2009, a workshop was organized in each village to teach participants how to apply them. After these sessions, they better understood the purpose and appropriate use of indicators. Throughout implementation, field staff made regular site visits to monitor progress.

The evaluation of results indicates that the group graded each indicator

honestly. Members accorded few of them full scores because projects were still in the early stage and it was too soon to expect a reduction/elimination of the dependency on forest resources—a key objective. Although implementation is on target, the quality of some outcomes was lower than anticipated one—especially the documentation and publication of indigenous knowledge and lessons learned. Though the villages became better known and received more visitors, the management of eco-tours and home-stays needed significant improvement. The pilots have accomplished much in six short months but the newly formed groups need continuous support to achieve sustainable outcomes.

1. Purpose of This Report

This report analyzes how stakeholder involvement helps to achieve the sustainable management and use of natural resources as a means to foster community development and eco-tourism.

2. Background

With financial assistance from the International Tropical Timber Organization (ITTO), the Royal Forest Department (RFD) of Thailand established the Phatam Protected Forests Complex (PPFC) as part of a trans-boundary pilot area for the conservation of biodiversity. This site was chosen because cross-border trade in plants and animals with Cambodia and Lao PDR placed biodiversity under increasing pressure. Phase I of the project ran from 2001 to 2003. After some delay, Phase II began in 2008—the focus of which was to strengthen cooperation among the three economies, build capacity to conserve and sustainably manage biodiversity, integrate programs in buffer zones and offer nature-based tourism packages to alleviate poverty and improve local livelihoods.

In addition to raising the socio-economic well-being of people in the area, local authorities and communities will better guard the Emerald Triangle Protected Forests Complex. Although activities under the integrated conservation and development programs in Thailand were not strictly defined, emphasis was placed on the participatory selection process. However, based on recommendations from Phase I, Phase II piloted the following projects:

- Bamboo handicraft (project 1);

- Home-stay (project 2);
- Food bank/planting of fruit trees (project 1);
- Tissue culture from wild orchids (project 2).

2.1 Objectives

The project aimed to conserve biodiversity in the Emerald Triangle Protected Forests Complex, an area which crosses the borders of Thailand, Cambodia and Lao PDR. Experiences will be used as a model to establish other trans-boundary conservation areas, including in the lower Mekong Basin.

2.2 Methodology

A consultant, hired to promote participatory community development and tourism, used the following principles to tackle the key questions of the study.

- Close consultations: opinions were sought from the project manager, park officials, staff of relevant departments, community members and local authorities from the planning phase up to and including implementation. Key persons provided information and views on policies, past achievements, constraints and future plans, all of which were documented. Special attention was given to policies and measures related to poverty reduction versus environmental conservation. Workshops and meetings were also organized to consider the comments and recommendations of stakeholder representatives.
- Data collection: quantitative and qualitative data collection techniques were used to obtain the views of both outsiders and insiders on proposed activities to be undertaken within integrated conservation and development programs. Results of the review of Phase I and other documents were included, as was the information gathered from target production groups and related agencies.
- Collaboration in the promotion of target activities: the consultant, in collaboration with ITTO and other agencies, carried out research and development in four sequential steps: ①assessment of community's potential to support tourism and other livelihood alternatives; ②selection of 6 villages to pilot activities and a funding mechanism; ③capacity building; and ④monitoring and evaluation of achievements.

A joint task force chose 6 villages to take part in the pilot and each was given 50,000 Baht to use as seed money for the activities listed above. Selection was based on their efforts to rehabilitate and conserve natural resources and on their commitment to exchange experiences with others. A meeting was then

held in each community to prepare proposals. A committee to oversee the project was also elected at that time. Some residents were later given training on eco-tourism management and on the development of local products. Indicators to measure the achievement of each pilot activity were also identified and, in December 2009, a workshop was organized in each village to teach participants how to apply them. Throughout implementation, field staff made regular site visits to monitor progress.

3. Framework for Development

3.1 Consultation and preliminary appraisal of community potential

Many changes took place in the pilot site before Phase II was implemented, including an increase in the population and in the number of villages. Therefore, the consultants needed more time to assess potential for supporting feasible enterprises and to consult local authorities and groups. For example, they made trips to Ta Long on the Mekong River where Broo ethnic people are famous of hand-woven bamboo products; to Huaimak where krajiew flowers are grown to sell; and to Lak Pai to learn of how bamboo is cut and sold to traders as raw material and how it is woven into containers to steam sticky rice. Other potential activities included dyed cotton weaving (Tung Namuang) and food processing (Suan Son).

Some villages were involved in the research that several agencies conducted such as Ubon Rajathani University's study on the Broo ethnic group; and the Thailand research fund on the eco-tourism management and the culture of the tissue of wild orchids. In addition, many families in Sasom and Pha Chan hosted home-stays and tours, in collaboration with the Tourism Authority of Ubon Rajathani Province and the Tambon Administrative Organizations (TAOs). However, it was found that the quality of services and tourist information needed improvement. The learning centre on tissue culture also required additional support.

As a result of government policies, including at the local level, more land was converted to grow cash crop (cassava, para rubber and palm oil) and many investors came from outside the community.

Lak Pai and neighbouring villages were not only big producers of bamboo products but also sold "Pung" bamboo in its raw state to local and distant traders. High demand eventually threatened the depletion of this resource, to the point that urgent measures were needed to ensure a sustainable supply to

weavers in the area.

Agencies and local authorities confirmed their interest in cooperating with ITTO to develop alternative occupations and eco-tourism. In this regard, some local authorities prepared a plan to promote tourism and set aside a budget for its implementation. In other cases, TAOs appointed an officer specifically to promote tourism. Updated information on the socio-economic and environmental situation of target communities as well as the assessment of their potential and development needs were useful for planning eco-tourism and environmentally friendly ventures. In addition, meetings with relevant partners helped stakeholders to better understand ITTO's project and objectives — an important first step to taking a participatory approach.

3. 2 Selection of communities

The ITTO Joint Task Force met in March 2009 to select communities to pilot activities under the integrated conservation and development programs and to provide them with seed money for start-up. After some discussion, they identified the following criteria on which their decisions were based:

- Indigenous knowledge and expertise in managing natural resources and environment;
- A history of rehabilitating and conserving natural resources;
- Strong organizational capacity in managing natural resources and the environment;
- Potential for eco-tourism and its sound management;
- Commitment to exchange lessons learned with other communities;
- Willingness to collaborate with relevant agencies.

After extensive discussion, the following six villages and pilot activities were chosen (Figure 1). The ITTO Task Joint Force also assigned project coordinators for each village.

- Ta Yoi and Non Soong villages near Yod-dom Wildlife Sanctuary for wild orchid culture;
- Pha Chan and Tha Long villages for home-stays and the eco-tourism;
- Suan Son village, close to Kaeng Tana Domestic Park, for integrated agriculture and food processing;
- Nong Rue village, bordering Buntrik Wildlife Sanctuary for bamboo handicrafts.

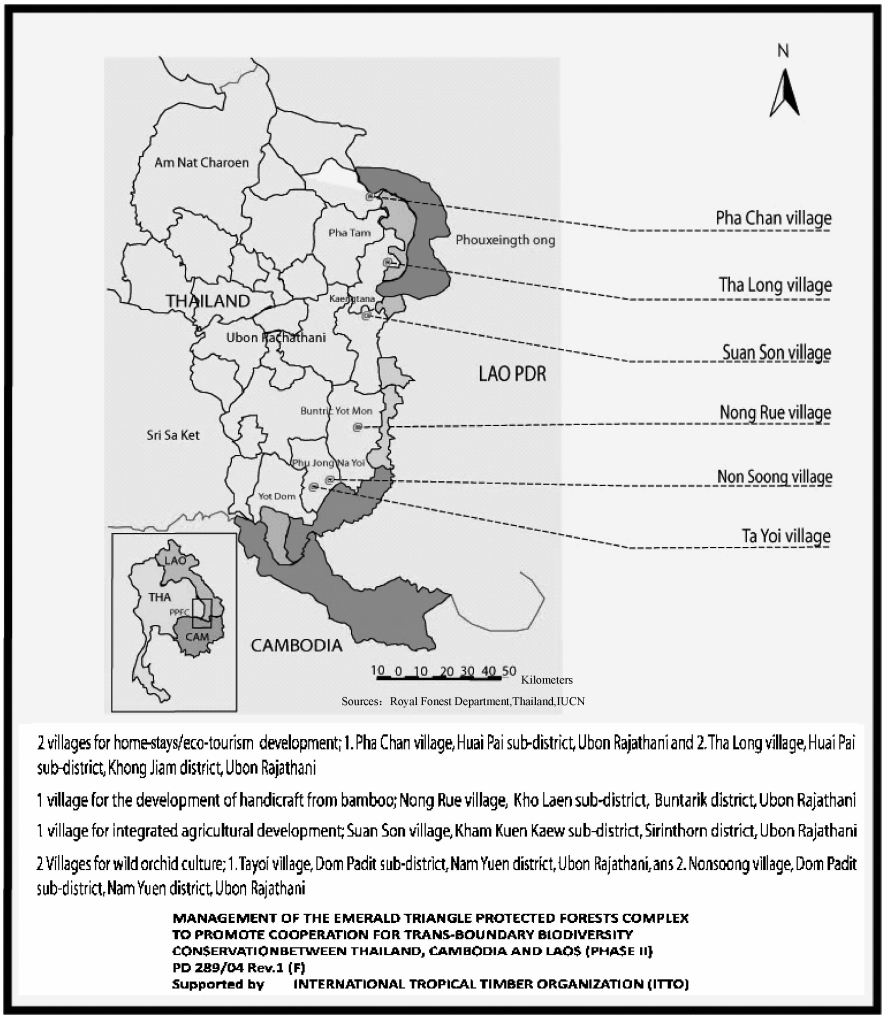

Figure 1 Map of PPFC and the location of six pilot villages

3. 3 Participatory monitoring and evaluation

The Consultant for Tourism Promotion and Community Participation, staff of the ITTO project and members of the ITTO Joint Task Force met in June 2009 to discuss collaboration in monitoring progress and in developing indicators to assess the outcomes of pilot activities. In addition, it was agreed that they would encourage the project to apply the guidelines drafted by the Office of the Community Forest Management, Royal Forest Department, on the Community Forest Management Fund when communities prepare requests for financial

support and when they establish local committees to manage the funds. However, as the types of activities differ from forest management *per se* , a separate monitoring system, guidelines and indicators should be developed. Meetings were then held in each community to promote participation and obtain comments on the draft guidelines and indicators. The role of the implementing agencies and local authorities throughout project development was highlighted, as was the supervisory role of project staff and officials of Domestic Parks.

3. 4 Development of indicators to assess pilot activities

Field staff made several informal visits to the project sites and representatives from the six management committees attended a workshop to develop indicators for the use of villages to evaluate final outcomes. The first set of indicators measured achievement of the project's purposes or the purpose of the ITTO pilot fund. The second set was tailored to the specific needs of each group.

3. 5 Capacity building

Assessment of community potential for eco-tourism revealed that the upper zone of the ITTO project area had much to offer: natural beauty, unique culture of ethnic groups, local products and historic sites. However, most villages had limited or no knowledge of how to run a sustainable tourism enterprise; the quality of local products was low; and cooperation between neighbouring villages or with agencies was weak. Thus, most income from tours went to private companies rather than to the communities.

Based on these findings, the first workshop focused on local product development and eco-tourism management by the peoples' organization network. It was held in February 2009 in the village of Sasom which was chosen as a test site for home-stays, nature trails, and local production groups. Participants (21) consisted of village leaders, home-stays owners, members of production groups, and officials from sub-district administrations and from Patam and Kaeng Tana Domestic Parks. Experts from the Office of Tourism and Sports in Ubon Rachathani Province and from organizations within the sub-district shared information on policies related to the planning and development of tourism.

4. Evaluation of Achievements

The six pilot villages are located in the three zones of PPFC and their potential differs according to their physical and ecological environments. Pha Chan and Tha Long are in the northern part, Nong Rue and Suan Son are in the middle zone, and Ta Yoi and Non Soong are in the southernmost district of Ubon Rajathani Province. Tha Long is smallest in terms of population and area. Households in the six villages average around 4 persons. The major source of income is from cash crops (cassava and para rubber) and from the sale of forest products such as honey, bamboo handicrafts and edible leaves.

4. 1 Profile of the six villages

Information Table 1 was obtained from direct observation and interviews, from the Information Centre for Rural Development, the Department for Community Development, and the Ministry of the Interior.

Table 1 Profile of the six villages

Village/ Sub-district/ District	Number			Major occupations
	HH	Pop.	Average/HH	
Pha Chan, Samrong sub-district, Posai district	97	431	4. 44	93% of households (HH) grow rice. Around 20 HH earn income by selling home-made products at nearby tourist shops. Study tours are another good source of income.
Tha Long, Huipai sub-district, Khong Jiam district	51	198	3. 88	Every HH grows rice and cassava. Para rubber trees cover almost 1/3 of the land. Located on the Mekong River, it is famous for beautiful scenery. The Broo ethnic people who live there are skillful in making handicrafts from bamboo. Many host home-stays and act as tour guides.

(Continued)

Village/ Sub-istrict/ District	Number			Major occupations
	HH	Pop.	Average/HH	
Nong Rue, Kholaen sub-district, Buntarik district	101	465	4. 60	Every HH grows rice, 2/3 grows cassava and 86 produce bamboo containers to steam sticky rice. It is one of the biggest producers of handicrafts from bamboo but most is sold as raw material to outside traders.
Suan Son, Khamkuen kaew sub-district, Siritorn district	99	418	4. 22	2/3 of HH grows cassava and 22 HH grow rice. Most plots grow fruit trees, vegetables, flowers and cashews and have fish ponds. The area of para rubber trees is increasing.
Ta Yoi, Dom Pradit sub-district, Nam Yuen district	86	374	4. 35	Every HH grows rice and cassava. Around 1/3 earns additional income from seasonal employment. 20 HH earn extra income by selling local species of wild orchids from their nurseries.
Non Soong, Dom Pradit sub-district, Nam Yuen district	138	624	4. 52	Every HH grows rice and cassava and 5 HH have orange orchards. The area of para rubber trees and oil palms is increasing. Villagers want to learn about wild orchid culture techniques to eliminate collection from the forest.

4. 2 Participatory evaluation process

Given ITTO's emphasis on community participation throughout the development and implementation of the project, the evaluation of outcomes was designed to be completed by the villagers themselves, using the indicators they developed to guide the process. A one-day workshop took place in the six locations to explain interview techniques, review indicators, identify key questions to ask respondents and assess the level of achievement of each activity on a scale from 0 to 4. Results were reported to the plenary session (see Annex 1 for details) and observations were made on aspects which were ranked extremely

successful and those which received a low score. Participants exchanged views on areas in need of improvement and, when large discrepancies occurred in the point system, explanations were given and discussed. Through this process, they better understood one another's reasoning and this insight paved the way for closer cooperation in future. Finally, it was concluded that the use of indicators could increase the effectiveness of outcomes because actual activities were better aligned with those planned. Moreover, they can be adjusted to take into account new tasks and group capabilities.

Participants said their knowledge of indicators and of their use as a tool for group development increased. In fact, the results show that they graded each one honestly, assigning few of them full scores because project implementation was still in the early stage. Although on target, the quality of some outcomes was lower than anticipated one—especially the documentation and publication of indigenous knowledge and lessons learned. Older members of the group recognized the importance of this activity and were willing to improve this aspect with the assistance of knowledgeable persons in the village, including the youth. Moreover, activities such as wild orchid tissue culture, bamboo cultivation and expansion of integrated plots require more time to reduce/eliminate the dependency on forest resources—a key objective. It was also clear that the villages became better known and received more visitors. However, the management of eco-tours and home-stays needed significant improvement. Closer coordination between villages and with local authorities/agencies is also critical in terms of information exchange and capacity building.

5. Recommendations

- The six villages accomplished much in six short months, with some showing strong potential to become learning sites or serve as models to other communities within the Phatam Protected Forests Complex (PPFC) and other conservation areas in the Mekong Basin. However, the newly formed groups need continuous support to achieve sustainable outcomes, including training to be good learning sites and transfer knowledge effectively.
- Minimum project duration should be more than one year because the tissue culture of wild orchids and the establishment of eco-tourism ventures, for example, need a longer period to produce benefits.
- In the next phase, current groups, neighbouring villages and other organizations should adopt a collaborative approach to community development. The exchange of lessons and experiences with people undertaking similar activities should be encouraged. Assistance should also be given to new groups and new areas

which have the potential to support alternative livelihoods.

- Financial support to provide seed money for pilot activities would be more useful and would better respond to different conditions if the criteria to select communities and the amount of funding granted to them were flexible to accommodate requests from a cluster of groups or a network.
- Assistance, especially to set up a system to store knowledge and lessons learned, is required. Such support will enable groups to raise the extent to which they can learn on their own—an important consideration, given the need to respond to rapid socio-economic changes. Furthermore, information can be published in various forms for dissemination to other communities in the PPFC and beyond.
- Touring packages to suit different demands and clients should be designed, for example, for short and long stays, study tours, trainees and students. They should also include topics such as ethnic culture and way of life, wild orchid tissue culture and natural dyed cotton weaving. In this regard, coordination should be done with the provincial Tourist Office and private touring associations to better disseminate information on the tour packages offered.

Reference

Project PD 289/04 Rev. 1 (F): Management of the Emerald Triangle Protected Forest Complex to Promote Cooperation for Trans-boundary Biodiversity Conservation between Thailand, Cambodia and Laos (Phase II).

Annex 1 Evaluation results

The Tables 1 – 9 below show the results of the evaluation by the six groups, starting with the general objectives of the ITTO project. As every group used the same indicators to assess these goals, Tables 1 to 3 indicate the combined results. Tables 4 to 9 present the aims and results of the specific activities. The following legend is applied to each table: V. 1 = Non Soong; V. 2 = Ta Yoi; V. 3 = Nong Rue; V. 4 = Suan Son; V. 5 = Pha Chan; V. 6 = Tha Long.

A. Achievement indicators for general project objectives

Table 1 Closer cooperation between communities and officers to improve livelihoods

Indicators	Village/Average weight					
	V. 1	V. 2	V. 3	V. 4	V. 5	V. 6
1. Members and stakeholders:						
– Members are composed of men and women of different age groups and diverse socio-economic status;	2	3	4	3	3	4
– There are more new members;	3	2	3	3	3	4
– Stakeholders from inside and outside village participate in activities.	2	3	3	3	3	3
2. Level of community participation:						
– Understanding of project's task and activity;	3	3	3	3	3	3
– Involvement in planning of activity;	2	2	3	3	3	3
– Participation in implementation;	3	3	4	4	3	3
– Involvement in monitoring and evaluation;	2	2	2	3	3	2
– Share of benefits/gains from implementation.	2	3	3	4	3	4
3. Extent of cooperation:						
– With other groups within the community;	3	0	2	3	3	3
– With other groups outside the community;	2	3	2	3	2	3
– New development activities.	1	3	3	3	3	2

Table 2 Conservation of forest resources

Indicators	Village/Average weight					
	V. 1	V. 2	V. 3	V. 4	V. 5	V. 6
1. Decrease utilization of forest resources.	3	3	1	4	3	2
2. Most efficient use of resources.	3	3	2	3	3	3
3. Conservation and rehabilitation:						
– Planning;	3	4	3	4	3	3
– Formation of regulation and agreement;	3	3	4	3	3	1
– Implementation;	3	3	3	3	3	3
– Documentation of knowledge/lessons learned;	2	2	2	3	3	2
– Monitoring and evaluation.	2	3	2	4	3	2

Table 3 Strengthening of community capacity in natural resource management

Indicators	Village/Average weight					
	V. 1	V. 2	V. 3	V. 4	V. 5	V. 6
1. Benefits to individual members:						
– Increase in income;	1	2	2	3	3	4
– Reduction in expenses;	2	1	2	3	3	2
– More knowledge;	1	2	2	4	2	2
– Personal data noted.	3	3	4	3	3	3
2. Capacity of target group:						
– Clear management and administration structure;	2	3	3	4	4	3
– Regulations and agreements formulated;	1	3	3	3	3	2
– Group work plan prepared;	2	3	3	3	3	3
– More capital;	2	2	3	3	3	3
– Monitoring and reporting system in place;	2	3	3	3	3	2
– Knowledge management system in place;	3	3	3	3	3	3
– Participation in group activities.	3	3	3	3	3	4
3. Network:						
– Experienced members disseminate knowledge;	2	3	3	3	3	3
– Participation of children and youths;	3	3	3	3	3	3
– More youths learn about local wisdom;	2	3	2	3	3	3
– More support from external sources.	2	3	1	3	3	3

B. Indicators for each activity

(1) Home-stays and eco-tourism

Objectives: the aim of these activities was to teach tourists the village's way of life, its traditions and beliefs, and its practices in terms of conserving natural resources. The project also sought to raise the importance of local wisdom, culture and natural resources among villagers and local authorities.

Table 4 Pha Chan

Indicators	Weight
1. Human resource development:	
– Local people are trained on how to be a good tour guide.	3
2. Natural resources:	
– Conservation area for "Jilo" (popular edible insect) is managed;	3
– Documents on Jilo conservation techniques are produced;	3
– Fish conservation area is identified;	3
– Documents on local fish are produced.	2
3. Management of target activity:	
– Tourist routes and necessary information are developed;	3
– Home stay activity is properly managed.	3

Table 5 Tha Long

Indicators	Weight
1. Human resource development:	
– Villagers are trained to work as local tour guides;	
– Local wisdom will be conserved and transferred to the youths;	2
– There will be younger handicraft producers;	3
– Rural way of life can be observed i. e. fishing methods, food preparation techniques, speaking language, and traditional shows.	1 4
2. Natural resources:	
– Conservation of Sang Pa bamboo (good for basket making) is initiated.	3
3. Management of target activity:	
– Tourist routes and information is developed;	2
– Statistics on number of tourists and habits are collected;	3
– Better management of handicraft production group;	2
– Home-stay is well managed.	3

(2) Conservation of local plants and promotion of integrated agriculture

Objectives: the aim of these activities was to establish community plots to demonstrate integrated agriculture as a way to ″move the forest to the homestead garden″ or grow at home what people once collected from the forest.

Table 6 Suan Son

Indicators	Weight
1. Human resource development:	
– People working as local tour guides are knowledgeable.	3
2. Natural resources:	
– The community has more integrated agricultural plots;	3
– Dependency on forest resources has decreased.	3
3. Management of activity:	
– Learning plots of integrated agriculture are established in every cluster;	4
– Group members have designed these plots well;	3
– Data on integrated agriculture is documented;	3
– Public relation is better and knowledge is appropriately disseminated;	3
– Community has access to markets to sell its products.	3

(3) Bamboo basket making

Objective: the aim of this activity is to conserve and rehabilitate ″Pung″ bamboo which is well suited for basket making.

Table 7 Nong Rue

Indicators	Weight
1. Human resource development:	
– Capacity to teach how to grow Pung bamboo has increased;	3
– More youths can produce bamboo baskets;	3
– Consumers understand the status/importance of conservation.	3
2. Natural resources:	
– A system is in place to monitor the source of the bamboo;	4
– Bamboo seedling plots are established;	3
– More Pung bamboo is grown.	2
3. Management of activity:	
– Knowledge to grow Pung bamboo is documented;	1
– A plot of Pung bamboo is well managed.	3

(4) Orchid tissue culture

Objectives: the aim of these activities is to employ tissue culture techniques to conserve wild orchids so that less are collected from the forest. Another goal is to establish a learning centre for tissue culture.

Table 8 Non Soong

Indicators	Weight
1. Human resource development:	
– Group members know about and can teach tissue culture;	2
– Members apply local knowledge in wild orchid culture;	3
– Knowledge is transferred to the younger generation;	2
– More wild orchids are produced using various techniques.	1
2. Natural resources:	
– Learning centre for wild orchid tissue culture is founded;	1
– A centre to conduct wild orchid tissue culture is established.	1
3. Management of activity:	
– A monitoring system is in place;	1
– Public is informed about the need to protect local wild orchids;	2
– Local wild orchids are documented;	2
– Regulations are formulated;	3
– Wild orchid species are collected.	3

Table 9 Ta Yoi

Indicators	Weight
1. Human resource development:	
– Group members know about and can teach tissue culture;	3
– Knowledge is transferred to younger generation, esp. school children;	3
– More wild orchids are produced using various techniques and local; knowledge.	3
2. Natural resources:	
– Orchids are returned to the forest;	3
– Learning centre is built;	3
– A centre to conduct wild orchid tissue culture is built.	3
3. Management of activity:	
– A monitoring system is in place;	3
– Public is informed about the need to protect local wild orchids;	4
– Local wild orchids are documented;	0
– Regulations are formulated;	3
– Wild orchid species are collected.	3

Sustainable Forest Management through Decentralization and Stakeholder Participation in Northeast Thailand: Case Study of the Nam Mong Sub-river Basin

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Abstract

The biggest constraints to sustainable forest management (SFM) in Thailand are bottlenecks in the regulatory framework; lack of coherence between public policies; widely varying perceptions among stakeholders about how forests should be conserved and managed; insufficient support to communities and the private sector; weak institutional capacity; deficient information systems; and the absence of human resource development strategies and extension services, including for value-addition through processing. Decentralization and participatory approaches within river basins are needed to better integrate forest management with watershed management.

Since the government banned logging in 1989, forest policies are focusing on conservation and sustainable use. They also note the importance of stakeholder participation and private investment. This new direction, coupled with public pressure, has somewhat improved forest management. Support to community forestry was also strengthened when decision-making and budget responsibilities were decentralized to local authorities. In 2004, 35% of the domestic income from taxation was allocated to the Tambon Administration Organization (TAO) to spearhead economic development through sustainable natural resource management. The Provincial Administration Organization (PAO) shares this task with TAO.

Nam Mong Sub-river Basin, as a part of the Mekong River Basin, was selected to pilot decentralization and public participation in the management of the area's natural resources and environment. Community development groups, a River Basin Committee and the Natural and Environment Volunteer (NEV) Network were established to assist with implementation. This paper describes lesson learned, including those pertaining to stakeholder involvement to achieve integrated watershed management.

1. Sustainable Forest Management in Thailand

1. 1 Current situation

Forest resources, the products and services they provide and the social,

institutional and business structures that surround them are changing across Southeast Asia, albeit at different rates. The demands which society places on forests and forestry also influence the sector's capacity to meet them. To measure progress towards sustainable forest management, regional and international criteria and indicators processes have identified seven thematic elements:

- Extent of forest resources (forest cover and stock) ;
- Biological diversity (conservation and management) ;
- Forest health and vitality (fire, pollution, invasive species, pests and diseases) ;
- Productive functions (wood and non-wood forest products) ;
- Protective functions (soil, hydrological and aquatic systems) ;
- Socio-economic functions (forestry contributions to the economy and society) ;
- Legal, policy and institutional framework (support to the above elements) .

Thailand's 1221 domestic forest reserves cover 23. 4 million ha, 11. 2 million ha of which are in the north. In total, they comprise nearly half the land area, although large parts are no longer forested. About 20% of the 56, 000 villages are located within domestic forest reserves (ITTO, 2006b) and government has issued various types of tenure to people living there. Community forests can now be established in domestic forest reserves which are under the formal management of the Royal Forest Department (RFD) . They are also permitted in other forests which are not yet occupied or developed for use (RECOFTC-ASFN, 2010) .

Forests have always been integral to rural life in Thailand, performing important social, economic and cultural functions. 1. 2–2. 0 million people live in and around protected areas (domestic parks and wildlife sanctuaries) and rely on forests for their livelihood. Another 20–25 million people live in or near forest reserves where they collect forest products for household consumption and for sale at markets.

Many drivers of change in forestry are external to the sector: population growth, changes in age structure, economic and technological development, urbanization and migration flows, for example. Depending on mediating factors, they may either moderate or intensify deforestation and forest degradation (FAO, 2010a) . Income growth and distribution as well as an expanding middle class affect forestry, as do changes in economic structure associated with the transition from subsistence to industrial and service-based economies. In many cases, the move towards better forest management follows a pattern in which forest resources are depleted to a point of perceived scarcity—often

punctuated by a catastrophic natural disaster—before rehabilitation policies and measures are instituted (FAO, 2010b).

Following the logging ban in 1989, focus was placed on forest conservation. The *First Policy and Prospective Plan for the Enhancement and Conservation of Environmental Quality* (*1997 – 2016*) contains guidelines for institutional reforms for the management of community forests and water, the protection of biodiversity and watersheds, and stakeholder participation. It set the target for forest cover at 50% (30% for conservation and 20% for production). References to the forest sector in the *9th Domestic Economic and Social Development Plan* (*2002–2006*) were general and provided little guidance for the development of the forest sector (ITTO, 2006b). The 10th plan (2007–2011), however, contains several specific targets to conserve natural resources and biodiversity, including:

- No less than 33% forest cover, including 18% for conservation forests;
- Restoration of 464,000 ha of conservation forest;
- Establishment of a GIS database and a 1:4000 map to demarcate, together with local people, the boundaries of reserved forests;
- Promotion of community rights and participation in resource management, including through measures to strengthen the recovery and management of natural resources.

Thailand's first comprehensive Domestic Forest Policy, developed in 1985, is based on the principles of SFM and emphasizes environmental protection. The domestic target of 40% forest cover was divided into 15% for protection and conservation and 25% for production. After catastrophic flooding in Southern Thailand in 1998, however, this ratio was reversed (Ongprasert, 2008).

In 1991, the Royal Forest Department drafted a bill to allow communities to manage forests in and around domestic reserves. Despite several amendments, conflict between "the people's movement" which emphasizes communal rights and the "dark green movement" which objects to the establishment of community forests in protected areas prevented passage (Ongprasert, 2008). Parliament approved the bill in 2007 but it has since been challenged in the Constitutional Court. In the meantime, a decision was made to allow community forestry if villages could prove they settled in the area before 1993 and could demonstrate their ability to protect forests.

The RFD was established in 1896 as the sole agency for forest administration and management. As a result, ownership and control of all forests were transferred from feudal chiefs to the government. In 2002, the RFD was divided into three departments: the RFD, the Department of Domestic Park, Wildlife

and Plant Conservation (DNC) and the Department of Marine and Coastal Resources (DMCR). All three are under the auspices of the Ministry of Natural Resources and Environment. The RFD is responsible for forests outside protected areas; DNC's mandate covers protected areas; the DMCR has jurisdiction over coastal flora and fauna, including mangrove forests; and the Forest Industry Organization oversees government plantations. Staff in public forest institutions in 2007 numbered 2329 (FAO, 2010). DNC and RFD regional offices liaise with the superintendents of domestic parks and wildlife sanctuaries as well as with provincial and local authorities. These offices, along with specialized departments, also provide extension services to forest farmers.

Decentralization and public participation in policy, planning and management of natural resources in Thailand is still rather limited. However, after the coup d'état in 2006, a new constitution provides for participation in environmental conservation and sustainable natural resource use (Ongprasert, 2008).

The biggest constraints to sustainable forest management in Thailand are bottlenecks in the regulatory framework; lack of coherence between public policies; widely varying perceptions about how forests should be conserved and managed; insufficient support to communities and the private sector; weak institutional capacity; deficient information systems; and the absence of human resource development strategies and extension services, including for value-addition through processing (ITTO, 2006b). In addition, land use and tenure arrangements are needed in places where forest dwellers and ethnic minorities claim ancestral rights over areas that are now designated as protected (Government of Thailand, 2010).

Since the government banned logging in 1989, forest policies are focusing on conservation and sustainable use. They also note the importance of stakeholder participation and private investment. This new direction, coupled with public pressure, has somewhat improved forest management. Support to community forestry was also strengthened when decision-making and budget responsibilities were decentralized to local authorities. In 2004, 35% of the domestic income from taxation was allocated to the Tambon Administration Organization (TAO) to spearhead economic development through sustainable natural resource management. The Provincial Administration Organization (PAO) shares this task with TAO.

Prior to the late 1990s, economic development drove reforestation efforts but, when forest conservation took precedence, greater attention was paid to restoring degraded forests as a means to conserve biodiversity and protect watersheds. Since 1995, more diverse species of forest trees were planted and reforested areas increased dramatically (Ministry of Natural Resources and Environment, 2005).

1. 2 International commitment and cooperation

Thailand has ratified and is implementing international conventions related to forests, including:

- *Convention Concerning the Protection of the World Cultural and Natural Heritage* (*the World Heritage Convention*);
- *Convention on International Trade in Endangered Wild Flora and Fauna* (*CITES*)
- *Convention on Biological Diversity* (*CBD*)
- *The Convention on Wetlands* (*RAMSAR*)
- *United Nations Framework Convention on Climate Change*

Its Domestic Climate Change Master Plan (2010–2019), drafted in early 2009, is now being implemented.

The *Constitution* (1997) recognizes the right and duty of traditional and other local communities to participate in natural resource management and the right of Thai people to participate in the formulation of domestic policies for the development and conservation of resources and the environment. As noted earlier, a bill was drafted in 1991 to provide a legal framework for community forestry but passage has been delayed due to a lack of consensus on key issues, in particular whether it should be permitted in protected areas. The DNC and the RFD is encouraging local communities and forest dwellers to participate in forest conservation and restoration in efforts to combat loss and degradation. They are also strengthening law enforcement and are mounting public awareness campaigns. In the Tenasserim Biodiversity Corridor in the provinces of Ratchaburi and Kanchanaburi, a REDD initiative is testing the use of participatory governance structures and mechanisms, such as a revolving fund, to enable communities to manage forests and improve their livelihoods.

1. 3 Mainstreaming SFM through integrated water resources management

Between 1989 and 2001, damage caused by flooding and drought averaged about 23,700 million Baht per year but sometimes rose higher than 70,000 million Baht. The Royal Thai Government considers that such events pose serious obstacles to domestic development and quality of life. It also recognizes that water issues are closely linked to forestry, land use, ecosystems and human settlements. Therefore, integrated water resources management (IWRM), as stated in the *Johannesburg Plan of Implementation,* is an effective approach to address problems and should be applied in Thailand's 25 river basins.

Domestic policies on water resources management, including their development and rehabilitation, are based on their location and functions within the river basin. They fall into three categories: the upper forested area, the middle agricultural area (including communities), and the lower or downstream area (including coasts). Plans are to establish an accurate database of all natural resources, along with environmental aspects, as an initial step for drafting comprehensive management strategies from the upper through to the downstream areas. In term of institutional arrangements, the Ministry of Natural Resources and Environment is responsible for the policy and planning of natural resources, including water, while the Ministry of Agriculture and Cooperatives oversees the infrastructure within agricultural areas (Tangtham, 2007).

Society's awareness and appreciation of the importance of forest resources have increased significantly since the 1980s as a result of the lessons learned following natural disasters and destructive human interventions. Within the last 20 years, at least four major events caused the loss of lives and destruction of properties. However, damage would have been far worse had the areas not been under forest cover. These occurrences were a massive land slide due to heavy rain which covered Katun and Kiriwong Village in the South (1988); hurricane Gay in Choomporn Province (1991); a massive land slide due to heavy rain on steep and degraded forest which covered Num Khor Village in the North (2000); and the tsunami which hit the six southern provinces on the coast of the Andaman Sea (2004). Land use patterns and the extent of forest cover were key factors in determining the severity of losses in ecological and socio-ecological terms.

The new *Constitution* (1997) calls for government decentralization and recognizes the right of traditional communities to participate in the management, preservation, and exploitation of natural resources and the environment in a balance fashion. These new provisions led to many changes in forest management in Thailand (Ministry of Natural Resources and Environment, 2005).

2. SFM and IWRM in the Upper Northeast Mae Kong River Basin

2.1 The Nam Mong Sub-river Basin

The Nam Mong Sub-river Basin covers 1,685,789 rais (1 ha =6.25 rais) and is part of the Mae Kong River Basin. Located in the northeastern provinces of Loei, Nong Khai, Udon Thani and Nong Bua Lam Phu, it supports about 270,000 people (60,000 households) in 318 villages in 12 districts (51 sub-districts). It also boasts four scenic attractions: Na Yoong–Nam Som Domestic Park, Phu Pa

Dang Natural Park, Phra Buddhabaht Bua Bok Natural Park and Wang Nam Mok Falls. The Nam Mong River is 113 km long and originates in the Na Duang District, Loei Province.

Annual runoff in the sub-river basin is 773. 88 million m^3, only 80. 49 million m^3 (11. 6 %) of which can be captured in reservoirs-an amount sufficient to support 85, 820 of the 1, 189, 536 rais available for agriculture. Some 693. 39 m^3 flow into the Mae Kong River and deluges caused by the shallowness of Nam Mong and its tributaries damage 80, 000 rais of arable land. An estimated 237, 500 rais (14. 06%) of the remaining basin is forest area. More than 64, 440 rais have been degraded, leaving only 173, 060 rais in good condition.

Some 70. 56% of land (1, 189, 593 rais) is used for agriculture, 42. 47% of which has been allocated for the sole purpose of farming. The Department of Agriculture has issued certificates under SOR-POR-KOR 4-01, an arrangement which forbids the sale of land but allows its transfer to the farmer's children. The soil in more than half of this area (52. 90%) is infertile or of low quality. Moreover, weak community capacity and degraded natural resources hinder the development of a sustainable ecotourism industry, thereby reducing the opportunity for villages to earn additional income. Also, lack of water is resulting in low agricultural productivity, pests and shortages for daily use in some villages. Water contamination is another problem, as is encroachment which is damaging some forested parts of the domestic park, including by people from nearby provinces. Residents living in this sub-river basin suffer from both floods and droughts.

Archeological discoveries show that people living in northeast Thailand and Lao PDR were closely connected to the Nam Mong Sub-river Basin. According to Professor Srisak Wallipodom, this area was once comprised of 3 sub-river basins: Nam Mong, Kook and Bang Puan. However, no communities like Vientiane were found in either Kook or Bang Puan from pre-historic times to the Dvaravati and Lop Buri periods — a finding that could explain this city's origin and development. Early inhabitants in this watershed were thought to have settled in the plain. They were hunter-gatherers and used the rock formation for religious ceremonies, as evidenced by the coloured paintings which pre-date historical records. Once Buddhism was introduced, ceremonies were also performed at these sites and temples which remained important until the Lan Sang period were built — Pra Buddha Baht Bua Ban and Pra Buddha Baht Bua Bok, for example.

Table 1 lists other characteristics of the Nam Mong Sub-river Basin, besides the ones described above.

Table 1 Additional characteristics of the Nam Mong Sub-river Basin

Area	1,698,750 rais
Height from mean sea level	500 meters
Runoff per year	773.88 million m^3
Agricultural area	1,189,593 rais
Hydrology Project capacity	33.3 million m^3
Forest area	237,500 rais
Soil quality	sandy and low quality in most areas fertile lateritic in secondary areas (collapses easily)
Area	1,698,750 rais
Land ownership and use	44.70% is owned under Sor-Por-Kor 4-01 and 19.25% is under forest cover
Mountainous area	223,270.5 rais
Water resources area	8,996.2 rais
Population	270,000
Population density	6.12 rais/person
Ethnic group	Lao

Because the Nam Mong Sub-river Basin covers a large area, it is rich in natural resources, including biodiversity. However, high population density, along with convenient access and suitability for agriculture, are exposing it to further invasion and risk of pollution. Since the basin flows into the Mekong River, interventions here directly affect these international waters.

2.2 Past and present management of the Nam Mong Sub-river Basin

In November 2002, under Order 51 of the Domestic Water Resources Committee, the River Basin Committee of Mekong 2T established a working group to manage the Nam Mong Sub-river Basin. As an agency in charge of coordinating the projects listed below, it set up an office in the 3rd region. In 2007 and 2008, the Ministry assigned it the responsibility to develop a work plan and to provide financial officials with an estimate of the funding required to support the initiatives operating in the area, in collaboration with other agencies.

In January 2005, formal agreement was reached to manage the Nam Mong Sub-river Basin project (2005–2012) in an integrated manner, according to the strategic development plan of the northeastern provincial group (Loei Province, Nongbua Lamphu, Nongkhai and Udon Thani). Some 2,500 million Baht were made available from the central budget to support activities in the first year. Along with efforts to better manage forests upstream, dredging also took place. Three departments initiated projects worth about 216.20 million Baht: Water Resources (34.20 million Baht for 2 projects); Irrigation (172 million Baht for 4

projects); and Domestic Parks, Wildlife and Plant Conservation (10 million Baht for a project in 2,000 locations). More specifically, they are responsible for implementing the following.

Irrigation:

- Dredging of the sub-river basin in Udon Thani Province;
- Construction of the Chum Manao Reservoir in Udon Thani Province;
- Development of Bung Kum Pang in Nong Khai Province;
- Development of Nong Tam Hai in Nong Bua Lum Phu Province.

Water resources:

- Construction of a weir in Nam Mong creek in Udon Thani Province;
- Restoration and improvement of the weir in Huay Ngao in Udon Thani Province.

Domestic Parks, Wildlife and Plant Conservation:

- Work on dams in 2,000 locations in 4 provinces.

3. Lesson Learned

3. 1 Effectiveness of the Nam Mong Sub-river Basin Committee on IWRM

When government decentralized watershed management to local authorities in 2003, it established 29 organizations of various patterns and structures in 25 river basins. Because the Domestic Water Resources Committee set up organizations in both the Mekong 2T and Mekong 3T regions, members came from the same groups, although they were from different areas. Representatives in the Nam Mong Sub-river Basin were chosen from sub-district, district and provincial jurisdictions, while those in Nam Pung lived in the sub-river basin. A preliminary study of the effectiveness of these groups showed that the one in Nam Mong performed better than the one in Nam Pung, based on 17 factors which are thought to have an impact on integrated watershed management. For example, Nam Mong displayed a higher level of stakeholder interest, participation and satisfaction; experienced fewer conflicts; collaborated more closely with external partners; and shared information more widely. However, internal communications took more time.

3. 2 Effectiveness of the Natural and Environment Volunteer Network on IWRM

From the same study, the Natural and Environment Volunteer (NEV) Network was judged to be effective, based on high attendance at meetings, ongoing coordination, the common views that the group held, interest in considering other ideas, and the extent of knowledge sharing and networking. In addition, it is making efforts to expand membership, locations and type of work it undertakes, including the development of a strategic plan for the Nam Mong watershed to cover upstream, midstream and downstream areas.

Despite resource limitations and the uncertainty of continued support from partners, NEV's impact on the natural resources and environment in the Nam Mong Sub-river Basin has been positive, as the examples below highlight.

Forestry: establishment and management of a community forest, establishment of a conservation network, more stable food supply, coverage of the upstream area and reduced conflict between the community and the governor's office.

Land: development of guidelines to solve conflict over land, public forests and forests in upstream areas.

Water and fisheries: establishment of a group and network of consumers in the districts of Ban Phue and Tarbor and of a group which concerns itself with the supply and quality of water.

Agriculture: establishment of group to promote organic farming and a group to campaign for less use of chemicals in the watershed and highland areas where rubber tree plantations are mainly found.

Environment: establishment of a group which involves itself with aquaculture and fisheries.

3. 3 Factors which promote sound management of the Nam Mong Sub-river Basin

Factors which promote the sound management of the Nam Mong Sub-river Basin include the following:

- A wise leader is available and willing to look after the watershed areas;
- Agencies in all 4 provinces adopt an integrated approach, based on a single management plan;
- A policy is issued to manage the watershed in such a way as to improve the

quality of life of the people who live there;

- Organizations, such as the International plan for the Development of Thailand, the United Nations Development Programme and the Swedish International Development and Cooperation Agency, support the management of natural resources and the environment of the area;
- The local administration trusts and supports the agencies and the working group affiliated with NEV;
- NEV's capacity to facilitate coordination among sectors ensures that close collaboration will continue.

3. 4 Factors which hinder sound management of the Nam Mong Sub-river Basin

The study revealed that lack of stakeholder participation in NEV's management of the Nam Mong Sub-river Basin was due to the following factors:

- Confusion about the role/authority of NEV which makes some people afraid;
- Lack of faith in NEV and its leader;
- Leader not providing permits to members to operate in some areas;
- Weak coordination of activities of various partners;
- Lack of awareness of the value of NEV's work;
- Insufficient capacity and financial resources for integrated operations.

4. Conclusion

Most households depend on subsistence agriculture because opportunities for off-farm activities are almost non-existent. This reliance negatively affects land productivity and leads to a decline in the socio-economic status of the watershed's inhabitants. Community development groups such as the River Basin Committee and NEV are helping to better manage the watersheds and improve socio-economic conditions. Democratic decision making for resource allocation and benefit sharing as well as transparency and communication is essential to reduce disputes and maintain good relationships among members. Positive attitudes, high participation in activities, sufficient funding and its mobilization, external assistance, and favourable political support/coordination are fundamental for community organizations to better perform and achieve sustainability.

5. Recommendations to Achieve Integrated Watershed Management

5. 1 Structure and composition of organizations

- To increase participation, promote a greater sense of ownership and better manage conflicts, organizations should ensure that the ratio of stakeholders who are most affected by decisions on the management of watersheds is higher than that of other members. As a general rule, each sub-river basin area should establish criteria for their selection, including broad representation from several groups—water users, those affected by encroachment, local authorities, women and NEV, for example.
- Prior to choosing members, the social composition of the river basin should be surveyed and decisions made accordingly.
- Each committee should be established and have jurisdiction within the river basin's administrative boundary.
- Communications and knowledge sharing should be ongoing with committees operating at the same level as well as with those which have higher authority.
- The capacity of committee members should be assessed and training should be given to them before project implementation.
- The central government should support the committee to update the data base of the river basin's natural resources and environment and make it user-friendly.
- It should be clearly define the duties of each member and working group as a means to promote team work.
- The central government and Domestic Water Resources Committee should empower the committee to make decisions and allocate funds to implement its integrated work plans in an equitable manner.

5. 2 Awareness raising

- To help people understand the important role of the committee in the sound management of the river basin, members need to become skilled in public relations so that information on its good work is available across the entire river basin.
- Capacity should be built to strengthen collaboration with other organizations (local, domestic and international); to secure support for the implementation

of work plans; and to address social and economic issues within the area.

- In addition to providing technical support to the committee, a core function of the central office should be to conduct research in the fields of public relations and organizational development.

5. 3 Information/knowledge management (Udon Thani)

- The NEV Network's accumulated knowledge should be gathered, managed and disseminated to the public through an information technology system.
- Collaboration among agencies involved in managing the watershed's natural resources and environment would ensure a holistic approach and would facilitate NEV's knowledge development program.
- Research and development are needed to promote continuous learning and ongoing exchange, as would a NEV learning centre at the community/forest level to educate families and provide information to address problems.

5. 4 Management of the NEV Network

- Increase understanding among NEV's members and the committee of the role the organization plays and build the trust of partner agencies and the public in its capacity to deliver.
- Communicate the activities and work of NEV to the public.
- Strengthen cooperation between the community and local administration for the management and development of natural resources, including through joint planning.
- Make the NEV Network a formal member of the community council.

5. 5 Guidelines for the development of the NEV Network and community

- Government, including local administrations, and community organizations should jointly support the NEV Network so it can operate on a continuous basis.
- The NEV Network should establish a mechanism that focuses exclusively on collaboration among stakeholders.
- The opportunity to exchange experiences, learn from each other, build good relationships and jointly plan projects will increase the NEV Network's positive impacts.
- A sustainable source of funding and a clear operational plan developed in

collaboration with all sectors, increase the chances of achieving successful outcomes.

- The establishment of a dedicated coordinating mechanism and a learning centre will allow information about budgetary and academic matters to be collected in one location and this approach can serve as a model to expand the organization into other areas.
- If other networks—such as the permanent agriculture network, the environmental protection volunteer network and civil society — collaborate with NEV, they will reinforce the work and activities being carried out.

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Turning Mangroves into Riches in Viet Nam's Mekong Delta

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1. Introduction

Viet Nam has 323,712 ha designated as mangrove forest but only 209,741 ha have standing mangroves. The value of these resources, their management and the pressures placed on them are of growing concern to managers, planners and policy makers, particularly at the local level. Moreover, this ecosystem is closely tied to the fisheries sector and to other coastal wetland ecosystems but no specific laws or regulations control their use—unlike wetlands and nature reserves which are managed according to domestic protection and development strategies—despite their importance to the economies in coastal areas, especially the Red and Mekong River Deltas which are known as Viet Nam's "rice bowls".

More than 60% (130,000 ha) of Viet Nam's mangroves are located in the Mekong Delta and provide a variety of economic goods: timber, firewood, leaves and branches; shrimp and crab; raw materials for pharmaceuticals; and other products such as pearls and honey.

This report describes a study conducted by Dr. Nguyen Hong Phan on how mangroves brought prosperity to the Mekong area and suggests how payment for ecosystem services could be introduced to generate revenue from their conservation. The ideas brought forward could be used as a basis for strengthening regional collaboration not only to improve the management of mangroves but also to enhance forest management more generally.

2. Successful Mangrove Management Model in Can Gio

Can Gio is situated on a recently formed estuary, where the Saigon and Dong Nai Rivers discharge into the sea. A network of canals and rivers divide the site into many islets. The dominant vegetation is mangrove forests—both planted and naturally regenerated. The site also supports beds of sea grass and houses of many species of mollusks, crustaceans, fish, amphibians and birds, in addition to terrestrial animals.

The Can Gio mangrove forest once covered more than 40,000 ha and the height of trees averaged between 20 m and 25 m. Before 1945, they were classified as

productive forests. The former Saigon regime demarcated 28,000 ha as protected and the remaining 12,000 ha of mainly secondary forest was exploited at random. Chemical agents and bombing during the Second Indochina War (1965–1969) nearly destroyed the ecosystem.

Following the war, Can Gio was allocated to the Duyen Hai District in Dong Nai Province until 1978 when responsibility for managing the forest was transferred to Ho Chi Minh City. The area was degraded heavily: 4,500 ha of Phoenix paludosa (a prickly wild plant species), 10,000 ha of barren and cracking muddy soil, and only 5,600 ha of cultivable land. The remaining 15,400 ha were covered with unproductive shrubs and bushes. Trees which supplied precious wood, such as Rhizophora and Bruguiera, had almost vanished.

In 1991, the *Prime Ministerial Decision 173/CT* designated Can Gio as a coastal protection forest and, in 2000, it was designated Viet Nam's first Biosphere Reserve under Man and the Biosphere Reserve Programme of the United Nations Education, Scientific and Cultural Organization (UNESCO). Today, Can Gio is the largest area of rehabilitated mangrove forest in Viet Nam (about 30,000 ha).

But, the story of Can Gio's rehabilitation is not straightforward. In fact, it mirrors the experiences and challenges of many other Asia-Pacific economies.

3. Early Rehabilitation Efforts

In 1978, the People's Committee of Ho Chi Minh City issued a decision to afforest and rehabilitate the Can Gio ecosystem. Duyen Hai Forestry Enterprise took initial action and central government later established plantations on fallow and salt-marsh lands. These state-owned farms were designed not only to alleviate overcrowding and unemployment in the inner city, but also to produce food and industrial crops such as sugar cane, pineapple, cashew nuts and eucalyptus. Can Gio forests were designated as production forests to provide city residents with fuelwood and timber for construction.

Nearly all projects failed due to poor management, insufficient funding and lack of experience. Managers brought in from outside were not familiar with local conditions and farms were established on land that, without mangrove forest cover, had been leached of nutrients and had become acidic and infertile. By 1999, many of the state-run enterprises abandoned rehabilitation efforts and returned the land to the city authority because the crops and forests were growing too slowly to be commercially viable. Many planted areas became vulnerable to illegal exploitation.

4. A New Strategy

This wholesale failure forced government to change its policy and strategies. Moreover, better appreciation of the environmental and social benefits that the Can Gio forests provide led to its reclassification as an environmental protection forest. A more effective strategy was applied, one which involved allocating land to local households and giving them the responsibility for protection and management. A Management Board of Environmental Protection Forests of Ho Chi Minh City was established to undertake the functions previously carried out by Duyen Hai Forestry Enterprise.

In tandem with this local government strategy, the domestic Department of Forestry now operates 24 units in the Can Gio zone. Each unit implements its own diversified plan and ensures that activities complement the efforts of households with regard to planting and protecting regenerated forest areas.

The new strategy is based on three fundamental principles.

- It empowers impoverished local people to manage forests, many of whom previously encroached on this land and cut down trees. The authorities reasoned that secure tenure would encourage them to protect their assets.
- It recognizes that local people who have been living in or near the forests for many years would know best how to manage them effectively. Therefore, it capitalizes on traditional knowledge.
- It provides a transparent means of support through the state-funded Management Board which oversees and coordinates the activities of households on matters related to forest protection so that none of them work in isolation.

Implementation followed a carefully structured approach. The Management Board informed all local communes about the strategy, and the households wishing to be allocated land were invited to make a formal application. Commune authorities and the Management Board made the final selection and, at meetings attended by the head of the forestry unit, representatives from the commune and the district Department of Agriculture, each successful applicant was given a record of the allocation, a contract for forest management and a detailed map of the area (at a scale of 1 : 10 000). The allocations were formalized by the Ho Chi Minh City People's Committee.

5. New Lives in Can Gio

Benefits to the people involved in forest care and protection have been steadily improved under new city regulations and as the forests matured. As of 1999, further thinning was prohibited because the area had been thinned at least twice. Since this decision reduced revenues, the city government increased its annual protection fee paid to households from US$ 4. 50 per ha to around US$ 20. 00 per ha.

The living standards of these households are, however, still quite low. Transport is difficult due to the many rivulets and canals which separate forests; shortages of freshwater are frequent in the dry season; and fresh vegetables are scarce. Forest guards lived without electricity until recently, when city government, with assistance from local and international organizations—SOLARLAB, the Fondation -nergies pour le Monde (Energies for the World Foundation) and the Japan International Cooperation Agency, among others—provided solar power to most residents. In addition, the installation of large plastic water tanks to replace earthen containers to store rain has increased freshwater reserves.

Boats provided by city government have improved the delivery of health care and the construction of the Dan Xay Bridge facilitates transportation from Ho Chi Minh City to the district of Can Gio. Support is also provided for children to attend primary and secondary schools in their communes.

The significant changes noted above are the results of long-term and intensive efforts by various stakeholders. As part of its strategy to develop the mangrove forests, city government has given preferential credit and commercial credit to inhabitants in the district to assist them in establishing enterprises related to agriculture, forestry, aquaculture, salt-making and other ventures to improve their livelihoods.

The successful management of mangroves in Can Gio is attributable not only to paying households for their protection, but also to providing them secure tenure, helping to build homes and settlements, and supporting the development of viable enterprises. The very existence of the Can Gio mangrove forests is testimony to the 25 years of effort and creativity of the authorities and people of Ho Chi Minh City and Can Gio.

The sight of the immense mangrove forest which stretches along the waterways and into six communes makes it hard to believe that the area was once largely barren. Can Gio mangrove forests have become a source of great

pride to the local people and authorities, especially since they have been designated as a World Biosphere Reserve. Educational materials distributed by the Mangrove Ecosystem Research Centre, extension activities conducted by the city and nearly 100 training courses funded by UNESCO, have made local inhabitants fully aware of the major significance of Can Gio mangroves. They now proudly demonstrate to visitors from different parts of the world how these resources are being protected and rehabilitated.

Today, Can Gio is significant in terms of conserving the biodiversity of species and genetic resources in landscapes and ecosystems. It has also fostered economic and human development, taking socio-cultural and ecological sensitivities into account. Support is provided for research, monitoring, education and information exchange on local, domestic and global issues related to conservation and development. Can Gio has also become a tourist destination and a research site for students and scientists. In this regard, the Action for Mangrove Reforestation (a Japanese non-governmental organization) and the TIERRA (a Japanese enterprise active in environmental education) have funded the construction of five seminar/training centers in the mangrove area to provide opportunities for people to interact and immerse themselves in the diversified mangrove ecosystem.

6. Possible Mechanism for the Sustainable Management of Mangroves in Mekong Delta

With more than 130,000 ha of mangroves, the Mekong Delta has the potential to generate revenue in the form of payments for ecosystem services to those who protect and conserve them, prevent their degradation and further loss, and plant additional trees to increase biomass.

With regulatory support, payments for ecosystem services may make conservation a viable alternative to development by generating significant long-term monetary and non-monetary benefits. This potential is due to the fact that mangroves grow in narrow strips along the coast—a pattern which translates into a high cost per unit of carbon emissions avoided when they are conserved or restored. The best option to store carbon in mangroves may therefore be in combination with other revenue sources, such as payments for other ecosystem services, ecotourism, or from sustainably-produced goods. Other arrangements also may be viable. For example, in areas where government spends significant funds to repair and maintain seawalls, some funds could be diverted to local people to conserve or restore protective mangrove buffers,

thereby delivering some of the same benefits. Such payments could protect inland areas from waves, storms and flooding, while enhancing local livelihoods and improving the coastal ecosystem at the same time. Tourism entrepreneurs could also pay to conserve or restore mangroves as a means to control erosion in scenic areas and the aquaculture industry could pay the managers of mangrove forests to offset losses resulting from operations.

The survival of mangroves in the Mekong Delta and in Viet Nam will ultimately depend on balancing development and conservation goals. As their importance has become more widely recognized over the past decade, management approaches have emerged which may be used independently or as part of an integrated strategy to achieve both objectives—for example, one which calls for collaboration among regulatory bodies (communes, districts, and provincial People's Committees) , management boards, the Ministry of Agriculture and Rural Development and the Ministry of Natural Resources and Environment. In addition, the domestic or local government could pay local people to conserve or restore mangroves which protect seawalls. Efforts to strengthen this natural buffer would reduce the costs to repair and maintain dikes, while providing income opportunities.

Integrated planning for the sustainable use and management of mangroves is needed at every level to secure long-term rights and benefits to forest users, balance competing interests and engage all relevant sectors: agriculture and rural development, natural resources and environment, fisheries, tourism, and construction. Such approaches are vital to the success of payments for ecosystem services which require stable, predictable, and consistent legal frameworks.

Creative thinking about the many regulatory tools that are available and about how different stakeholders can be engaged in their implementation will help to conserve mangroves and initiate payments for ecosystem services schemes to overcome challenges associated with high opportunity costs and mangrove loss.

Development of Viet Nam's Forest Sector

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1. Context

In 2011, the world faced many challenges such as the debt crisis in Europe, slow economic growth, inflation and the rising cost of food, oil and raw materials. Viet Nam felt the impact of these negative trends, including its forest sector. However, the global forest community also celebrated the International Year of Forests—an occasion which marked several special events to underscore the importance of forests to life on earth.

Climate change also featured prominently in discussions, especially at the 17th Conference of the Parties to the United Nations Framework on Climate Change in Durban (South Africa) in December 2011 where negotiations focused on future international arrangements to replace the *Kyoto Protocol*. More than 12,000 participants from 195 economies attended this meeting but outcomes fell short of expectations.

In the same year, the 5 Million Hectares Reforestation Project (5MHRP) came to a close and the Prime Minister approved the *Forest Protection and Development Plan* (2011–2020) on 9 January 2012 (*Decision No. 57/QD-TTg* and *Decision No. 58/QD-TTg*).

The Ministry of Agriculture and Rural Development (MARD), in collaboration with other government agencies, sectors and provinces, have been paying close attention to forest issues and the sector has been receiving continuous international and technical support. Newly issued policies on payment for environmental services and on the designation/management of special-use forest, for example, provide a sound legal framework for forest protection and development as well as nature conservation. In addition, local governments, other sectors and society in general are becoming more aware of the role of forests in domestic sustainable development and in mitigating the effects of climate change.

2. Major Achievements

Despite many difficulties, substantial achievements were made, especially with regard to forest protection and development, as the following highlights show.

2. 1 Implementation of the sectoral plan

With the Domestic Assembly, various government ministries and local authorities all paying attention to forestry, the sector achieved significant growth. In this regard, most production and export targets were either met or were exceeded. Many provinces made full use of available funding for program implementation and, due to concerted efforts, forest cover is expected to reach 40. 2%—an increase of 0. 7% over 2010.

As of December, zoning for regeneration reached 375,174 ha (94% of the target in the annual plan); 211, 381 ha of plantations were established (106% against target), including 21,120 ha of protection forests (59%); 190,261 ha of production forests were designated (116% against target); 2, 371, 076 ha of protection forests were set aside (105% against target); tending was done on 208, 529 ha (138% against target); and 27 million trees were planted (55% against target). In total, 376, 394, 000 seedlings were produced, an amount sufficient to meet demand. Compared to prices in 1994, the production value of agriculture, forestry and fisheries reached about 245. 9 thousand billion VND, 5. 2% more than in 2010. Agriculture earned 177. 6 thousand billion VND, increasing to 4. 8%; forestry earned 7. 8 thousand billion VND, increasing to 5. 7%; and fisheries earned 60. 5 thousand billion VND, increasing to 6. 1%.

2. 2 Completion of the 5MHRP

After 13 years (1998 – 2010), the 5 Million Hectares Reforestation Project achieved much in the fields of socio-economy, environment, domestic defense and security. Upon completion of the project, the Domestic Assembly passed *Resolution No.18 / 2011/QH 13* in November 2011, after reviewing and confirming that the objectives and targets set under *Resolution No. 08 / 1997/QH 10* and *Resolution No. 73 / 2006/QH 11* were met. In addition, government developed and began to implement the Forest Protection and Development Plan (2011 – 2020), a move which is seen as a milestone in the forest sector in terms of moving forward. Under 5MHRP, some 4, 675, 006 ha were either planted or zoned for regeneration (93. 5% against target). About 2, 450, 010 ha out of 3,000,000 were planted (81% against target), including 898, 088 ha out of 1,000,000 ha for protection and special use (89. 7% against target) and 1, 551, 922 ha out of 2,000,000 ha of material forests (76% against target). Some 1, 283, 350 ha out of 1,000,000 ha (128% against target) were zoned for regeneration, of which 900,000 ha became forest. Plantations of industrial and fruit trees were established on 941,464 ha out of 1,000,000 ha (94% against target).

In 1998, forest area was 10,435,466 ha (9,533,401 ha of natural forests and 902,065 ha of plantations). By 2005, these figures rose to 12,601,751 ha (10,272,973 ha of natural forests and 2,328,778 ha). By 2010, the area totaled 13,388,075 ha (10,304,816 ha of natural forests and 3,083,259 ha of plantations). Thus, forest cover went from 32% in 1998, to 37.1% in 2005, and to 39.5% in 2010. Compared to the 1997–1999 forest inventory, timber volume increased from 751.5 million m^3 (including 30.6 million m^3 from plantations) to 811.6 million m^3 (53.4 million m^3 from plantations), according to the 2001–2005 inventory—an overall increase of 60.1 million m^3 or 8%, mostly from plantations. As of 2010, provincial data place the total volume of domestic timber at 935.3 million m^3, 74.8 million m^3 of which came from plantations. Compared with 2001–2005, timber volume rose to 123.7 million m^3. Thus, during the period of the project, the volume of timber in Viet Nam increased by 183.8 million m^3, or 24.5%.

At the same time, central government accorded high priority to forest protection and the Prime Minister issued a series of legal measures for this purpose. The number of violations dropped from 62,300 cases in 1998 to 39,400 cases in 2005 and 33,800 cases in 2010. Forest damaged from fire also decreased sharply: 23,652 ha (about 7,884 ha per year, on average) between 1998 and 2000; 21,531 ha (4,306 ha per year, on average) between 2001 and 2005; and 10,163 ha (about 2,033 ha per year, on average) between 2006 and 2010. In 2005, some 18,300 ha were lost, compared with 13,900 ha (about a drop of 24.0%) in 2008 and 7,400 ha (about a drop of 59.6%) in 2010.

2.3 Sustainable forest management

2.3.1 *Certification*

Sustainable forest management requires that people who hold title to forest land have the capacity to use their resources for long term economic, environmental and social benefits. Several sets of international and regional indicators and standards are available to achieve these goals, including certification schemes. The steps which Viet Nam took in this direction culminated in the first FSC certification being granted to 118 households (covering 316.11 ha) in Gio Linh and Vinh Linh districts of Quang Tri Province, initially for 5 years. With support from SECO of Switzerland, through WWF of Viet Nam, they were trained in FSC on tending and harvesting techniques in forest plantations. Despite modest gains, however, issues remain:

- Sustainable forest management principles, guidelines, criteria, and indicators have not been tailored to match the conditions and the needs of farmers and

communities in Viet Nam;

- The mechanisms to pilot implementation of sustainable forest management at the local level are not much different from the forest management plans of agencies which call for stumpage fees and approval of silviculture practices but do not call for reinvestment to promote self-sustaining activities;
- Holders of forest title or interdomestic projects have been certifying sustainable forest management but no comprehensive system is available, either at the domestic or local level;
- Certification is an effective tool to achieve sustainable forest management but local people find conditions difficult meet, especially because forest area is fragmented, implementation is expensive and audit requirements are demanding.

2. 3. 2 *Forest planning and allocation of forest land*

Forest management, forest conversion, allocation of forest land, forest statistics and forest inventories are improving gradually. The allocation and lease of forests and forest land to various economic entities are also better controlled through instructions and guidelines issued by the sector, including to local authorities. In provinces, the conversion of forests for other purposes is carefully considered before such action is taken.

In 2011, the forest sector began to carry out a domestic forest census and inventory to use as the basis for forest management and payment for environmental services. Pilot projects were implemented in the provinces of Bac Kan and Ha Tinh. Improvements were made to the design, and important issues were integrated into the inventory, including aspects related to the sector's development. The timely provision of data on forest resources and forest land served as the basis for the management and operations of VNFOREST and MARD. In addition, VNFOREST allocated 21. 2 billion VND to each agency to implement 15 projects.

2. 3. 3 *Reform of state forest enterprises*

In recent years, state forest enterprises (SFE) were converted into 170 one-member limited liability companies which manage nearly 2. 1 million ha of forests. However, reforms are needed to remove their reliance on subsidies, increase the effectiveness of land use and improve the operations of forest management agencies and forest management boards. Therefore, at VNFOREST's request, MARD established a committee in July 2011 to advise it on forest management policies, forest research and mechanisms to help guide companies and management boards when carrying out their responsibilities on

protection and special use forests, including natural forests which are not harvested and do not generate income. This decision on institutional reform of the sector is considered a breakthrough. The committee is also developing a concept note for restructuring forestry companies under state management, in line with a resolution taken at the 3rd Session of the 11th Central Party Steering Committee.

2. 3. 4 *Community forestry and co-management*

Community forestry is becoming popular in Viet Nam, along with other approaches such as forest management by state and private forest enterprises. In reality, management modalities vary significantly from community to community, depending on each situation. For example, arrangements will differ if a community owns the forest or forest land; if it is allocated to them by local authorities; if state organizations (SFEs, management boards, and project management units) contract protection, rehabilitation and establishment of new plantations to the community; or if households and individuals form groups to co-manage or join efforts to share/exchange labor.

In 2011, the Trust Fund for Forests (TFF) supported the establishment of community forestry in 10 provinces. The forests which were allocated were mostly degraded and part of the land was barren and hilly. However, with the support of technical staff and local rangers, communities assessed the resources, identified the demand for forest products, tried to balance demand with supply and developed their own forest protection and management regulations based on local traditional practices and rules which clearly define benefits-sharing mechanisms and household obligations. Villages established 7 criteria, appropriate to each site, for selecting the trees to be harvested so that forest management is sustainable. One such criterion is tree diameter which is measured at 5-year intervals. Trees exceeding the base standard can be cut and sold, with net profits accruing to the village according to the regulations it establishes. In many instances, the village committee receives 10%, individual households are given a small percentage based on the labor it contributes and the remainder is placed in a community forest development fund. Residents are highly supportive of these benefit-sharing arrangements because they believe them to be equitable. Therefore, REDD+ (Reducing Emissions from Deforestation and Forest Degradation) projects should consider adapting this approach as well.

Other factors which support the need for different management models include the legal status of the community in terms of its rights to participate in forest management and planning, to engage in the trade of forest products and to share the benefits. Because these aspects require further study and

institutionalization, VNFOREST submitted a proposal to TFF to fund a 2nd phase of this pilot project. MARD has appraised this proposal and the TFF Board of Directors has endorsed it in principle. Activities are expected to resume in early 2012.

In February 2012, the Prime Minister issued *Decision No. 126/QD-TTg* on special use forests. The aim is to develop a legal framework for benefit sharing, specify the rights and obligations of management boards and develop a co-management policy for the sustainable management, protection and development of special use forests and buffer zones. Viet Nam Conservation Fund (VCF) is supporting this pilot project.

2. 4 Forest protection, biodiversity conservation and delivery of forest environmental services

In 2011, the party in power, ministries and government agencies at various levels accorded high priority to forest protection. This attention resulted in the issuance of instructions and guidance which achieved significant outcomes and raised society's awareness of the importance of forest protection.

2. 4. 1 *Forest protection*

VNFOREST issued instructions to local agencies to strengthen forest protection and combat the illegal harvesting and transportation of logs, especially in critical areas in the northeast, central coast, central highlands and southeast of Viet Nam. Provinces with large areas of natural forest and commercially valuable species found it particularly difficult to implement safeguards.

Compared to 2010, domestic statistics showed a decrease in the number of violations, with many provinces reporting substantial progress: about 26,789 related to forest management and protection (16% less), about 3,145 related to forest destruction (24. 5% less); 2,445 related to illegal harvesting of forest products (16% less); 13, 541 related to illegal logging and associated trade (21% less); 641 related to the processing of timber and forest products (7% less); and 5,747 of other types of violations (6% less). However, the number of violations related to wildlife species increased to 929 (18% more). A total of 231 forest fires damaged 3, 651 ha, compared with 886 ones which damaged 7, 348 ha in the previous year.

2. 4. 2 *Biodiversity conservation*

Viet Nam is known worldwide for its rich biodiversity due to widely varying

terrain, ecosystems, landscapes and climate. Therefore, the global community is giving high priority to conserve precious ecosystems, species and gene sources. In this regard, the forest sector is producing encouraging results.

In 2011, VNFOREST provided local agencies with guidelines and instructions to implement *Decree No.117/2010/ND-CP*, dated 24 December 2010, on the organization and management of special-use forests. It also submitted a 10-year plan (2010 – 2020) to MARD for the conservation and sustainable development of protected areas. As a result, 164 special-use forests have designated: 30 domestic parks, 69 nature reserves, 45 landscapes, and 20 areas for scientific research and experimentation. In addition, VNFOREST sent patrols into these forests to monitor and report on illegal logging and mining, encroachment and forest conversion.

As signatory to CITES, Viet Nam and its forest sector have been active in international discussions to protect endangered species of wild fauna and flora. They are also collaborating with other governments to strengthen law enforcement associated with their illegal trade. Local authorities have issued instructions on the management of these species; campaigns to raise awareness have been launched; training on CITES implementation has been conducted; and guidance has been provided on how to register for growing flora and raising fauna for commercial purposes.

2. 4. 3 *Forest environmental services*

Payment for forest environmental services (PFES) is becoming an important source of funding for the forest sector. Between 2009 and the first 7 months of 2011, Viet Nam Forest Protection and Development Fund (VNFF) collected 139 billion VND. In addition, it is working out terms of payment for 2 provinces (90. 8 billion VND for Son La and 12. 4 billion VND for Lam Dong). Hoa Binh Hydropower Company still owes 168 billion VND for 2009 and 2010, while payments for 2011 and 2012 are expected to be 550 billion VND and 796 billion VND respectively.

Steering committees have been established in 7 provinces, funds for forest protection and development have been set up in 6 provinces and PFES proposals/plans have been approved in 8 provinces. Circulars to guide the implementation of *Decree No. 99/2010/ND-CP* are under development but the one on payment for forest environmental services (*Circular No. 80/2011/TT-BNNPTNT*) was approved in November 2011.

2. 5 Forest harvesting, utilization, processing and trade

Forest utilization is often in line with regulations on forest management (*Decision No. 86/QD-TTg*) and with administrative procedures/controls which MARD issued in May 2011 for harvesting timber and other forest products, especially in natural forests, based on approved management plans (*Circular No. 35/2011/TT-BNNPTNT*).

2. 5. 1 *Harvesting*

As of 9 December 2011, the domestic volume of timber harvested was 5,512,600 m^3, including 5,162,000 m^3 from plantations and 358,580 m^3 from natural forests (196,580 m^3 harvested and 154,000 m^3 from salvage). The yield of non-timber forest products amounted to 59,332,000 tons of bamboo trees; 51,866,000 tons of pine resin; 8,057 tons of cinnamon; and 19,851 tons of rattan.

2. 5. 2 *Processing, export and import*

Timber production and processing in 2011, especially for export, rose over 2010 levels to an estimated 4.1 billion VND (an increase of 14.7%). However, the value of exported non-timber forest products for the same period decreased to US$ 200 million (21.5% less). China, the European Union, Japan, South Korea and the United States make up 79% of Viet Nam's market, with sales reaching US$3.08 billion. Therefore, the economic crisis in the United States, the public debt crisis in Europe and the devastating earthquake and tsunami in Japan negatively affected trade — situations which forced Vietnamese enterprises to search for new markets, including domestic one. Although export trade increased rapidly over the past 10 years, annual growth has slowed considerably and this trend is expected to continue into 2012. It reached 32% in 2005 but dropped to just 13.7% in 2011. In addition, local problems related to land and funding, higher timber prices, and an unstable labor market continue to pose difficulties.

Imports of timber and non-timber forest products reached about US$1.33 billion in 2011, 16.6% more than in 2010. Viet Nam bought goods from traditional suppliers such as China, Lao PDR, Malaysia and the United States for an estimated US$750 million (56.5% of the total).

2. 6 Research, training and education, and forestry extension

2. 6. 1 *Science and technology*

VNFOREST has focused on researching high yield seedlings, especially indigenous and large timber trees species; developing and improving domestic seed gardens and forests; testing sustainable forest management models; applying advanced methods and technologies to monitor and compile forest resource inventories as well as prevent and fight fire; applying new technologies for timber production and wood processing; investigating ways to combat desertification and land degradation; and exploring the potential of carbon markets.

In 2011, VNFOREST supervised 23 scientific and 3 environmental projects at the ministry level, and 66 projects at the local level (26 led by VNFOREST agencies; 25 by the Forestry Science Institute of Viet Nam; and 15 by Viet Nam Forestry University). The budget for these initiatives amounted to 4.150 billion VND. By the end of the year, all but one project at the ministry level completed their tasks and 66 projects at the local level finalized their assignments as well. To facilitate the management of scientific research activities, VNFOREST issued temporary regulations which decentralized MARD's mandate in this respect and it checked the progress of projects on a regular basis.

2. 6. 2 *Seeds and seedlings*

In 2011, VNFOREST provided local agencies and seed production and business units with guidelines to effectively implement regulations on seed management. In addition, it assessed and proposed that 26 new seeds of 5 tree species be recognized: 4 domestic ones (*Acacia auriculiformis*) and 22 advanced ones (6 *Acacia auriculiformis*. 5 *Eucalyptus Camaldulensis,* 1 *Acacia mangium,* 1 *Castanea mollissima* Blume and 9 *Macadamia*). About 376,394,000 seedlings were produced that year, enough to meet the demands of plantations.

2. 7 International cooperation and emerging issues

2. 7. 1 *International cooperation and economic integration*

In 2011, bilateral and multilateral cooperation in forestry expanded and officials remained active in international and regional forestry organizations and initiatives (REDD+, FLEGT, forests and green growth, among others). A proposal for overseas development assistance (ODA) for the period 2012 – 2015 was

developed as the basis for negotiating new programs and projects for the sector. Because of MARD's effective use of past funding, it was able to mobilize additional support, including for REDD+, climate change and biodiversity conservation. Bilateral cooperation in the region, with Cambodia, China, Lao PDR and South Korea, for example, has been strengthened via exchanging visits and workshops/meetings hosted by Viet Nam. Viet Nam also became the Deputy Chair of ASEAN's Senior Officials of Forestry, a move which strengthened cooperation in forestry in ASEAN and ASEAN Plus Three①.

In addition, domestic action was taken in response to the *Lacey Act of the United States* and the FLEGT program of the European Union, including its voluntary partnership agreement (VPA). With regard to the forest sector, MARD issued the *Circular No. 35/2011/TT-BNNPTNT* (20 May 2011) on harvesting and salvaging timber and non-timber forest products and the *Circular No. 01/2012/TT-BNNPTNT* (4 January 2012) on documenting the contents of shipments of legal forest products and examining the point of origin of forest products.

The International Year of Forests saw Viet Nam implementing many activities to raise public awareness on the role of forests in environmental protection, climate change mitigation, socio-economic development and poverty reduction. It also highlighted the importance of Viet Nam's forests and forest sector within the region and around the world. Several media events were launched as well: the broadcast of a documentary entitled *"Climate Change and Forests"*, contests for best photos and best articles on forests, and the naming of a decade to combat desertification in which many people were involved, especially youth. Two policy dialogues within the 2011–2015 Forest Sector Support Partnership (FSSP) were held, along with meetings of 6 regional forestry networks to inform the global community of developments in Viet Nam's forest sector. A Policy Advisory Board, consisting of 11 top forestry experts, was established to assist VNFOREST address key issues.

The Trust Fund for Forests (TFF) and Viet Nam Conservation Fund (VCF) continued to perform effectively, contributing financial resources and capital to the sector in a difficult year as the 5MHRP came to a close.

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① Members of ASEAN Plus Three are: Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand and Viet Nam. They cooperates in such areas as food and energy security, trade, disaster management, rural development and poverty alleviation, human trafficking, movement of labour, communicable diseases, environment and sustainable development, and transnational crime.

2. 7. 2 *FLEGT-VPA*

Negotiations under the VPA proceeded well, with the establishment of a steering committee for both FLEGT and the *Lacey Act* . Evidence shows that the number of FSSP partners and stakeholders involved (enterprises, plantation households and civil societies) is increasing. Two technical working groups were also set up after domestic consultations took place in Hanoi in August: one to propose a definition of timber legality and one to develop a timber legality assurance system. The first group completed a 4th draft which includes 7 principles that are in line with the timber supply chain. The second group has designed the system's framework and elements.

2. 7. 3 *REDD+*

MARD assigned VNFOREST to be the focal agency for implementing the initiative REDD+. At the international level, Viet Nam attended negotiations on climate change and REDD+ at the 17th Conference of the Parties to the UNFCCC in Durban (South Africa) , organized side events and held bilateral/multilateral meetings with the Norway, the Netherlands, the United States, the World Bank, and the UN-REDD Programme, for example. In addition, two meetings of the domestic REDD network were held in conjunction with working group sessions on specific themes. Both events attracted several of Viet Nam's international partners who have also supported regional workshops/conferences on REDD/ PES and free prior and informed consent.

2. 8 Institution, policy, planning and monitoring

In November 2011, the 2nd Session of the 13th Domestic Assembly passed the *Resolution No. 18 / 2011/QH 13* upon completion of the 5MHRP. As part of implementation, MARD submitted its *Forest Protection and Development Plan* (*2011 – 2020*) to the Prime Minister who approved it in *Decision No. 57 /QD-TTg* on 9 January 2012. VNFOREST provided guidelines for local agencies to follow and reviewed the plans of 14 provinces for forestry development.

VNFOREST's development plan, outlined in a legal document, focuses on the following key policies: forest management and utilization under the 5MHRP; pilot benefit-sharing mechanisms in sustainable management, protection and development of special use forests; forest protection; continued reform of state forestry companies; forestry development of the northwest and central highland regions; investments in infrastructure, vocational training, processing of timber from plantations and consumption of forest goods and services.

On the advice of VNFOREST, MARD requested the Prime Minister to issue *Directive No. 1685/CT-TTg* (27 September 2011) on strengthening forest protection, preventing and fighting illegal logging, and improving law enforcement. In this regard, it organized a conference in the central highland and southeast regions to guide the implementation of associated measures and it enhanced collaboration with the Ministry of Public Security and the Ministry of Defense.

A comprehensive evaluation on the implementation of Viet Nam Forestry Development Strategy (2006–2020) was undertaken and, with assistance from the Forest Sector Support Partnership, a report was drafted, published and shared widely with stakeholders.

2.9 Shortcomings and causes

2.9.1 *Shortcomings*

Despite achievements, the forest sector experienced the following shortcomings and limitations.

- Illegal harvesting, transportation and trade of forest products in critical areas: deforestation and opposition against government officers still occurred, especially in the central provinces and central highlands. Some localities did not disburse funds to carry out the plan but focused on entering into contracts for forest protection, rehabilitation and tending of plantations—a decision which led to delays in implementation.
- Low returns on forest exports: although the processing industry developed quickly and exports rose both in terms of volume and price, the high cost of importing materials reduced profits. In addition, processing was not linked well to other aspects of forestry; the distribution of labor was uneven; a recognized trademark in the world market was absent; capital investment was lacking; and small-/medium-sized enterprises were unprepared to meet international obligations to be imposed in the near future.
- Lack of attention to forest protection and development planning: localities were short in resources to carry out required planning or implementation.
- Weak data and information on forests: inadequate monitoring and data collection prevented an accurate assessment of the extent and quality of forestland and resources for making decisions on the management of the sector.
- Difficult transition for SFEs: state forest enterprises found it difficult to move to one-member limited modalities due to shortage of capital, inability to meet registration requirements, and inability to obtain a stamp to allow operations, for example.

- Other issues: ODA funds for forestry projects were limited and the conversion of forests and forestland to other uses was not strictly controlled.

2. 9. 2 *Causes of the shortcomings*

- Localities were reluctant to shift from the 5MHRP to the *Forest Protection and Development Plan* (*2011 – 2020*), partly because funds and guidance were limited. Implementation, therefore, was slow.
- Coordination of policies and mechanisms across sectors was weak.
- Local authorities in some areas lacked the motivation, staff and equipment to patrol forests, compile inventories, reduce deforestation and prevent/fight forest fire.
- Because the law on forest protection and development was not widely advocated, society's involvement was inadequate.
- To complete assigned tasks in 2011, 1. 897, 9 billion VND was required. However, the sector only received 750 billion VND, of which 500 billion VND was used for forest protection and development and 250 billion VND went to special use forests. This amount covered the cost of tending 154,000 ha of plantations established in 2008, 2009 and 2010. No budget was allocated for planting in protection forests and carrying out other forest activities in 30 districts.

3. Orientation in 2012

3. 1 Context and forecast for 2012

World markets are still recovering, and the sale of some commodities including those based on agriculture, forestry and fisheries is difficult. In addition, strict regulations on proof of origin of forest products make their import from Viet Nam to other economies extremely challenging—conditions which significantly affect the sector's production and trade.

In terms of domestic issues, the budget for forest protection and development is insufficient to meet 2012 targets even though more funds are available than in 2011. Therefore, international cooperation and support are more important than ever. Urbanization and industrialization are reducing land for agriculture and forest expansion—problems which impact on forest management and utilization. Higher than normal temperatures and more flooding due to climate change are also of concern.

Changes in forest policies and regulations require additional human and financial

resources to implement—for example, *Decree No. 99/2010/ND-CP on PFES*, resolution of the Politburo to invest in regional development, as well as *Resolution No.30a/2008/NQ-CP* and *Decision No.147/2007/QD-TTg* to support 62 poor districts. A review of current forest policies is also needed to identify those which should be revised, supplemented or replaced to conform to domestic regulations and international obligations.

The *Forest Protection and Development Plan (2011–2020)*, grounded in *Decisions No. 57/QD-TTg* and *No. 58/QD-TTg*, provide a solid basis for developing annual plans.

3.2 Targets for 2012

To achieve 40.8% forest cover by end of 2012 and achieve other goals, *Dispatch No.1724/TTg-KTLN* (27 September 2011) contains the following targets.

3.2.1 *Protection*

- Issue contracts to protect 2,000,000 ha of forests, including special use forests, 1,200,000 ha of which are assigned to 62 poor districts titled 30a.
- Rehabilitate 750,000 ha: 400,000 ha new and 350,000 ha transitional.
- Establish 30,000 ha of protection/special use forest.

3.2.2 *Production*

- Establish 250,000 ha of plantations, including 100,000 ha of production forest.
- Re-plant 120,000 ha of production forest and rehabilitate 30,000 ha more.
- Plant 50 million trees, dispersed.

3.2.3 *Utilization*

- Harvest 200,000 m^3 of timber and salvage 100,000 m^3 from natural forest.
- Harvest 6,000,000 m^3 of timber from plantations, 55,000 bamboo trees, 30,000 tons of rattan, 45,000 tons of pine resin, 20,000 tons of cinnamon.
- Increase exports of forest products by 12% for a value of US$ 4.6 billion (US$ 4.37 billion in timber and US$ 224 million in non-timber forest products).

3. 2. 4 *General*

- Reduce violations against forest protection and development regulations
- Reduce the rate of deforestation and forest loss due to fire.

3. 3 Solutions

To meet 2012 targets, the forest sector should:

- Improve advocacy and awareness of the importance of forest protection;
- Strengthen local capacity, particularly at the commune level, and the capacity of forest rangers to protect forests;
- Revise and develop policies on the management/use of natural forests and protection forests; on the allocation and leasing of forests and forest land; and on the reform of forest enterprises;
- Assess proposals to convert natural forest and forest land to other purposes;
- Strictly manage the planning of 3 forest categories;
- Reclaim areas which have been encroached for the establishment of plantations;
- Study and apply modern technologies for seedling production, intensive plantation and silviculture techniques to improve productivity and forest quality;
- Enhance state administration of forestry at all levels, from central level to local level;
- Consolidate the system of forest rangers at the local level;
- Continue to reform VNFOREST so that it can effectively discharge its role to guide and control forest operations in a timely manner;
- Help enterprises to resolve their difficulties, especially in terms of capital;
- Create favorable conditions for households and enterprises to access credit, with preferential treatment, to invest in plantations;
- Assist localities which receive income from payments for forest environmental services to establish a provincial VNFF by early 2012;
- Help these localities to meet the conditions for PFES according to *Decree No. 99/2010/ND-CP* and *Decision No. 2284/*QD-TTg.