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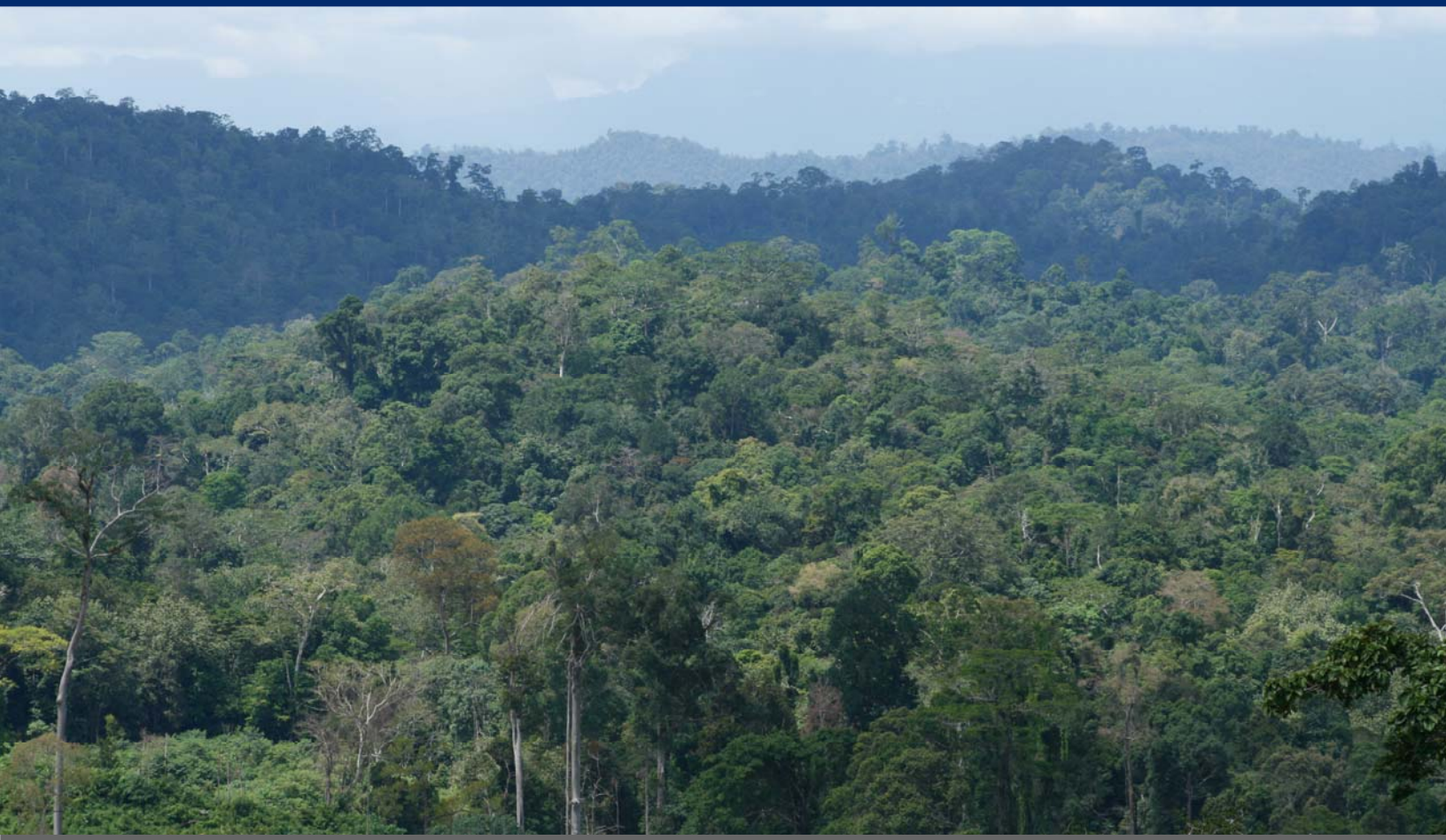
COMMUNITY-BASED FOREST MANAGEMENT IN KALIMANTAN, INDONESIA: A STOCKTAKING OF LESSONS LEARNED



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COMMUNITY-BASED FOREST MANAGEMENT IN KALIMANTAN, INDONESIA: A STOCKTAKING OF LESSONS LEARNED

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CONTENTS

TABLES & FIGURES

TABLE

FIGURE

CHAPTER 1: INTRODUCTION

Capitalizing Knowledge Connecting Communities (CK2C) strives to build knowledge of successful natural resource management (NRM) initiatives by capturing lessons learned at the community level. The project identifies successful activities and analyzes the reasons underpinning these successes through a process termed stocktaking. Stocktaking was developed to complement conventional program evaluations by purposefully focusing on experiential knowledge. Stocktaking starts with impacts and then works backwards to a) identify the barriers that were overcome to achieve those impacts, and b) identify the specific actions taken to break down the barriers.

Impacts can be measured in economic terms (revenues, yields, diversification of revenue sources, and so on), biophysical terms (degradation rates), or governance (rights and access to resources, decision making authority, and so on). Barriers could be inappropriate policies, ineffective institutions, weak producer organizations, or poor knowledge of options. Once these barriers have been overcome and sustainable NRM is underway, the wealth of information that has been gained by these communities can be captured and shared with a broad range of stakeholders in order to overcome obstacles, build on successes, and strengthen groups that would derive tangible benefits from practicing sustainable resource management. Stocktaking does this by using teams to gather and share this information with a broader audience through forums in the country where stocktaking has taken place and posting information about best practices on Frameweb.com, the U.S. Agency for International Development (USAID)-funded website for sharing knowledge about NRM with a global audience. While the stocktaking is managed by a CK2C team, the entire process is largely driven by local experts and practitioners of NRM who become champions and advocates for policy change that benefits other communities engaged in NRM.

This study, or stocktaking, was conducted at three sites in West Kalimantan, Indonesia. Kalimantan is one of several Indonesian provinces where many communities rely on forest resources in addition to agriculture for their subsistence. West Kalimantan was selected for this stocktaking activity because a variety of sites are known to exemplify extremely successful NRM practices.

1.1 OBJECTIVES

The goal of this stocktaking was to identify enabling conditions that engendered successful forest management in different locations in order to inform a process that would establish a set of principles for sound forest management. The stocktaking reviewed earlier work and examined three sites where different ecological, economic, and socio-cultural conditions prevail and distinct systems of forest governance are in place. The intention was to isolate the factors that have led to success across a broad array of ecological and socio-cultural conditions. This process and the discussions following the study also provided visibility that has attracted the attention of government, donors, and other parties that are in a position to influence forest management practices in Indonesia.

1.2 SITE SELECTION

The stocktaking activity started with site selection. The CK2C stocktaking identified three sites out of roughly 10 candidate sites within Kalimantan that reflected successful, sustainable community-based forest management (CBFM), defined as the use of forest that meets or exceeds conservation objectives

while maintaining livelihoods, or sustainable human-nature interaction. The team conducted the site selection through literature reviews and extensive discussions with various stakeholders, and concluded in selecting three locations in West Kalimantan that reflect successful practices of sustainable CBFM. The limited number of sites that were studied in this stocktaking exercise and the small geographical scope of the study should not constrain the utility of the findings. The subject matter for the study and the selection of the sites were made purposefully with the goal of avoiding myopic conclusions. The situation in Kalimantan with regard to approaches to sustainable forest management is diverse in the extreme. That is why Kalimantan was selected as the focal area. What we hope to demonstrate here is that there are common threads in the way people have addressed local challenges – these commonalities cut across different ecological, cultural, social and economic landscapes.

Site selection criteria included community-driven conservation practices, long-term outlook on future conservation practices, and governance of NRM in some form, whether it be through customary law or regulations imposed by user groups. Other criteria included varying levels of dependence on the forest, such as extraction of both timber and non-timber forest products (NTFP) for the communities economic base, or protection of raw water sources.

During the various stakeholder discussions, Sungai Utik and communities living within the boundaries of Danau Sentarum came up repetitively as sites for best practices in community forest management. Literature reviews emphasized this as well.[1] Due to the difficulty of travel in Kalimantan sites were selected in one province. West Kalimantan contains a good representation of CBFM: the three sites selected are distinct in livelihoods and economic base (from subsistence to economy) but each met the selection criteria for the study.

The team made field to the three sites and used rapid appraisal techniques to gather detailed information on CBFM. One important determination was the ecological and societal system boundaries, which would help the team understand the dynamics of CBFM. The team used the Berkes and Folke Complex Ecological Approach to analyze the data collected for this study [2]. This approach is based on ecosystems having complex adaptive systems; their governance requires flexibility and a capacity to respond to environmental feedback.[3] Knowledge of resource and ecosystem dynamics in addition to associated management practices exists among communities who, on a daily basis and over long periods of time, interact for their benefit and livelihood with ecosystems.[4]

1.3 METHODOLOGY

This stocktaking activity was undertaken by a team of experts that included a biodiversity specialist, a socio-cultural anthropologist, a natural resource economist, a climate change specialist, and a spatial

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[1] Please see Annex I: Literature Review and Justification as well as: Durst, P. et. al In Search of Excellence: Exemplary Forest Management in Asia and the Pacific. 2005 FAO UN Regional office for Asia and the Pacific. Asia-Pacific Forestry Commission. Bangkok.

[2] Berkes, F., and C. Folke, eds. 1998. Complex Ecological Approach. Linking Social and Ecological Systems: Management Practices and Social Mechanisms for Building Resilience. Cambridge University Press, New York.

[3] Levin, S. A. 1998. Ecosystems and the biosphere as complex adaptive systems. Ecosystems 1:431–436. Berkes, F., and C. Folke. 2002. Back to the future: ecosystem dynamics and local knowledge. Pages 121–146 in L. H. Gunderson and C. S. Holling, editors. Panarchy: understanding transformations in human and natural systems. Island Press, Washington, D.C., USA. Dietz, T., E. Ostrom, and P. C. Stern. 2003. The struggle to govern the commons. Science 302:1907–1912.

[4] Fabricius and Koch 2004 Rights Resources, and Rural Development: Community-based Natural Resource Use in Southern Africa. Earthscan US and UK

planner. This team engaged a broad range of stakeholders in discussions aimed at identifying the factors that led to their successful forest management activities. This CK2C stocktaking employed several approaches that were used to select the sites, gather information, and analyze data to identify the enabling factors for best practices of community-based natural resources management.

Through this process, two sites assessed for Kalimantan were selected: Sungai Utik, and Semangit in Danau Sentarum National Park. Upon arrival in West Kalimantan and discussion with experts, an additional site was selected, Semaung-Sepapan in Sanggau District.

METHODS APPLIED FOR GATHERING THE INFORMATION AND DATA

The team used a number of methods to gather data on the sites:

- An extensive literature review to identify sites for the best practices in sustainable CBFM in Kalimantan.
- Discussions with various stakeholders from government agencies, research institutions (such as the Center for International Forestry Research [CIFOR] and the World Agroforestry Centre [ICRAF]), nongovernmental organizations (NGOs), and universities to gain further insight on best practices in CBFM in Kalimantan and elsewhere in Indonesia.
- Site visits intended to validate the existing data and information as well as document and research the enabling factors that catalyzed successful management practices.
- Rural appraisal to collect data at each study site. Each consultant specialized in data collection for his or her own area of expertise. After gaining an overview of the study site, additional techniques were applied to validate results and complete the appraisal. Semi-structured interviews resulted in a more in-depth analysis of practices at the study sites. Group discussions were used to gather information on group consensus activities such as laws governing natural resource extraction instituted in customary laws. Participatory mapping was used to capture the community's knowledge of natural assets and land use and seasonal calendar[5] was applied to understand NRM activities on an annual basis, critical to understanding livelihood activities.
- Rapid biodiversity assessments to identity important forest species, patterns of natural resource use, and the overall health of the ecosystems.
- Global positioning system (GPS) data to map and understand the logic of the community spatial arrangements. The location of the study sites and biodiversity plots were determined and these data were then combined with imagery from Google Earth to help analyze the community forests and land use planning practices in the context of the surrounding landscape.
- While it may have been useful to study more sites that just the three that were selected, it was decided that in-depth analysis of three cases rather than more cursory studies at more sites would produce a level of detailed that would enrich the discussions. Moreover, if additional resources become available, we now have a model that can be used to focus future initiatives.

[5] Seasonal calendars identify patterns of natural resource use throughout the year and the effects of local weather on planting and harvesting.

METHODS APPLIED TO DATA ANALYSIS

Once data were gathered, the team used the following data analysis methods:

- Qualitative methods to analyze socio-cultural aspects of the sites including customary laws governing the forest management system and the daily lives of the communities in each of the study sites.
- Economic analysis to evaluate economic activities based on natural resource utilization of communities in the study areas.
- A strengths, weaknesses, opportunities, and threats (SWOT) analysis to identify factors that contribute to sustainable CBFM practices.
- Spatial analysis to determine specific community-based NRM practices in different ecological settings. Community spatial planning and commodity market chains were examined for each study site. It is critical to understand the importance of spatial dynamics and the economic interactions that support livelihoods at each of the study sites.
- Rapid historical analysis to assist in identifying the dynamics of community-based NRM. Understanding the shifts and transformations that have taken place in the past (and that continue) are valuable in elucidating the underlying factors, the indirect influences, and the barriers that shape community-based NRM in different locations.
- The socio-ecological system approach to understand the linkages between social subsystems (socio-cultural and economic factors) and ecological subsystems (natural resources) that contribute to the sustainability of forest management. It is imperative to understand the resiliency of the system and subsystems in order to sustain the functions of the system as a whole and thereby model the human-nature relationship and help inform desirable future outcomes.

CHAPTER 2: DESCRIPTION OF THE STUDY SITES

This chapter begins with an overview of spatial planning practices in Indonesia that, until recently, were primarily dictated by the central governmental authorities in Jakarta. Systems are now slowly being put in to place to incorporate provincial and local land use needs. Following this overview, the chapter includes details of the study sites selected for the CK2C stocktaking activity. There are descriptions of communities, their livelihoods, and approaches to natural resource governance. The team conducted a SWOT analysis to identify the strengths and weaknesses in the social, economic, and environmental or ecological aspects of forest management. The results, included here, illustrate the benefits and challenges that the communities develop internally, and the opportunities as well as threats exerted by external factors that influence management of forest resources. The strengths and opportunities are the underlying factors that determine the communities' ability succeed in overcoming internal weaknesses and external threats.

SPATIAL CONTEXT OF THE STUDY SITES

SPATIAL PLANNING PRACTICES IN INDONESIA

The Government of Indonesia manages its territorial resources using different types of legal mechanisms. The highest level is law No.26/2007 which manages space—air, land, and water—in order to achieve public welfare and social equality as mandated by the constitution. It is the legal basis for all activities and spatial planning at different jurisdictional levels.

According to this law, there are two types of land area distinguished by their function, *kawasan lindung* (protected areas) and *kawasan budidaya* (utilization zones for agriculture or other production areas). The main purpose of *kawasan lindung* is to ensure the sustainability of the environment, including natural resources and manmade resources, while *kawasan budidaya* has the main purpose of enabling utilization based on the availability and potential of natural resources, human resources, and manmade resources. *Kawasan lindung* includes national parks, natural parks, ecotourism parks, protected forest, protected peat forest, protected mangrove forest, and marine reserves. *Kawasan budidaya* includes limited production forest, production forest, forest that is eligible for conversion to other uses, and non-forest areas.

This law also states that spatial planning is classified and defined by the following:

- The type of land system, that is, a regional or internal-city system;
- The main function of the area, that is, *kawasan lindung* or *kawasan budidaya*;
- Administrative region, that is, national-level, provincial-level, or city and district (regency) level spatial planning units;
- Land use in the area, which includes different classifications of urban use and rural use; and
- The strategic value of the area (articles 4 and 5).

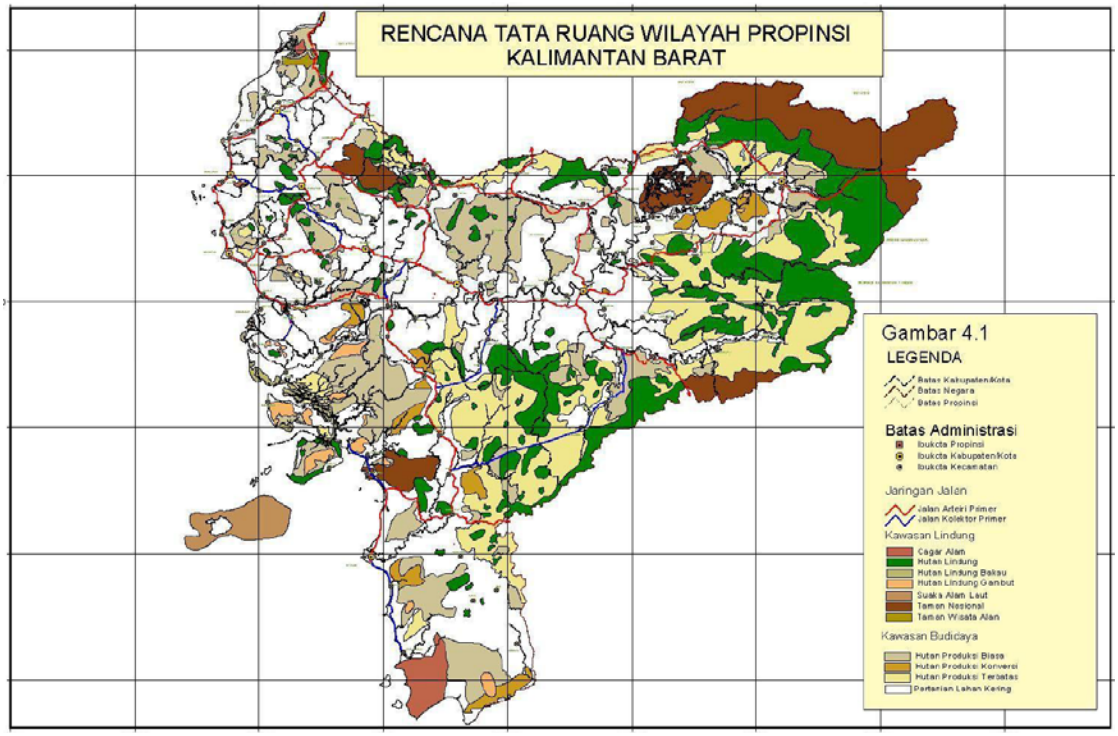
The law describes the authority of the local government at the provincial level (article 10), which is to 1) regulate, develop, and supervise spatial planning activities at the provincial level as well as at the city/district (regency) level; 2) implement spatial planning at the provincial level; 3) implement spatial planning for strategic areas at the provincial level; and 4) provide cooperation on inter-provincial spatial planning and facilitate cooperation inter-city/district (regency) spatial planning. In this regard, the law states that the provincial government holds the responsibility for disseminating information regarding the general and detailed spatial plan, and disseminating instructions regarding zoning regulations based of land use planning at the provincial level. Elsewhere, the law has similar regulations that deal with the city/district (regency) level.

Law No. 26/2007 explicitly states that at least 30 percent of the watersheds must be conserved as forest. This law also ensures the rights of citizens to access spatial planning documents to ensure the right of citizens to be involved in the spatial planning process, which is theoretically achieved through participation of citizens, participation in using the space, and control of the use of space. All spatial planning and spatial arrangements in Indonesia are based on this system.

SPATIAL PLAN OF WEST KALIMANTAN PROVINCE

The Spatial Plan of West Kalimantan Province (Rencana Tata Ruang Wilayah Propinsi – RTRWP) is legalized as Provincial Regulation No. 5/2004 and considered the legal document related to the spatial planning process in West Kalimantan Province. As defined by law No. 26/2007 regarding spatial planning, there are two types of land use areas in West Kalimantan: protected areas and utilization areas. These areas are interspersed throughout West Kalimantan (see Figure 1).

FIGURE 1: SPATIAL PLAN OF WEST KALIMANTAN PROVINCE



Source: RTRWP – Kalimantan Barat 2004

The total coverage of protected areas in West Kalimantan province is 3,963,698 ha, which accounts for 27 percent of the entire area of West Kalimantan. The distribution is shown below in Table 1.

TABLE 1: PROTECTED AREAS (IN HECTARES) IN WEST KALIMANTAN PROVINCE

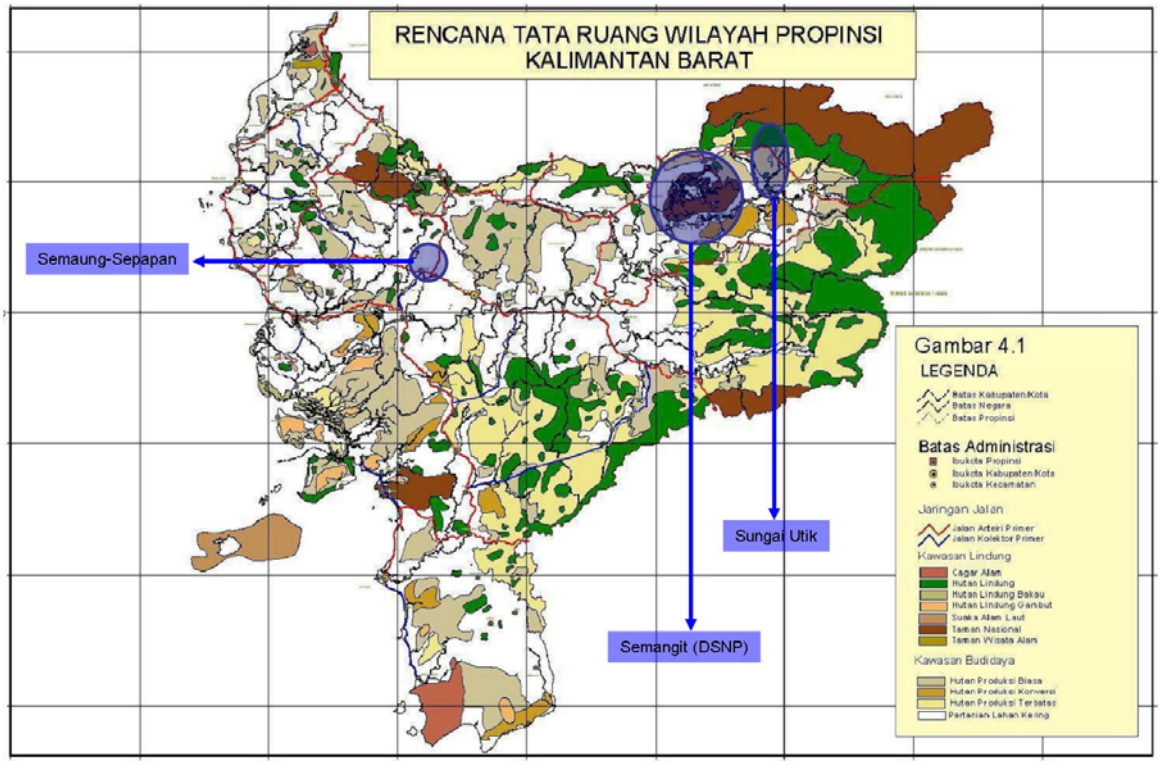
Type of Use	District Sanggau	District Kapuas Hulu	Total in West Kalimantan	Proportion protected (%)
National Park	811	890,489	1,206,176	8.22
Natural Park			160,787	1.1
Ecotourism Park			23,818	0.16
Protected Forest	94,298	806,539	2,163,853	14.74
Protected Peat Forest		4,580	140,745	0.96
Protected Mangrove Forest			76,192	0.52
Marine Natural Reserve			192,127	1.31
Total	95,109	1,701,608	3,963,698	27.00
Proportion (%)	7.4	57.02		

Source: RTRWP Kalimantan Barat 2004

STUDY SITES WITHIN INDONESIAN SPATIAL PLAN

The sites for this stocktaking are Semaung-Sepapan Forest, Semangit Village, and Sungai Utik Village (see Figure 2). In Semaung-Sepapan, the Dayak Hibun protect 3,000 hectares of forest (0.138 percent of the total protected areas in West Kalimantan Province). In Semangit, Malay communities live within the boundaries of Danau Sentarum National Park (DSNP), which consists of 132,000 ha of protected forest from which they make their livelihoods. In the village of Sungai Utik, the Dayak Iban protect and manage 9,452 hectares of forest to fulfill subsistence needs. Interestingly, two locations (Semangit and Sungai Utik) are recognized by the national and provincial spatial plans. Semangit is recognized as a protected area through the establishment of DSNP. In Sungai Utik, the upstream area is recognized as a protection forest in the national land use plan, and downstream is zoned as limited production forest and dry-land agriculture. While the Semaung-Sepapan Forest, it has maintained a legal status as a protected forest since 2003, it remains unrecognized in the official spatial plan of West Kalimantan.

FIGURE 2: STUDY SITES SEMAUNG-SEPAPAN, SEMANGIT, AND SUNGAI UTIK



Modified from West-Kalimantan Province Spatial Plan 2004

STUDY SITE: SEMAUNG-SEPAPAN

Hamlet: Sanjan Emberas
Village: Pandan Sembuat
Subdistrict: Tayan Hulu
District: Sanggau
Province: West Kalimantan

LOCATION

The Semaung-Sepapan protected forest is located within the hamlet of Sanjan Emberas in West Kalimantan Province, roughly 250 km east of the provincial capital. Surrounding this protected area are eight additional hamlets (*dusun*). The protected forest and community managing it are located along the main route connecting West Kalimantan to the Malaysian State of Sarawak. The Dayak Hibun in this area have relatively high incomes generated by oil palm plantations relative to the two other study sites. Oil palm was introduced to this immediate area in 1986. The Semaung-Sepapan protected forest is surrounded by three large oil palm plantations: PTPN XIII, PT MAS, and Salim Group.

COMMUNITIES

Based on data collected in 2007 there were 27,942 inhabitants of Tayan Hulu Subdistrict, while in Pandan Sembuat village there were 3,405 residents, and in Kedakas village there were 1,658 residents. Most of

inhabitants in these two villages are of the Dayak Hibun ethnic group. Within this community there is an elementary and junior high school in addition to a local clinic and a catholic church.

Dayak Hibun in Sanjan Emberas reside in individual houses, not in a traditional communal long house, which is common among many Dayak groups. Their houses are built on both sides of a paved road that leads to the border with Sarawak, Malaysia. Many houses are on stilts and made predominantly of wood. Owing to their location along one of the major routes to Malaysia, there is easy access to markets and considerable outside interaction. In addition, there are many modern amenities in these communities including electricity, cell phone service, and access to credit, which is used to buy motorcycles and other amenities.

Traditionally, Dayak Hibun's religious belief system is "animist," with a belief that spirits reside in all natural objects such as trees, mountains, stones, rivers, and so on. It is also believed that ancestral spirits continue to reside in the world. Some of these spirits function as protectors of the Dayak Hibun and they could be angered if they are not given proper respect and care. Formally, most of the Dayak Hibun inhabitants are Catholic—however, this does not interfere with their ancestral worship and animist beliefs. The community also practices a traditional governance system known as *Adat*, or customary law. The system is hierarchical with *Adat* heads at the village, hamlet, and neighborhood levels. *Adat* plays an important role among the Dayak Hibun, and punishment for "formal" transgressions of the "law" must be coordinated with *Adat* leaders. The customary system is not in conflict with the formal religion. On the contrary, *Adat* is supported by the formal religion.

MAIN ACTIVITIES: SOCIO-ECONOMIC, LIVELIHOODS

The cash economy comes mainly from two main sources: palm oil and small-scale rubber cultivation. In this study site, there are 5,900 hectares in palm oil production and only 921 hectares in rubber. Oil palm cultivation was initially introduced by large private and state-owned plantations. The cooperation between the palm oil enterprises and the communities is arranged under the scheme known as "Inti-Plasma." Under this scheme, the communities (as the land owners) cultivate oil palm; their capital resources are provided by the palm oil enterprise. In return, the communities sell the products to the companies. Shifting or swidden agriculture provides staple goods for household consumption. Rice and vegetables are grown on the swidden plots. Rice and other goods are available for sale in the local market.

NATURAL RESOURCE GOVERNANCE

The Semaung-Sepapan forest has been protected by the Dayak Hibun because they believe that ancestors and spirits reside in the forest. In the 1950s, *Adat* rituals were performed to protect this forest with the objective of maintaining it for future generations owing to its spiritual importance. Because much of the ancestral land has been converted to oil palm plantations, many of the spirits in the original forest area have been "relocated" to the remaining protected portions of the forest. These beliefs mean that the people are inclined to protect the land to ensure a resting place for ancestral spirits—in addition to protecting the watershed and current and future access to natural resources. This combination of cultural values, provisioning services (access natural resources) and regulating services (watershed functions) are common reasons for managing forests in Kalimantan and elsewhere in south-east Asia.

The community that manages the protected forest of Semaung-Sepapan is governed in part by a "formal" governmental administrative system. The village next to Semaung-Sepapan includes eight hamlets that are further divided into the lowest level of formal government organization, the neighborhood group. In

2000, the local Dayak Hibun formed a new *Adat* organization, the Dayak Hibun Adat Council. Established to strengthen the community's protection of the forest, Semaung-Sepapan became an *Adat* forest. The *Adat* council regulates forest usage by delineating it into three zones for different levels of use. In the outermost zone, hunting, fishing, limited tree felling, and small-scale slash-and-burn agriculture are permitted. Land use in the middle zone is more restricted; for instance, taking wood for home construction is permitted but must be reported to the *Adat* head. In the core zone, both hunting and the extraction of timber are completely prohibited.

Adat prohibitions on forest use include timber extraction and river pollution, for example, it is prohibited to dispose of animal carcasses or trash in the river, as is using toxic substances to catch fish. Far from static, customary law among the Dayak Hibun has evolved to address new needs and priorities. Sanctions for breaking *Adat* rules have also evolved, with dramatically increased *tail* (fines) for using toxic substances in the river. Previously, offenders had to pay 8 *tail* for each offense; now they must pay 1 tail for every household in their subdistrict, resulting in a much larger penalty. *Tail* are imposed and managed by the adat councils members. Consequences for breaking forest *Adat* go beyond *tail* however. In one case, a father and son who illegally harvested trees from the forest not only had to pay *tail* but also faced social ostracism and the father was removed from his position as hamlet head. The customary law is adaptive and evolves when necessary to the needs of the local population, as such maintaining good governance structures with changing environments.

Coordination with the formal legal system strengthens the ability of the community to protect the forest. The *Adat* Council has asked the police and the local regent to take action to combat illegal logging.

The strong desire of the Dayak Hibun to protect the forest is motivated by several anthropocentric factors. First, reliance on the forest's resources—wood, clean water, and protein from game—for meeting basic needs requires they remain intact over time. Additionally, the Dayak Hibun believe that spirits, including those of their ancestors, live in the forest, and protecting the forest placates and honors them. Angering the spirits would bring misfortune upon the community, a belief reinforced by the death of two people after they cut down trees in the forest. Lastly, the wish to bequeath the forest and its resources to future generations also motivates its conservation.

The SWOT analysis in Table 2 summarizes the foregoing information and indicates that socio-cultural factors are one of the main reasons for protecting the forest, in addition to it being a water catchment area. Identified weaknesses include a lack of a regulatory monitoring system and no efforts to enhance the ecological health of the forest stand.

TABLE 2: SWOT ANALYSIS FOR SEMUANG-SIPAPAN

SEMAUNG-SEPAPAN CUSTOMARY PROTECTED FOREST (Dayak Hibun communities; Tayan Hulu subdistrict, Kapuas Hulu district)				
SWOT: To maintain ecosystem of customary protected forest in Semaung-Sepapan				
	Strengths	**Weaknesses**	**Opportunities**	**Threats**
Social	• Spiritual beliefs • Strong internal leadership initiatives • Long-term environmental vision for future	• Weak forest monitoring system	• Participation of local people in higher-level politics	• Weakening of local socio-cultural values

SEMAUNG-SEPAPAN CUSTOMARY PROTECTED FOREST (Dayak Hibun communities; Tayan Hulu subdistrict, Kapuas Hulu district)				
SWOT: To maintain ecosystem of customary protected forest in Semaung-Sepapan				
	Strengths	**Weaknesses**	**Opportunities**	**Threats**
	generations • Existence of strong customary *adat* law • Adaptive and participative customary law • Strong coordination among *Adat* leaders in area • Legal recognition of protection forest.			
Economic	• Existence of production zone	• No economic benefit from NTFP	• Access to credit • Available alternative income • Incentives providing water resource • Good accessibility	• Drop of palm oil price • Climate change impact
Natural Resource	• Legal status as protected forest • Water catchment area	• Previously logged forest, over exploited • Low carrying capacity of production zone	• Enrichment planting	• Minor illegal logging • Land conversion

STUDY SITE: SEMANGIT

Village: Leboyan
Subdistrict: Selimbau
District: Kapuas Hulu
Province: West Kalimantan

LOCATION

Semangit is a hamlet located within Danau Sentarum National Park (DSNP). This study site includes riparian and forest ecosystems that provide livelihoods to the local population derived from natural resources. Semangit houses the main office for the Danau Sentarum association of forest honey farmers, Asosiasi Periau Danau Sentarum (APDS).

DSNP is located roughly 700 km inland from the West Kalimantan provincial capital Pontianak, in Kapuas Hulu district. DSNP was established as a national park in 1999 and comprises 132,000 hectares,

which include dry lowland, swamp, peat swamp, lakes, and river ecosystems. It is the largest flooded tropical forest ecosystem in Southeast Asia. In addition, this area is known as the largest supplier of freshwater fish in West Kalimantan. Fishing is one of the main economic activities for communities. The environmental conditions of DSNP are affected by the variability of the weather. During the wet, or high-tide season, the lakes inside DSNP are flooded with water from the Kapuas River. Most of the area is flooded to a depth of 6 to 14 feet. During the dry season, several smaller permanent lakes serve as the fishing grounds for the community. Despite the lack of formal decision making regarding land-use zoning, the DSNP's official management is based on two zones: protected areas (core zone) and buffer areas. DSNP comprises 7 subdistricts and 55 villages.

COMMUNITIES

Before the area became a national park, Dayak and Melayu communities had resided in the region and used the area's natural resources such as timber, fish, and forest honey. In Semangit hamlet, 83 households include 320 Melayu people living in stilt houses along the Leboyan riverside. The district population is 13,530 with a population density of 14 people/km^2. There is one elementary school in Semangit; the junior high and health clinic are located in Leboyan 30 minutes from the village. In addition, there is a mosque within the immediate community.

MAIN ACTIVITIES: SOCIO-ECONOMICS, LIVELIHOODS

In Semangit there are two main income-generating activities for the local communities: forest honey harvesting (during the wet season, from October to January) and freshwater fishing (during the dry season, from May to August). Outside of Semangit, which is in the core zone of DSNP and often experiences floods that limit the availability of arable land, other area hamlets in the buffer zone area of DSNP of the park have more available agricultural land. Consequently, these hamlets have more opportunities to derive additional income from farming. For example, Communities in Semalah village generate income from freshwater fisheries, dry land agriculture, rubber production, forest honey harvesting, and maintaining small numbers of cattle.

Forest Honey Harvesting

Twenty-two villages within DSNP harvest forest honey from the species *Apis dorsata*, the Giant Honeybee. These villages produce between 20 and 25 tons of honey annually using sustainable harvesting techniques introduced by the NGO Riak Bumi in 2006.[6] Every year, the community harvests honey during the rainy season when the bees build their hives and produce honey. Income derived from honey relates directly to the health of the forest because the bees rely on native flowering plants. This encourages the community to protect the forest.

Honey harvesters have formed their own cooperatives called *periau*. There are 33 *periaus* in the area of DSNP, eight of which are members of the harvester association APDS. APDS was formed in 2006 and to date consists of eight *periaus* that practice sustainable honey harvesting. The Semangit community formed the initial *periau* in APDS. Roughly 25 percent of the total area of DSNP (28,000 hectares) is within the resource area managed by APDS. The Semangit periau manages and harvests an area that is

[6] Yayasan Riak Bumi, 2006.Information from printed brochure.

equal to the size of their hamlet. At present, Semangit is where APDS has its main office and is where all the forest honey is processed, stored, and packaged.

NRM Governance for Honey Harvesters

Honey harvesting governance systems operate through consensus and reflect location arrangements agreed upon by all hamlets in the surrounding area. APDS applies regulations using a standardized method that ensures the quality of the forest honey and develops market networks. The communities construct artificial hives out of wood, called *tikung*[7], in which bees nest and produce honey. The honey produced in a *tikung* is the property of the person who built and placed it in the forest.

APDS secured organic certification for its members' honey, which increased the product's local prestige and reinforced local determination to care for and maintain their natural resources. It also highlighted the interdependence of livelihood strategies. For example, using poison to fish could result in honey contamination, which would endanger its status as an organic product. There has been a ban placed on forest burning and combating illegal logging, two more threats to bee habitats, which are also critical to sustaining livelihoods.

APDS members use sustainable harvestings techniques. These methods allow two to three harvests annually. Only the portion of the hive that contains honey is removed, as opposed to the removal of the entire hive that houses the larvae. In 2007, APDS was able to certify its honey as an organic product through the Board of Indonesian Organic Certification (BIOCert). This certification allows the producers to sell their certified honey for nearly twice the amount they can sell non-certified honey.

Unlike Semaung-Sepapan, *Adat* customary law does not play a visible role in NRM in Semangit. However, the two areas share a motivation for managing the natural resources sustainably in order to maintain the stream of economic benefits they provide.

Freshwater Fisheries

The Malay people who live in Semangit practice fishing techniques using various types of fishing gear, including nets (*jaring*, *waring*), hooks, and rattan fish traps (*bubu rotan*), as well as aquaculture using floating fish ponds placed along the sides of the river and near homes. According to DSNP officials, 265 species of fish are caught for consumption or for the ornamental trade. Among them are Biawan, Toman, Belida, Lais, Jelawat, and Patin for food and Ulanguli (*Botia macracantho*) and Siluk Merah Super (*Scleropages formosus*), which are known locally as *Arwana*, as ornamental fish that command high prices. The dominant species in the area is Biawan. Fishers acquire much of their knowledge of fish behavior based on this species. The fishing area for Semangit fishermen is called *wilayah kerja*, which is an area as large as their hamlet. The size of a fishing area is agreed upon by consensus with all neighboring hamlets. The main time of year for fishing is the dry season from May to August when fish are trapped in the smaller lakes (*kerinan*), which allows for manageable fishing.

NRM Governance for Fisheries

Similar to forest honey farmers, the fishers in Semangit have set up an association of which all 83 households are members. The association establishes regulations to determine fishing grounds, allowable types of gear, the allowable size of the catch, and profit management. The regulations are adaptive and are

[7] Each *tikung,* made out of wood,is about 2 m long and 20 cm wide at one end and 15 cm at the other. These are placed in low trees and slathered with honey to attract bees that then form rafters (hives).

followed by the association members. General meetings are conducted once a year. The information and results of any modifications to fishing practices are shared and sent to other hamlets throughout the area. The hamlets are expected to respect these regulations. This community-based governance plays an important role in maintaining the sustainability of the fishery.

Management of fisheries resources is based around the two main seasons: wet and dry. During the wet, or high-water, season, essentially everyone is allowed to fish in the Setarum Lake area. In the dry season, when most of Sentarum Lake has dried up, fishers are permitted to fish only in remaining *kerinan* within their hamlet's own territory. Five main *kerinan* are used in this community and these are collectively owned by the fishers. In four of the *kerinan*, the fish caught become the property of the individual fishers. Strict rules, established by the fishers themselves, govern fishing in the *kerinan*. Specific times are allotted for fishing and someone is considered a thief if they catch fish outside these hours. To avoid crowding, the fishers are divided into groups, each of which is randomly assigned a fishing location.

In the fifth *kerinan*, Senampun, all of the fish caught are owned collectively among the fishers. The money earned goes to the Fishermen's Group and is used for common objectives, such as managing territorial boundaries. In 2008, more than Rp. 9 million (about $1,000) was earned from fishing in Senampun Kerinan.

Additional rules, established by the fishers in each hamlet, serve to keep fishing sustainable. Certain types of nets are prohibited, while the use of others is permitted only when the water levels are high. Keeping undersized, immature fish is not allowed. Moreover, the use of poison or electricity to catch fish is banned. The Semangit fishers hold discussions to review the regulations every one or two years and convey their decisions to fishers in other hamlets in writing. The Semangit fishers also practice aquaculture, using floating fish enclosures called *karamba*.

The SWOT analysis in Table 3 indicates that many of the site's strengths are based on the fact that this close-knit community has strong commitment to adhering to their NRM management practices. There is a strong economic incentive for conserving the ecosystem and protecting the resources since many households rely upon them.

TABLE 3: SWOT ANALYSIS FOR SEMANGIT

SEMANGIT COMMUNITY EXTRACTING AREA ECOSYSTEM in DANAU SENTARUM NATIONAL PARK (DSNP) (Malay communities; Selimbau subdistrict, Kapuas Hulu district)				
SWOT: To maintain ecosystem in Semangit *community* working area within the association of honey farmers and fishermen group				
	Strengths	**Weaknesses**	**Opportunities**	**Threats**
Social	• Existing community consensus for NTFP resources • Strong organization and coordination • Local ecological knowledge • Strong social cohesion • Long-term	• No technical assistance for fisheries	• Promotion/documentation of NRM • External support/intervention (NGO) • Enlargement of honey association members and production	• Residential status

SEMANGIT COMMUNITY EXTRACTING AREA ECOSYSTEM in DANAU SENTARUM NATIONAL PARK (DSNP) (Malay communities; Selimbau subdistrict, Kapuas Hulu district)				
SWOT: To maintain ecosystem in Semangit *community* working area within the association of honey farmers and fishermen group				
	Strengths	**Weaknesses**	**Opportunities**	**Threats**
	orientation to sustain environmental condition			
Economic	• Diverse economic income from NTFP • Biocertified, recognized product • Market networking • Aquaculture/floating fish farm system	• Limited working capital • Lack of processing equipment (honey) • Fluctuating price (fish) and limited market (honey)	• Alternative income from rubber • Potential market for honey products • Ecotourism development	• Limited area for agricultural activities • Climate change impact
Natural Resource	• Within the boundaries of DSNP (1990) • Sustainable honey and fish harvesting system	• "Destructive" fishing equipment/gear	• Potential to explore new NTFP such as medicinal plants	• Natural disasters; susceptible to floods and fire • No waste management

STUDY SITE: SUNGAI UTIK

Village: Batu Lintang
Subdistrict: Embaloh Hulu
District: Kapuas Hulu
Province: West Kalimantan

LOCATION

Sungai Utik is located in the region of *ketemenggungan* with seven other hamlets in the immediate area. The boundaries of Sungai Utik forest area are the hamlets of Lauk Rugun (North), Mungguk (East), Pulan (West), and a concession area, PT. BRUWI (South). Sungai Utik is located along the main road that leads to the border area between Indonesia and Malaysia. It is accessible from Putussibau, capital of Kapuas Hulu, roughly three hours away by car. Although this village is located on a main arterial road and has much interaction with external influences, it maintains a traditional subsistence economy.

COMMUNITIES

Based on village data from 2008, Sungai Utik had an estimated population of 269 and 90 households. The majority of residents reside in the long house (*rumah Betang*), with 84 people living in 28 housing units (*bilik*). The dominant ethnic group in Sungai Utik is Dayak Iban although other ethnic groups such as Dayak Kantu, Dayak Embaloh, Timorese, and Bugis are also represented owing to marital ties within the community.

Customary law remains the dominant governance system in Sungai Utik and shapes the everyday life of the communities, including the management of natural resources in customary forests. The Dayak Iban in this area, as in other regions of Kalimantan, practice swidden agriculture and forest resource extraction. The institutional arrangements involve a hierarchical structure of *Adat* leaders who guide the community and are responsible for ensuring that *Adat* laws are maintained. The people in this community practice both their traditional "animist" religion as well as Catholicism. The rich customary laws and the traditional religion, which focuses on ancestor worship and the belief that natural elements of the earth have souls, encourages conservation and sustainable extraction of forest resources.

The government services available in Sungai Utik are an elementary and junior high school housed in one building. There is one village health center with two local healthcare workers. In addition, there is one Catholic Church. The availability of clean water is limited: water is pumped from the Utik River to supply the houses. Rainwater is also collected. Electricity is provided by diesel generators in some residences while others are lit by kerosene lamps. There is no cell phone coverage in this area.

MAIN ACTIVITIES SOCIO-ECONOMICS, LIVELIHOODS

The livelihoods of the communities in Sungai Utik depend primarily on forest resources for subsistence and income generation from small-scale rubber cultivation. Dry paddy and rubber plantations are the main economic activities. Other activities—including hunting, fishing, and livestock rearing—are practiced for subsistence. Forest timber and non-timber products are used by the communities: wood for building or repairing houses, firewood for cooking, animals, fishing, fruit, and other non-timber forest products. The use of the forest resources is managed by customary law. Through customary law, community members have rights to limited extraction. They are expected to follow these laws within each forest zone: protected, reserve, and utilization areas. Dry hill rice from swidden plots is intended for household consumption. It can be sold, however, if there is an over-abundance. The harvesting of forest resources fulfils the needs of individual households and is not yet commercially oriented.

The community managing the forest of Sungai Utik (9,452 ha) obtained a certificate of sustainable community-based forest management (SCBFM) from Lembaga Ecolabel Indonesia (LEI) in 2008. The land use within the forest area is divided into three categories:

- *Taroh* (protected forest) covering 3667.2 ha is designated as a core area and no-take zone;
- *Galao* (reserve forest) covering 1510.7 ha has limited utilization for timber harvesting for household consumption such as housing, boat repair, firewood, and medicinal plants; and
- *Embor* (production forest) covering 4,276.4 ha is intended for productive uses such as agriculture, rubber plantations, and timber extraction.

The use of these areas is controlled by customary law (*hukum Adat*) and penalties are applied when there are infractions.

NATURAL RESOURCE GOVERNANCE

The *Adat* system plays an important role in the management of the forest. *Adat* leadership is hierarchical with a regional leader who has authority over multiple hamlets. A hamlet committee includes a number of respected people from the community who are considered capable of handling social problems based on *Adat* rules and values, including youth who are considered competent. Some members of the committee

are *Tuai Rumah* (loosely translates as head of the house), who each lead a longhouse community. In addition to leadership skills, *Tuai Rumah* must possess a mystical stone.

Some areas of the forest can be privately owned, including plots that have been cleared by slash-and-burn, rubber plantations, stands of certain types of trees, and places where houses or huts have been built. However, much of the forestland is owned collectively by Sungai Utik, with each community member enjoying the right to use it. *Adat* law stipulates the number and size of the trees that each household may fell each year: each household head is permitted to cut down 30 trees per year in the production forest, provided they are of a minimum diameter (40 cm in the production forest and 60 cm in the protection forest) and are of specific species. If the timber is sold, a fee must be paid to the longhouse. To date, however, no trees have been sold commercially. To ensure adherence to the rules, groups of community members take turns patrolling the forest every two years, also clarifying the boundaries and checking boundary markers.

Several ceremonies surround natural resource use among the Dayak Iban. When a plot of forest is to be cleared through slash-and-burn, food offerings are presented to the sharpening stone that is used to hone the special axe used for clearing a plot for the first time. In addition, permission is sought from the "guardian spirits" who reside in the trees. After the slash-and-burn is complete, food is offered to the spirits in a ceremony called *bedara*. Another ceremony is held yearly for cleaning the rivers and watercourses. The community also relies on natural resources that support agriculture and a yearly ceremony is held to present offerings of food to the "spirit of the land," asking for its blessings for an abundant harvest. An additional ceremony is conducted once the rice harvest is complete. This community more than the others in this study maintains a very traditional way of life.

The SWOT analysis for Sungai Utik, shown in Table 4, indicates that *Adat* law plays an important role in managing the forest, as in Semaung-Sepapan. However, the spiritual reasons for forest protection are not as strong as in Semaung-Sepanan. Here, the motivation stems mostly from the desire to maintain and sustain benefits from timber, wild game, and water for the current and future generations. If management schemes were put in to place, the community could benefit from further extraction and commercialization of forest resources.

TABLE 4: SWOT ANALYSIS FOR SUNGAI UTIK

SUNGAI UTIK CUSTOMARY FOREST (Dayak Iban communities; Embaloh Hulu subdistrict, Kapuas Hulu district)				
SWOT: To maintain ecosystem of customary forest in Sungai Utik				
	Strengths	**Weaknesses**	**Opportunities**	**Threats**
Social	• Certification of Sustainable CBFM • Participatory mapping process • Existence of strong customary written law (*hukum Adat*) • Strong internal leadership initiatives • Strong commitment to preserve forest;	• Growing economic interest and pressure (needs amongst youth)	• Promotion/documentation of NRM • Support from Ministry of Forestry • External support/intervention (NGO) • Participation of local people in higher-level politics • Interest from	• No legal support from local government • Accessible by main road Putussibau and Badau

SUNGAI UTIK CUSTOMARY FOREST (Dayak Iban communities; Embaloh Hulu subdistrict, Kapuas Hulu district)				
SWOT: To maintain ecosystem of customary forest in Sungai Utik				
	Strengths	**Weaknesses**	**Opportunities**	**Threats**
	long-term orientation • Adaptive customary law • Strong social cohesion • Local ecological knowledge		surrounding villages to follow Sungai Utik practices	
Economic	• Economic potential from timber and NTFP	• Limited income from NTFP generation • Limited facilities, clean water, electricity	• Ecotourism development • Access to microcredit • Premium price for forest products due to certification	• Economic transformation from subsistence to commercial economy • Climate change impact
Natural Resource	• Clear forest boundary • Less environmental pressure due to family planning program • High dependency on immediate natural resources	• Practice of slash-burn/shifting cultivation	• Biodiversity potential	• The customary forest falls within timber concessionary area • Pressure from external illegal logging

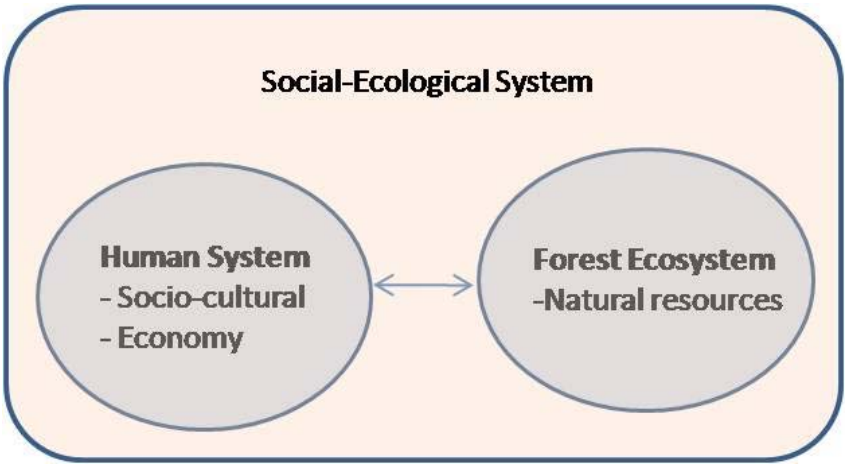
CHAPTER 3: ANALYSIS OF SUCCESSFUL CBFM

This chapter focuses on the sustainability of current CBFM at the three study sites. We have use the socio-ecological approach to analyze the data. This approach is based on ecosystems having complex adaptive systems and ecosystem governance requiring flexibility and a capacity to respond to environmental feedback. Since the study sites vary significantly from subsistence to commercial economies, each site was analyzed individually.

DEFINING SUSTAINABILITY AND SOCIO-ECOLOGICAL APPROACH

Sustainability has become a term that can be applied to any process, condition, system, and scale. Therefore, it is necessary to define sustainability in terms of this specific analysis. This study focuses on CBFM practices in which the sustainability of the forest ecosystem is the main objective. From the perspective of complex social-ecological system approaches, ecosystems or natural systems always interact dynamically with the human or social system—they form a social-ecological system that is complex, dynamic, adaptive, transformable, and has a resilient capacity.[8] Our focus is the forest ecosystem, so this study defines the social-ecological system as the human system that comprises social, political, and economic subsystems and the forest ecosystem with a natural resource subsystem (see Figure 3).

FIGURE 3: SOCIO-ECOLOGICAL SYSTEM BOUNDARY



The complex, dynamic, and nonlinear nature of interdependent components in the systems implies that the notion of sustainability as steady-state equilibrium is not realistic.[9] Forces of change, disturbance, and

[8] Berkes, F., and C. Folke, editors. 1998. Linking Social and Ecological Systems: Management Practices and Social Mechanisms for Building Resilience. Cambridge University Press, New York. Gunderson, L., and C. S. Holling. 2001. Panarchy; understanding transformations in systems of humans and nature. Island Press, Washington, D.C., USA.

[9] Fiksel, J. 2006. Sustainability and Resilience: toward a systems approach. *Sustainability: Science, Practive, & Policy* 2:2.

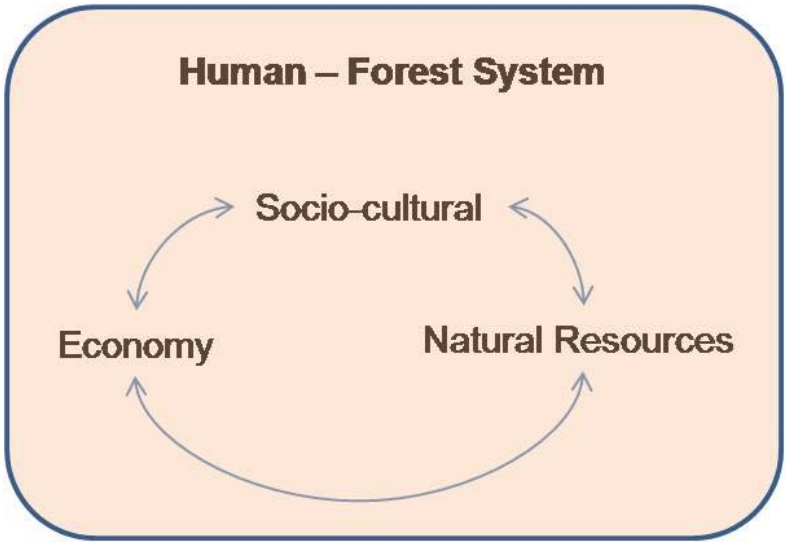
threat will inevitably disrupt the cycles of material and energy flows within the system. Sustainability is often misinterpreted as a goal to which we collectively aspire. In fact, sustainability is not an achievable end state. Rather, it is a fundamental characteristic of a dynamic, evolving system. Therefore achieving sustainability will require the development of a resilient and adaptive system. Resilience, the capacity of a system to tolerate disturbances while retaining its structure and function,[10] of subsystems will lead to the resilience of whole system.

From this systems approach, resilience capacity is the relevant parameter to ensure as well as to measure sustainability. Therefore, the definition of *system sustainability used in this study is the capacity of a system to adapt, transform and maintain its resilience capacity.* Sustainability of the system is determined by the sustainability of its subsystems, or their resilience capacity. The Stockholm Resilience Centre defines ecosystem resilience as a measure of how much disturbance an ecosystem can withstand without shifting into a qualitatively different state. It is the capacity of a system to both withstand shock to rebuild itself if damaged. On the other hand, social resilience is the ability of human communities to withstand and recover from stress, such as environmental change or social, economic, or political upheaval. Resilience in societies and their life-supporting ecosystems is crucial in maintaining options for future human development.

In assessing sustainability using a complex system approach, it is important to consider:

- The scale or boundary of the system assessed;
- The transformation time that each subsystem needs to reach the sustainable state before the disturbance takes place, and
- The interactions (back-loop) among subsystems, which in this study are the interactions between socio-cultural, economic, and natural resource subsystems that underlie the sustainability of forest ecosystem (see Figure 4).

FIGURE 4: BACK-LOOP INTERACTION WITHIN HUMAN-FOREST SYSTEM



[10] Fiksel, J., "Designing Resilient, Sustainable Systems," *Envir. Science & Technology*, Dec. 2003.

In summary, sustainability assessment of the forest ecosystem in each of the study sites was conducted using a systems approach. The strengths and opportunities in the social, economic, and natural resources subsystems in the study area are the underlying factors contributing to the adaptive and resilience capacity of the whole system balanced against the weaknesses and threats.

UNDERLYING FACTORS CONTRIBUTING TO SUSTAINABLE FOREST MANAGEMENT

CBFM is one among many approaches supportive of forest conservation efforts. Types of CBFM are determined by the characteristics of the local communities and the level of dependence on forest resources. This study has identified that the three study sites have some key similarities: the communities are able to manage the forest in a sustainable way although their use of timber and non-timber products vary and are influenced by community's characteristics.

SEMAUNG-SEPAPAN

Sustainability of Social Subsystem

Spiritual Beliefs

The Dayak Hibun community believes that Semaung-Sepapan forest is a resting place for spirits, such as ancestors and guardian spirits. The spirits from other areas were "relocated" to this forest in the past when oil palm plantations encroached on ancestral lands. These spirits need to be respected and cared for. There are sacred places in Semaung-Sepapan where Dayak Hibun conduct rituals with offerings to the spirits for continued protection over the community. This ritual is *pucupo* and is a critical component in conserving the Semaung-Sepapan forest.

Existence of a Strong "Green" Customary Law ("Green" *Adat*)

The Dayak Hibun continue to maintain strict customary laws (*Adat*). *Adat* leaders hold influential positions within the community and uphold laws and regulations daily. Government officials, such as police, coordinate with these elders. The customary law contains some "green" or conservation principles such as prohibiting the pollution of water and a prohibiting logging in the core zone of the protected forest. If a person violates such *Adat* laws, penalties are applied. Furthermore, *Adat* leaders and the community strongly support the existence of the protected forest. *Adat* ceremonies have been performed to "formalize" the status of the protected forest. This is an important factor in determining the success of community forest management in Semaung-Sepapan.

Adaptive and Participative Customary Law

The customary law of the Dayak Hibun community is adaptive. The laws can evolve when required, adapting to the situations and the needs of the community. There can be amendments to laws for matters such as the environment; they can be added to the *Adat* system through a participatory processes. Adaptability of the customary law is important in the context of maintaining the existence of the protected forest.

Leadership

Adat leaders play an important role in promoting the protection of the forest. For example, these leaders have sent requests to recognize the protected forest to the Department of Forestry both at the district and provincial level, and to the governor of West Kalimantan. The conservation of the forest is also actively promoted through the media, including newspapers and local television. *Adat* leaders participate in

politics and other social networks—one of the *Adat* leaders is a Member of Parliament and promotes awareness of the protected area in various meetings and conferences in a move toward legal recognition. A conference of *Adat* leaders in 1999 resulted in a consensus in 2001 among eight villages of Dayak Hibun to change the status of the forest to a legally protected customary forest. This was an important toward legal recognition by the West Kalimantan Provincial authorities, formalized through Governor Decree Number 66/2003. The indigenous movement, initiated in Pontianak in 1999, has increased awareness of the importance of obtaining legal status for customary forests. Communication and coordination among local leaders of hamlets has improved and they now meet regularly and conduct meetings with local communities.

Long-Term or Future Orientation

Local leaders and the community have a long-term vision of their environment and well-being. They want to ensure that future generations have access to resources in the protected forest including clean water, timber, and spiritual requirements. Although there is no economic benefit from the protected forest, the forest is still well managed.

Sustainability of the Natural Resource Subsystem

Clear Utilization of the Forest Area and Natural Resources

In Semaung-Sepapan, the combination of strong customary law that regulates the zoning of the area and the legal status of the forest as a protected area provide clear boundaries and regulations for the use of natural resources by communities. This has given rise to the sustainable practices that prevail today.

Forest Ecosystem Service

In addition to supporting spiritual beliefs, the function of the forest as a water catchment area is the underlying factor driving the protection of the forest. Communities recognize that the forest prevents flooding and provides clean water for the surrounding area[11]. As so much of the land has been converted to other uses, the Dayak Hibun realize the importance keeping this area forested; it is documented within their *Adat* law.

Furthermore, the Semaung-Sepapan forest generates almost no financial benefits, in terms of timber and valuable NTFPs because of the heavy logging that occurred when the land was cleared for rubber and oil palm plantations. This low economic value may pose threats to the sustainability of the forest. Therefore, rehabilitation efforts to increase the number of high-value plants such as fruit trees, medicinal plants, and rattan in the production zone would increase the economic value of the forest for the community and thereby create incentives for better management.

Sustainability of Economic Subsystem

There are several economic factors that encourage improved management of the protected forest in Semaung Sepapan: the local community's reliance on clean water, income from the sustainable harvest of timber and non-timber forest resources, and the availability of jobs and livelihoods from oil palm and rubber tree plantations, as well as agriculture.

[11] Durst, P. et al. *In Search of Excellence: Exemplary Forest Management in Asia and the Pacific.* 2005 FAO UN Regional office for Asia and the Pacific. Asia-Pacific Forestry Commission. Bangkok.

Forest Ecosystem Service: As Provider of Clean Water

The local people's high level of dependence on water resources derived from the forest influences to the protection of the area. Each family uses up to 180 cubic meters of water per year that comes from water originating from the forest. Currently, a large segment of the community is dependent on this water. As water is currently free of charge in this area, water is one of the compensatory aspects of protecting the forest. The community is aware of their level of dependence on forest water sources, as water is difficult to obtain from the surrounding areas, which are under oil palm plantations. Plantations typically increase run-off, make stream-flow more erratic, increase soil erosion and sedimentation in the river basins, thus increasing of the risk of flooding that can causes major losses to the communities. There has been some debate about the impact of deforestation and conversion to forests to agricultural land or plantations on hydrological processes – some arguing that the impact can be negligible[12] compared with the impact of roads and settlements. Nevertheless, it is acknowledged that forest conversion often results in changes in runoff and erosion.

Low-Level Dependence of Population on Forest Resources

People's dependence on the exploitation of timber and non-timber forest resources is low because: 1) they derive livelihoods from oil palm and rubber plantations and from the cultivation of rice and other crops rather than exploiting the resources in the protected area; and 2) exploitation of forest resources is limited to the forest margins and utilization zones, which make up only 1,000 hectares of a total area of 3,000 hectares of protected forest. Efforts to establish limited utilization zoning have become an important element in protecting forested areas. This establishment of utilization boundaries is strengthened by the existence of customary law, as in the stipulation that timber can only be extracted for household consumption (only three to four trees can be harvested per family annually). The communities are not increasing the use of forest resources because oil palm plantations are providing lucrative income.

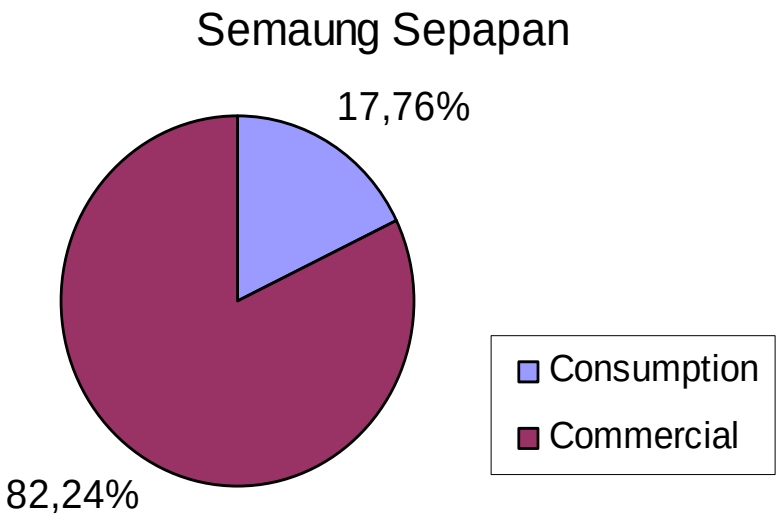
This low level of community dependence on the forest might be only "temporary" if external impacts, such as changes in commodity prices, put pressure on the environment. Any decrease in the prices of commodities, such as palm oil, rubber, and agricultural crops, has the potential to drive the community to exploit the timber and non-timber resources of the forest. This could also happen if the prices for forest products rose.

Community Livelihoods

Average household income is Rp. 2.8 million per month from the plantations, with 82 percent of plantation production sold (income from sales averages at Rp. 2.3 million per family/month) and 18 percent of the income used for expenditures. Based on overall utilization/production of natural resources, the majority of products are sold for commercial purposes such as the oil palm and rubber (82.24 percent), while the remaining are used in household consumption such as agriculture products including fruit and vegetables (17.76 percent) (see Figure 5).

[12] Bruijnzeel, L.A. (2004) Hydrological Functions of Tropical Forests, Not Seeing the Soil for the Trees?, In *Environmental Services and Land Use Change: Bridging the Gap between Policy and Research in Southeast Asia*. Tomich, T.P., van Noordwijk, M, and Thomas, D.E. eds. A special issue of *Agriculture, Ecosystems and Environment*, pp. 185-228: **104**.

FIGURE 5: UTILIZATION OF NATURAL RESOURCES—SEMAUNG-SEPAPAN



Other factors beyond economic impact, such as ecological and environmental sustainability and the socio-cultural milieu, must be taken into consideration when considering the viability of different livelihood activities. Failure to pay attention to the socio-cultural and environmental underpinnings of rural communities could have a direct, long-term impact on the forests.

The plantation-based activities focus primarily on oil palm cultivation, which has driven a significant change in efforts to meet people's subsistence needs. This motive for commercial production is supported by the ease of access to markets, the proximity of communities to border crossings, and the availability of credit unions, all of which drive and support increasing commercial production.

Threats to the forest could result from crop failure or a drop in plantation or agricultural commodity prices. Crop failures and price decreases have the potential to increase exploitation of protected forest areas as people strive to meet their subsistence and livelihood needs. Any correlation between the exploitation of the forest area and sustainable management of protected forests must be considered within the context of the following factors:

- The function of the forest as a water source for the local community;
- The low level of dependence of the population on the forest for livelihoods;
- The existence of alternative income sources outside of the forest, such as plantations and other agricultural cultivation; and
- Local people's motives for engaging in economic activities and their livelihood aspirations (see Table 5).

TABLE 5: PATTERN OF UTILIZATION, LEVEL OF SUSTAINABILITY, POTENTIAL FOR DEVELOPMENT—SEMAUNG-SEPAPAN

Parameters for Utilization	Pattern of Utilization	Sustainability of Forest Practices	Potential for Development
Dependence of function	High (as water source)	High, but still vulnerable to crop production losses and commodity price decreases (external factors)	Limited: If livelihood alternatives only take into consideration economic aspects and not socio-cultural and environmental aspects of the area. Prospective: If the development of alternative livelihoods takes into consideration economic, socio-cultural and environmental aspects.
Variety of use of forest resources (timber and non-timber)	Very Low		
Main source of Income	Oil palm plantations		
Other alternative livelihoods	Both related and unrelated to forest exploitation		
Actual level of income	High (Rp. 2.3 mil plantations and agriculture per family/month.		
Motives for production	Commercial		

SEMANGIT

Sustainability of the Social Subsystem

Existence of Local Organizations and Rules Governing Natural Resources

The Semangit community has no formal system of customary laws as is found in Semaung-Sepapan and Sungai Utik. However, there is a strong local organization with regulations that governs the use of natural resources in addition to the formal regulations governing Danau Sentarum National Park (DSNP). In the fisheries sector there is a fisher working group, *Kelompok Nelayan*. The honey farmers have also set up an association (*periau)* to sustain NRM. The associations have developed laws that prohibit certain activities that are considered destructive to natural resources, for example using poison for fishing, burning forests, and logging.

Adaptive and Participative Community Consensus

The fisher and honey farmers' associations have established policies that respond to their members' needs in a changing environment. Regulations are developed through a participatory process of community discussions and regular meetings. Furthermore, these regulations are communicated to everyone in the community as well as neighboring hamlets, and all the community members follow the rules. This type of community consensus plays a similar role to the customary systems in Semaung-Sepapan or Sungai Utik. The adaptive capacity of local institutions is important for increasing the resilience and sustainability of the system.

Long-Term or Future Orientation

The community has a long-term vision for the future, particularly in terms of livelihoods. This is slightly different from Semaung-Sepapan and Sungai Utik where the communities explicitly voice the need to maintain the forest ecosystem for future generations. In Semangit, the community manages the natural environment to ensure continuity of future income generating activities. For example, the prohibition on using poison such as *tuba* for fishing was developed to preserve the quality of organic honey. The

community worked hard to achieve organic certification and they do not want to jeopardize it. There is also a prohibition on the use of nets with a small mesh size to ensure that smaller fish grow to maturity and sustain the fish population.

Strong Social Cohesion

Semangit is an enclave in which houses are concentrated on both sides of the Leboyan River. Almost all of the inhabitants of Semangit are Muslim Malay and differences between social strata are relatively small ("simple" social stratification). Consequently, this community has strong social cohesion and little conflict. This cohesion facilitates consensus building regarding the management of natural resources.

Local Ecological Knowledge

Existing ecological knowledge is an important factor in shaping forest management practices in the area. For instance, local communities know about different species of flowers that are pollinated by bees; bees' seasonal migration patterns; and the lake ecosystem and its seasonal changes. All influence NRM activities and help in managing the protection of the ecosystems.

External Support/Intervention from NGOs

The use of '*tikung*[13]' in honey production has been practiced for many years. In 2005, NGOs worked with these communities to promote an internal control system and undertook a mapping exercise in the areas where the *periaus* work. This later was recognized an important intervention as it simplified management of the area. APDS, established with support from the Riak Bumi Foundation, has been working with the communities to implement sustainable honey harvesting, resulting in bio-product certification in 2007. The intervention of NGOs—particularly in providing training for the internal control system and sustainable honey harvesting methods—has provided the opportunity for biocertification and to access better markets. These activities have been invaluable for the community, improving their income from forest honey harvesting and consequently strengthening the will to manage the ecosystem sustainably.

Sustainability of Natural Resources Subsystem

Clear Utilization Guidelines for Natural Resources

As Semangit is located within DSNP, honey farmers and fishers are required to use the ecosystem sustainably. This practice is supported by good relations between communities and DSNP authorities. Both DSNP and the communities are mandated by the national park mission to maintain good communications and coordination on natural resource use. In addition to protocols governing sustainability, there are shared responsibilities for research, education, and knowledge management, and for supporting cultural initiatives and tourism to improve livelihoods in the communities.

Forest Ecosystem Services

Various terrestrial, swamp, and riverine plants in Semangit such as *Barringtonia acutangula*, *Syzigium claviflora*, and *Shorea sp.* supply nectar for honeybees, which produce the honey that is harvested to provide economic benefits for the communities. Hence, it is in the communities' own interest to guard the ecosystem from any mass disturbances such fire and timber extraction. Similar factors apply to fishing activities. These regulations are imposed through APDS and the Fisheries Association members' group consensus. Additionally, the ecosystem has a potential for ecotourism since the seasonally flooded lakes and riverine environments are unique. Local knowledge regarding honeybee behavior, the establishment

[13] Each *tikung made out of wood,* is about 2 meters long and 20 cm wide at one end and 15 cm at the other. These are placed in low trees and slathered with honey to attract bees that then form rafters (hives).

of APDS and the Fisheries Association's strict enforcement of regulations, and services provided by the ecosystem have collectively established conditions supportive of sustainable NRM practices.

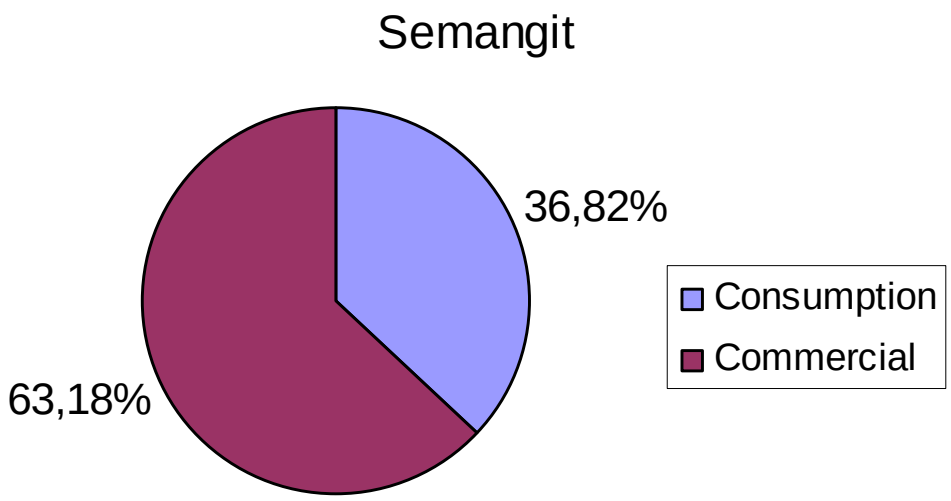
Sustainability of Economic Subsystem

The development of the local economy in the forestry and fishery sectors in Semangit is supported by several factors: 1) a high level of livelihood dependence and reliance on water resources from the forest; 2) a wide variety of economic benefits from natural products, such as honey and fisheries; 3) the development of alternative livelihoods within the community; 4) the high quality and good prices for local forest honey; and 5) stable prices and good marketing networks for forest and fishery products. However, economic potential of the forest and the fishery sites is affected by some external factors, particularly fluctuations in prices and the limited amount of capital available for development of businesses.

Dependence of the Community on Natural Resources

People depend on the forest resources (wood and honey) and fish stocks. At the time of this study (April 2009), the total economic value of the exploitation of resources was Rp. 29.87 million/family/year or an average of Rp. 2.48 million per month, 37.24 percent of which was from timber and honey being, and 63 percent from fishing and aquaculture. Commercial honey production and aquaculture composed 63.18 percent of the total value of goods. Household consumption of natural resources, including wood for house building, boat construction and fuel, and bee and fisheries products equaled 36.82 percent of the total value of resources extracted from the forest (see Figure 6).

FIGURE 6: UTILIZATION OF NATURAL RESOURCES—SEMANGIT



The commercial value of honey and fisheries products provides incomes totaling Rp. 1.57 million/family/month, which has led to a high dependence on natural resources in the area around DSNP. In addition, patterns of production in the community have evolved from a subsistence to commercial basis for forest and fisheries resources. The economic value of forest products per household averages Rp. 927,000 /household/month, with the largest contribution coming from the forest honey harvesting (55 percent) and the utilization of timber (45 percent). The value is still low when compared to income from

fisheries, which is Rp 1.56 million/household/month. Thus, the primary source of income is fisheries; honey harvesting has functioned to supplement household income.

The level of dependence on non-timber resources is reflected in the harvesting of up to 175 kilograms of honey per family annually. The harvesting of wild honey is carried out sustainably through the adaptation of technology to fit local ecological conditions. The extent of the people's dependence on their surroundings has increased as honey harvesting and production of honey products have become a commercial initiative aimed at improving livelihoods.

Meanwhile, the exploitation of wood is largely domestic, trees are cut to build houses and other structures such as boats, fish nurseries/cages, and bee hives. The dependence on wood from the forest is fairly high by Indonesian standards: $8m^3$ per family per year. Clearly, the future welfare of the 85 families now living in Semangit depends on the availability of wood. It will be necessary to manage utilization and exploitation of certain types of wood, particularly those species used in the construction of beehives.

Dependence of the local community on fisheries is also very high: it is the main source of daily income. Local people catch fish and raise them in submerged cages called *karamba*. Villagers both consume and sell the fish they catch and raise.

Variety of Exploitation of Forestry and Fishery Resources

The wide variety of approaches for managing forestry resources, particularly in the development of honey products, has provided many economic and environmental benefits. Economically, the honey provides much needed additional income. As a result, the villagers are concerned about preserving the forest vegetation that provides shelter for bees because they harvest directly from wild rafters, as well as from the *tikung* rafters they construct. One of the ways to manage timber and non-timber resources sustainably is to use resources by adapting technologies that avoid or minimize damage to the forest ecosystem.

Efforts to improve honey production have gained momentum over the past three years (2006–2008). Unfortunately, in 2007, only 163 kg of honey was harvested because of flooding that inundated the beehives. In 2008, production was back on track with 16 tons of honey harvested. This seems to indicate that honey production is a highly resilient endeavor since harvesting resumed to normal production rates following the flooding year.

In the fisheries sector, open water fishing, as well as raising *toman*, an ornamental fish, in underwater cages provides a lucrative source of income in the community. Fishery activities contribute an average of Rp. 1.5 million per month/household, with the largest contribution coming from *toman* aquaculture (68 percent), and with daily catches providing 32 percent.

The *karamba* cage nursery approach to raising fish is an important adaptation in the community. The fish cage system also provides fishing families with a steadier source of income than open water fishing can provide. Fish caught in open waters are eaten and sold, and provide new stock of *toman* for the fish cages. As fishing continues, institutional oversight and monitoring of the fishery must be improved to ensure better management using the APDS system that has proven successful in production of honey.

Production Quality of Non-Timber Resources (Wild Forest Honey)

The efforts of honey producers to improve quality have resulted in the certification granted by BIOCert in 2007. This certification has created significant marketing opportunities. The certified, high-quality honey produced by the members of APDS has increased prices and income for the honey harvesters. In turn, these improvements have raised awareness within the community of the need to protect the forests.

Sales Prices and Marketing Networks

In its efforts to increase income for local bee farmers, APDS brokered a marketing and distribution contract with PT. Dian Niaga Jakarta and Riak Bumi Kalimantan Barat Foundation. This marketing network has led to better prices being paid by APDS to local bee farmers—rising from Rp. 28,000/kg (2007) to Rp. 35,000/kg (2008). APDS sells the honey to consumers for between Rp. 45,000/kg and Rp. 55,000/kg. To accommodate increasing production and overcome current constraints of a market limited to wholesalers/retailers and the local public, APDS is in the process of expanding into processed honey products such as beeswax candles and extending its marketing and distribution networks into West Kalimantan and Malaysia.

In the fisheries sector, the main challenge has been maintaining the quality of the product. The fish spoil quickly and prices fluctuate widely from seasonal to season. Price fluctuations can be mitigated to some extent by increasing the value of the product. This can be achieved through local processing: smoking and drying, or processing fishmeal or oil.

Livelihood Alternatives

The recent development of alternative sources of income for the people of Semangit is most evident in the expansion of rubber plantations. The establishment of rubber plantations by the local community is a response to new opportunities and increasing economic pressures. To protect the forest and preserve the existing swamp ecosystem, which is extremely sensitive to change, the adoption of alternative livelihoods must take into consideration the ecological and socio-economic potential of the area (see Table 6).

TABLE 6: FORESTRY AND FISHERY PATTERN OF UTILIZATION, LEVEL OF SUSTAINABILITY AND POTENTIAL—SEMANGIT

Parameters Utilization	Pattern of Use	Sustainability of Forest practices	Potential for Development
Dependence on function of forest area	High (forestry and fishery resources, transportation facilities, water sources, and so on)	High, due to the adaptation of populace toward resources. However, influenced by honey and fish price fluctuations, as well as alternative livelihoods.	Opportunity: Prospects exist with the development and support of alternative livelihoods in line with\potential of area (example: sustainable harvesting of honey, ecotourism).
Variety of benefits of exploitation of forestry and fishery resources	High (wild honey, fish catches, fish husbandry)		
Main source of income	Fishing and honey production		
Other alternative livelihoods	Exist, but potential of area is limited		
Actual level of income	High (Rp. 1.5 million/family/month from fishing and honey production)		
Production motives	Subsistence to commercial		

SUNGAI UTIK

Sustainability of the Social Subsystem

Spiritual Beliefs

The Dayak Iban community in Sungai Utik holds beliefs that the natural world—land, forest or trees, river, and paddy—are inhabited by spirits. Some animals, such as monkeys, orangutan, and birds, are believed to be the reincarnation of human beings. It follows that they believe that natural resources need to be cared for and respected. This is reflected in *Adat* ceremonies that are performed to honor the spirits. These spiritual beliefs play an important role in promoting successful forest management in this community.

Existence of a Strong "Green" Customary Law ("Green" *Adat*)

Just as Dayak Hibun in Semaung-Sepapan, the Dayak Iban maintain strong customary laws (*Adat*). Governed by *Adat* leaders, the system identifies the forest as a customary forest and establishes regulations on forest management such as forest use zones (such as where swidden agriculture is permitted and which forest area is assigned as protected forest), the number of trees that can be logged by each family each year, the size of the trees that are permitted to be felled, and so on. The existence of this strong "green" customary law is a significant factor in the success of community forest management.

Leadership

Adat leaders play a critical role in maintaining and promoting *Adat* forest in Sungai Utik. With the assistance of several NGOs, these *Adat* leaders have been actively involved in achieving formal recognition of their customary forest from the government (local and national). Pak Janggut, the village *Adat* leader, has become nationally known for his active involvement in this effort. At the same time, official leaders such as the *Kepala Dusun* (hamlet head) and *Kepala Desa* (village head), who are also Dayak Iban, support this effort. For example, it was the village head who issued a village decree regarding boundaries of *Adat* forest in Sungai Utik. The leadership in protecting the forest is not limited to *Adat* leaders and senior members of the community; younger generations are also involved in these activities.

Adaptive Customary Law

The *Adat* system in Sungai Utik is dynamic. It changes and adapts to the community's needs as well as environmental changes. Regulations regarding *Adat* forest management such as the size and number of trees permitted to be felled are modified over time. The community reviews *Adat* laws each year and revises them every five years.

Long-Term or Future Orientation

As in Semaung-Sepapan, Dayak Iban also have a long-term vision with respect to NRM. They conserve the forest in order for future generations to have access to resources. The *Tuai Rumah* (Pak Janggut) made an analogy that the *Adat* forest is similar to a supermarket or a bank. By conserving the forest, it will meet the subsistence needs in the future by providing flora, fauna, clean water, and more. Consequently, the community resists offers by timber enterprises and *cukong* (individual timber buyers) to start logging operations. In contrast, nearby hamlets have given authority to timber enterprises to log their forests. Pak Janggut wants to preserve resources so that the future is full of deep water (*dalam*), while there are others who emphasize short-term or immediate gains and will see only shallow water (*dangkal*).

Strong Social Cohesion

Social cohesion of the community is still quite strong. There are several reasons behind this cohesion, including ethnicity (the majority of the population are Dayak Iban) and religion (Catholic, although they still strongly maintain their traditional religious beliefs). Also, the social stratification and division of labor are basic with the majority of the population living in the long house (*betang*) and governed by the *Adat* system. Using Durkheim terminology, this is a mechanical solidarity type of social cohesion. Again, this bonding of social capital is critical to executing *Adat* forest management and it contributes significantly to the success of community forest management.

External Support/Intervention by NGOs

The efforts of the community to protect the forest began when the longhouse was built in 1968 and they settled in the area in 1972. There have been number of conflicts between the community and the company that holds the concession to exploit timber near the community's protected forest, as well as issues with illegal loggers. In 1996, Pemberdayaan Pengelolaan Sumber Daya Alam Kemasyarakatan (PPSDAK), an NGO, worked with the community to create a participatory map of Sungai Utik that outlined the spatial arrangements and land use zones. The establishment of West Kalimantan Indigenous People Alliance (Aliansi Masyarakat Adat Kalimantan Barat) in 1998 and Archipelago Indigenous People Alliance (AMAN – Aliansi Masyarakat Adat Nusantara) in 1999—umbrella organizations that act for the indigenous people movement in Indonesia—assisted the Dayak Iban in their quest for recognition of their protected forest. These organizations advocate for indigenous rights. In 1999, a workshop of Adat Dayak leaders was held in Pontianak. It was at this workshop that external influence and support drove the community to seek legal recognition of their customary forest.

Today, there are still several NGOs that are involved in supporting the community's effort to maintain their *Adat* forest and to obtain formal recognition from the government. For example, LEI supports certification of *Adat* forest management as an SCBFM, AMAN is involved in supporting efforts to obtain formal recognition of the forest from the government, Community Legal Resources Empowerment LBBT focuses on law and legality issues, and PPSHK (Program for Strengthening Community Forestry) works to improve the management of natural resources.

Pride and Distinction

Recently Sungai Utik has become more widely known for its successful management practices. Sungai Utik benefits from the eco-label certification awarded by the Indonesian Minister of Forestry in August 2008. This achievement was given considerable attention by the media especially in the surrounding area where six other Dayak Iban communities have settled. The pride of community in protecting their forested area has become an important factor driving them to continue their efforts.

Sustainability of the Natural Resource Subsystem

Clear Utilization Rights for the Forest Area and for Natural Resources

In the past, Sungai Utik has experienced difficulties in protecting their forest from timber concessionaires, illegal loggers, timber commercialization, and land clearing for other purposes. The participatory mapping assistance provided by the NGO PPSDAK in 1998 produced a map of Sungai Utik that creates a clear division of four main forest areas: reserve (conservation) forest of 3,667.2 ha; limited production

forest of 1,510.7 ha; production forest of 1,596.1 ha; and agricultural areas of 2,680.3 ha [14]. The map establishes clear boundaries for the use of natural resources in Sungai Utik.

Forest Ecosystem Service

Ninety households (roughly 269 people) comprise the Sungai Utik population. Sungai Utik's forest areas (9,000 ha) contain high-value timber and NTFP, which provide the community with an abundance of natural resources for subsistence needs. Sungai Utik is dependent on natural resources as the forest fulfills the community's daily needs. At a subsistence level, the community uses forest resources such as timber for fuel, canoes, and housing material. Commercialization is allowed (up to 150 m^3/household/year). However, owing to the difficulty extracting timber and the customary prohibition on using heavy equipment, this practice has not been pursued. The high dependency of the communities on the forest ecosystem for their daily needs is the strongest incentive for forest protection in Sungai Utik.

Sustainability of Economic Subsystem

The Sungai Utik forest plays an important role in the lives of the local community as seen in the close relationship between the people and the forest. This relationship involves exploitation of forest resources for daily subsistence. The forest also provides a modest income from the exploitation of timber and non-timber resources.

The potential for economic development of the Sungai Utik forest area is strongly influenced by both internal and external factors, including 1) the heavy dependence of the community on the forest for subsistence; 2) the economic potential of exploitation of timber and NTFP, as well as rubber plantations; and 3) acknowledgement of the right to manage the forest through a certificate from the Indonesian Eco-label Institution[15].

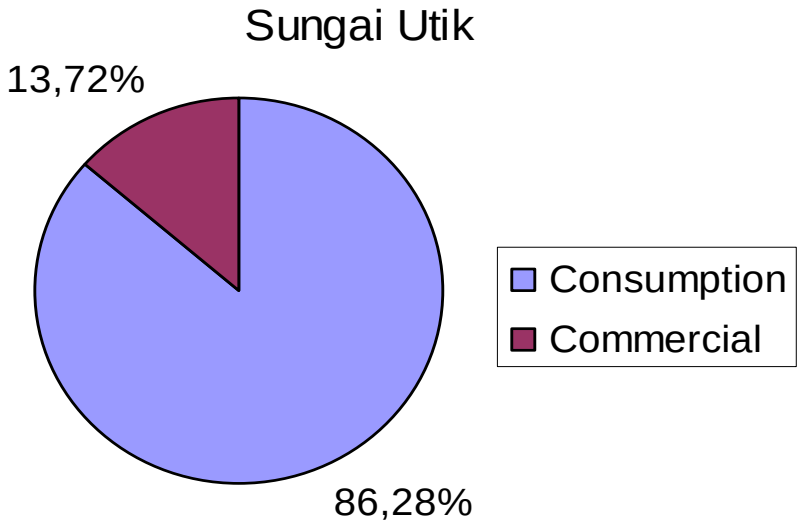
Dependence of Community on the Customary Forest Area

The relationship between the people of the Sungai Utik and the surrounding resource base has many similarities to the pattern of NRM taking place in Semangit. Both communities are highly dependent on the forest for meeting their subsistence needs. However, the resource use differs in that the Sungai Utik community remains at a subsistence level, while the people of Semangit are more oriented toward commercial exploitation of the forest. For example, the total economic value derived from the use of forest resources for each family in Sungai Utik is Rp. 2.23 million per month. The proportion derived from the sale of resources is low, averaging Rp. 306.000/family/month (13.72 percent) and most of the resources exploited are for household consumption (86.28 percent) (see Figure 7). This high level of dependence of the local people on their surrounding resources means that there is an integral connection that influences the community's management of the forest. Until now, people in the community depend almost entirely on the forest to meet their daily subsistence needs.

[14] LEI 2006 documentation.

[15] Lembaga Ekolabel Indonesia, LEI

FIGURE 7: UTILIZATION OF NATURAL RESOURCES—SUNGAI UTIK



The exploitation of wood and timber resources by the community is mainly for the construction of homes, boat building, and cooking (firewood). The local community uses an average of 6m^3/family/year. Non-timber resources are the most critical for meeting family needs and people depend on a variety of flora and fauna for consumption including palm sugar, fruit (such as durian), rattan, and medicinal herbs. Timber and non-timber resources contribute very little to household income. There is some potential to improve livelihoods through activities such as harvesting and processing forest resources including the commercial production of palm sugar, handicrafts, and woven reed and grass items, as well as the development of ecotourism.

Forest Resource Products

Because the management of Sungai Utik Forest has been governed by customs that have been handed down for generations, the forest remains in almost pristine condition. Results of a study conducted by PPSHK-West Kalimantan in 2002-2003 suggest that the potential for timber production reaches 91.22 m^3/ha in some parts of the forest. This argues that forests designated as protected forests and conservation areas, where timber resources is not exploited, contain as much high-value timber as in production forests. The economic value of the timber is high because exploitation has been limited to meeting household needs. The exploitation of non-timber resources is also primarily for family consumption (67 percent), with only a small amount (33 percent) sold. Information on the potential economic benefits from exploiting timber and non-timber resources based on market values indicates that there is considerable scope for growth in Sungai Utik. Because, people are not selling many forest products and confining their use to meeting subsistence needs, the local economy is weak, closed, and functioning more as a subsystem.

In the long-term, the existence of the customary forest and the subsistence economy (characteristically a subsystem) will be disturbed if efforts to retain the land and their way of life are not supported. It is important to maintain sustainable timber and non-timber forest resource extraction and to improve non-NRM related opportunities such as ecotourism. Recently, a sustainable furniture consortium, Eco-exotic, in affiliation with LEI, conducted a training workshop in Sungai Utik on furniture production. With technical assistance provided by Eco-exotic, it is possible that Sungai Utik residents can benefit from their LEI certification and learn techniques for sustainable furniture production.

Cultivated Fields and Rubber Plantations

Household income is derived from agricultural production (97 percent of the total) and rubber plantations (3 percent of the total). The small contribution of rubber is due to low productivity and prices. The agricultural practices are heavily influenced by tradition and the exploitation of forest land is limited owing to strict customary laws. The future of the forest could still be threatened if use of land for farming (2,680.3 ha) continues to expand to meet the need to cultivate and develop rubber plantations. For this reason, a new approach is required for promoting alternative income generating activities that can reduce the dependence of the community on the forest. It is anticipated that the population in the area will increase and that the need for land and resources will grow accordingly, thereby influencing the condition of the forest.

Community-Based Customary Forest Management Certificate

The granting of a SCBFM from the Indonesian Eco-label Institution (Lembaga Ekolabel Indonesia, LEI) is a way of acknowledging the efforts of the people of Sungai Utik Village who have succeeded in sustainably managing their forest. The certificate demonstrates that the efforts made by the local community have been recognized nationally. The next and most important step will be to determine how the forest can benefit local people economically by expanding livelihoods linked to timber and non-timber forest resources. There are opportunities for the community to manage the forest in a manner that improves incomes and sustains CBFM. The premium prices paid for certified timber and non-timber products extracted sustainably are particularly promising. The existence of the SCBFM certificate can also be used to spur the development of ecotourism through the promotion of the Utik River as a domestic and international tourist destination.

The excellent condition of the protected forest is primarily the result of management by strong customary institutions and the continued influence of traditional long-house culture on the people living in the area. The relationship between customary institutions and the forest has several implications for the future utilization of forest resources: 1) the high level of dependence of the local people on the forest for subsistence; 2) the pressures exerted by the ever-increasing economic potential of the exploitation of timber and non-timber forest resources; and 3) the influence of existing logging and rubber plantation patterns. This varied use pattern, shown in Table 7, influences the range of livelihoods opportunities available to the community and will shape the motives for conservation and production in the future.

TABLE 7: EXISTING UTILIZATION PATTERNS, LEVEL OF SUSTAINABILITY, AND POTENTIAL—SUNGAI UTIK

Parameters for Utilization	Pattern of Use	Sustainability of Forest practices	Potential for Development
Dependence on Function of Forest Area	High (timber and non-timber forest resources, water sources, etc.)	High due to adaptation of toward resources. must be supported by development of livelihoods	Opportunity: In order to develop regions in which customary institutions remain strong, it is necessary to support through development of livelihoods for NTFPs and ecotourism.
Benefits of Exploitation of Forestry Resources	High (timber and non-timber forest resources and cultivation of crop fields and plantations)		
Main Source of Income	Crops, rubber, and non-timber forest resources		
Other Alternative Livelihoods	Limited		

Parameters for Utilization	Pattern of Use	Sustainability of Forest practices	Potential for Development
Actual Level of Income	Low (Rp. 306,000/family/month from *illipe* nuts and rubber)		
Production Motives	Subsistence		

SUMMARY

All three of the study sites, despite their vast differences in economic activities and income, have a number of factors that encourage sustainable NRM. Strong leadership and community-based activities allow for strong social cohesion in decision making processes. Those that veer from customary laws are penalized in various ways that discourage unsustainable or "illegal" practices. Another factor includes the cultural value of the forest. As in the cases of Sungai Utik and Semaung-Sipapan, the strongest reason for maintaining a healthy forest ecosystem lies in the cultural heritage value of the forest under *Adat* law. Livelihood dependence, of course is another strong factor for sustainable NRM whether it is dependence on water resources or extraction of NTFPs, such as forest honey, which require a healthy ecosystem. In addition, all three communities studied have the forward thinking that these forest resources are needed for future generations. With these factors in mind, the conservation of forest resources for the communities is critical to their existence.

With these strengths are several weaknesses that should be addressed in order to maintain or improve current practices. As mentioned above, while breaking customary laws or regulations are heavily discouraged with fines imposed as well as shame, Semaung-Sipapan lacks enforcement and forest monitoring. Stronger forest monitoring in addition to rehabilitating the customary forest is needed (in the past the forest was somewhat degraded). Outside assistance, such as technical support to develop a monitoring system like the one in place in Sungai Utik, would better safeguard forest resources. Replanting degraded areas could ensure future needs can be met. In the case of Sungai Utik, which is basically a subsistence economy, younger generations are becoming more interested in a market economy. Job creation through NRM-based activities could improve livelihoods and allow the communities to benefit from the rich forest resources as long as extraction remains sustainable. High-value species of timber and NTFP are found in the customary forest. LEI and ASMINDO (a sustainable furniture corporation) recently conducted a workshop on furniture production with Sungai Utik community members in order to indentify income-generating activities through sustainable furniture production. These weaknesses also come with solutions. If technical assistance is made available, the communities could continue to manage and improve current practices.

CHAPTER 4: FINANCIAL OPPORTUNITIES AND ECONOMIC LEVERAGE FOR CBFM

Within the three study sites there are several potential opportunities for communities to benefit from funding through various programs related to climate change mitigation. In addition to these opportunities, access to credit for individuals within the community has the ability to enhance small enterprises. To date, communities have not explored this to the full potential. In both Semaung-Sepapan and Sungai Utik there is now access to credit that, for the most part, has been used to purchase motor scooters. Because Semaung-Sepapan residents have more disposable income from oil palm microenterprises, additional access to credit may not be needed except possibly to diversify income-generating activities with less dependence on oil palm. It is possible, however, that access to credit in Sungai Utik could be used to enhance and encourage microenterprises to give communities the tools necessary to develop opportunities related to NTFP extraction.

CLIMATE CHANGE INITIATIVES

REGULATED CARBON MARKETS

The Kyoto Protocol is an international agreement under the United Nations Framework Convention on Climate Change (UNFCCC) that sets greenhouse gas emissions reduction targets for industrialized countries. The Kyoto Protocol was signed in 1997 and came into force in 2005. Recognizing that industrialized countries are responsible for the majority of historical greenhouse gas emissions, and over 40 percent of current emissions[16], the Kyoto Protocol placed a heavier burden on developed nations to reduce emissions under the principle of "common but differentiated responsibilities." Developed or industrialized countries agreed to reduce their greenhouse gas emissions collectively on average to 5.2 percent below 1990 levels, though individual country commitments varied widely. These countries are called "Annex I" countries. Developing countries such as Indonesia are "non-Annex I" countries, and have non-binding goals for emissions reductions. The Kyoto Protocol and subsequent negotiations included three flexible mechanisms for achieving emissions reductions to minimize costs as well as to encourage technology transfer from industrialized countries:

- **Emissions trading:** Emissions trading can be done between any countries that have an emissions reduction commitment through the exchange of assigned amount units (AAUs).
- **Clean Development Mechanism (CDM):** The CDM was established to allow Annex I countries to receive credit for funding emissions reduction projects in "non-Annex I countries" (developing

[2] Per Intergovernmental Panel on Climate Change (IPCC) 4th assessment report; in 2004 the Annex I parties produced 46 percent of greenhouse gas emissions with 20 percent of the world's population.

countries). The emission reductions can be converted into offsets or carbon credits called Certified Emissions Reductions (CERs) via the UNFCCC approval process.

- **Joint Implementation (JI):** JI projects allow Annex I countries to sell emissions credits if they have exceeded their emission reduction goals, through the creation and sale of emission reduction units (ERUs). Most JI projects are sourced in the former Soviet Union where "Economies in Transition" experienced a natural reduction in emissions after 1990 (the Kyoto baseline year).

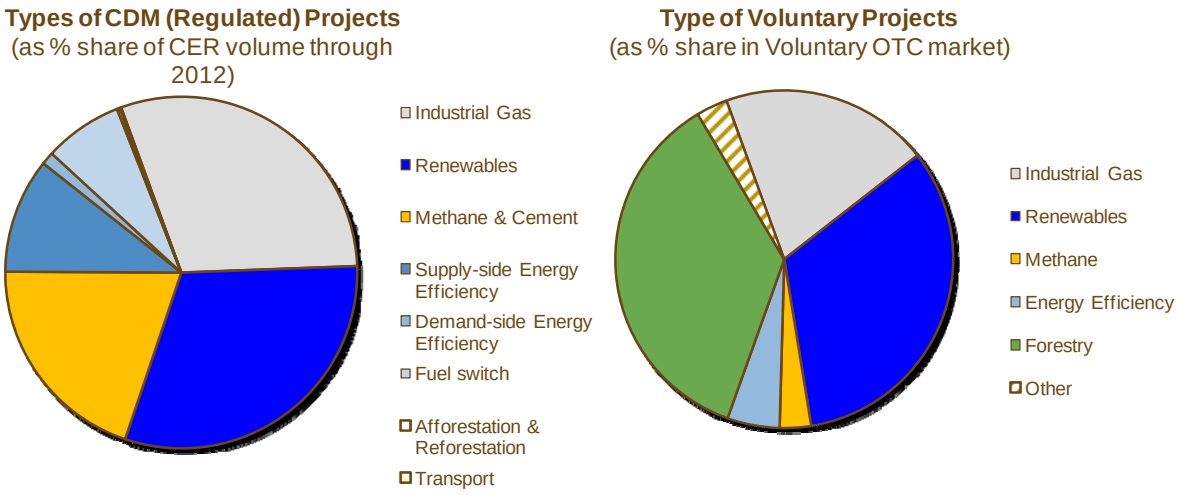
Indonesia can capitalize on the regulated carbon markets by submitting qualifying projects for UNFCCC approval under the CDM. The country has nearly 100 projects that could produce over 46 million tons in emissions reductions by 2012 in the UNFCCC CDM process. Currently, the UNFCCC requires that CDM projects (and most voluntary standards) prove that the emissions reductions they produce are verifiable (often auditing systems are in place), additional to reductions that would have taken place in the absence of the project, permanent (sequestered emissions are not released in future years such as a forestry sequestration project that dies or burns), and account for any leakage (emissions increases that are caused by the project). Of these requirements, additionality is the most controversial and challenging aspect. Additionality refers to the requirement that a project must produce emissions reductions that exceed (are additional) to reductions that would have occurred in absence of the project (business as usual). To prove additionality, it must be shown that there are barriers to the project that carbon credit funding helps overcome, such as investment (project is higher cost than alternatives), access to finance (insufficient funding), technological (high risk technology or skills not available), or prevailing practice (project is first of kind).

VOLUNTARY CARBON MARKETS

Outside the mandatory or regulated markets, credits from projects for greenhouse gas emission reduction are also sold to unregulated, voluntary buyers. These buyers may purchase credits "over the counter" (OTC), directly from projects, via brokers, or in voluntary markets such as the Chicago Climate Exchange[17]. Most of the credits (approximately 80 percent) in the voluntary markets are purchased by U.S. businesses that buy for several reasons, including sustainability reporting/internal goals, public relations/branding, and to allow the sales of carbon-neutral products. As the regulated CDM markets bring higher prices for carbon credits than voluntary markets, sources for voluntary credits are generally projects that do not meet EU Emissions Trading Scheme standards, such as Reduced Emissions from Deforestation and Forest Degradation (REDD) projects, projects that are located in non CDM or JI countries, or projects that have high transaction costs in comparison to their values and do not warrant submission to the UNFCCC. In addition, because of particular aspects of the UNFCCC process and the lack of clarity on regulations post-2012, many other types of projects are entering the pipeline (See Figure 8).

[17] Chicago Climate Exchange members are have voluntarily joined but are contractually bound to reduce, avoid, or offset their greenhouse gas emissions to 6 percent below the average of its 1998 to 2001 emission levels by 2010.

FIGURE 8: COMPARISON OF CDM AND VOLUNTARY PROJECT TYPES



FORESTRY

In the context of mitigating climate change, forests play a role in capturing and storing vast amounts of carbon. Therefore, restoring forests, planting new forests, reducing deforestation or forest degradation, and implementing sustainable forest management will reduce atmospheric greenhouse gases. Furthermore, the forest not only retains carbon but also supports local communities (indigenous people) and livelihoods through provision of many products, as well as performing ecosystem services such as the provision of water resources and wildlife habitat. Consequently, local communities can receive financial rewards for engaging in activities that preserve the forest, thereby compensating them for a portion of income lost from forest exploitation. As Indonesia generates a significant share of the world's carbon emissions from forest loss (more than four times the volume of emissions from energy consumption in Indonesia based data from World Resource Institute**),** it could potentially access a large share of the forest emission reduction market (potentially $2 billion per year). The existing and proposed (anticipating a post-2012 agreement) market-based, forestry carbon finance project types are afforestation/reforestation CDM and REDD.

Afforestation/Reforestation CDM (A/R CDM)

Afforestation refers to forest planting and/or seeding in areas that previously were not classified as forest. Reforestation is restoration of deforested areas. Under the CDM, afforestation is classified as the conversion of land that has not contained a forest for at least 50 years to forested land, and reforestation is the conversion of land that was not forested before 1990. Land that was deforested post-1990 cannot be claimed for A/R credit under the CDM rules. The rules governing afforestation and reforestation (A/R) activities under the CDM have been among the most controversial issues under the Kyoto Protocol. One major problem was the potential "non-permanence" of carbon stored in A/R projects; if the forests are destroyed by pests, fire, or human actions after payment has been made, there is no net greenhouse gas benefit.

The complexities in the CDM project registration process, and its coverage of only A/R projects in the forestry sector have led to most forestry projects being certified and registered in the voluntary carbon markets. In the voluntary carbon market scheme, several organizations have issued international standards for forestry projects, such as Voluntary Carbon Standard (VCS); Gold Standard, Carbon, Communities, Biodiversity (CCB) Standard, and California Climate Action Reserve (CCAR). These voluntary standards address diverse issues related to forest management, such as local communities, biodiversity, sustainability, and more. As an example, one of the projects under CCB standard in Costa Rica is *'Avoided deforestation through the payment of environmental services in rainforest on private lands in the conservation areas of the central volcanic mountain range of Costa Rica.'*

Reduced Emissions from Deforestation and Forest Degradation (REDD)

Deforestation refers to the conversion of forest to another land use or long-term reduction of canopy cover below the minimum of that defined as forest cover. Degradation refers to the impoverishment of standing, woody material mainly caused by human activities such as overgrazing or over-exploitation of the biomass (trees). The basic concept of REDD is simple: as the intact forest stores carbon both above and below ground, developing countries should be incentivized to preserve their forests instead of cutting them down. This payment to discourage deforestation under REDD was suggested in 2005 by a group of countries called the Coalition of Rainforest Nations. Avoided deforestation can be costly, as it involves much more than just protecting the land: credit revenues are needed across the value chain for protected area management and the local communities need to be adequately motivated to prevent illegal deforestation. There are significant stocks of carbon stored below ground, particularly in Indonesia's peat forests, but most REDD methodologies are focused above ground, where the carbon stocks are easier to measure. Despite the lack of a current market outside of voluntary payments for REDD credits, there are high hopes that during the post-Copenhagen (2009) negotiations and other Council of Party meetings, a mechanism to include payments for REDD credits will be established. The UK's Stern Review estimated that the REDD market could grow to $15 billion per year if regulated, and some estimates believe Indonesia could capture $2 billion of this.

The main concerns from the purchasers of REDD credits are additional, permanence, and leakage as described earlier. The developing countries that stand to receive REDD payments are concerned about surrendering their sovereignty and compromising future development plans. There are also concerns about indigenous peoples' rights, and the payment and profit sharing mechanisms of REDD funding. However, several REDD projects have been carried out. The payments have been arranged through standards-based voluntary carbon markets or directly in agreement between project owners and the fund providers. The World Banks' BioCarbon Fund began operations in 2004, and is still by far the most important buyer of carbon credits from forestry and other land-use activities. Through the carbon funds that it administers, the World Bank has established itself as one of the leaders in creating new carbon asset classes and building the level of comfort that is necessary for other public and private entities to become involved in selling and buying them. Some other leading REDD proponents include the United Nations Development Programme (UNDP), the United Nations Environment Programme (UNEP), the Food and Agriculture Organization of the United Nations (FAO – UN-REDD), the Norwegian government (committed $600 million), Brazil (Amazon Fund), the Australian government, GTZ, as well as NGOs such as The Nature Conservancy, Conservation International, WWF, CIFOR, and Wildlife Conservation Society. Merrill Lynch is funding the Ulu Masen project in Sumatra whereas Marriot Hotels support the Juma Sustainable Development Reserve in Brazil.

ADAPTATION FUND

The Adaptation Fund was established to finance concrete adaptation projects and programs in developing countries that are parties to the Kyoto Protocol that are particularly vulnerable to the adverse effects of climate change. The fund is managed under UNFCCC by the Adaptation Fund Board (AFB), which was decided at UNFCCC COP13 in Bali, 2007. The Adaptation Fund is not directly focused on NRM-related financial sources but as local communities are adversely affected by the climate change, the Adaptation Fund may serve to support the communities' wellbeing, enabling them to continue to manage their forests on a sustainable basis. In this context, the Adaptation Fund can be seen as one mechanism for supporting sustainable CBFM.

PAYMENT FOR ENVIRONMENTAL SERVICE (PES)

Environmental services are the provision of natural resources and healthy functioning ecological systems that produce environmentally and economically valuable goods and services including clean water, erosion control, carbon uptake, landscape beauty, and so on.[18] Payments for Environmental Services, or PES, are the compensation for providing environmental services. The actual payment that is transferred can take many forms: cash, in-kind assistance, tax exemption, tenure security, skills training, and more. Varied approaches are used for payments as each case of PES is distinct. The providers/suppliers (those who will receive the PES) are natural resource stewards "producing" environmentally and economically valuable goods and services. In the case of watersheds, providers are typically individual landowners or collective resource user groups of upland farms or forests or protected areas. Users/buyers (those who will pay out the PES) are beneficiaries willing to pay the benefit of receiving environmentally and economically valuable goods and services. In the case of watersheds, buyers are most likely public or private companies, irrigators, hydroelectric power generators, and industries.

There are several criteria that should be in place for PES execution. According to Wunder (2005), for PES to be implemented with success, five principles must be met[19]. The first and most critical principle is that the transaction is voluntary and not forced by the Provider or the Buyer. The environmental service provider must have land use choices that are not forced upon him, her, or it by outside entities. The second is that there must be a well-defined environmental service or land use, for example clean water or erosion control. Third, the service must be "bought" by a minimum of one ES buyer and, fourth, from a minimum of one environmental service provider[20]. The fifth and final criterion is that the environmental service provider must secure the environmental service will be continuously provided.

Ultimately, through PES, buyers will provide payments for natural assets and sustainable development, securing additional social and environmental benefits to the provider communities.

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[18] Conservation Finance Alliance 2002

[19] Wunder, S. 2005. *Payments for Environmental Services: Some nuts and bolts.* CIFOR Occasional Paper No. 42. Center for International Forestry Research, Bogor, Indonesia.

[20] The payments, whether it is monetary or in-kind, usually go through an intermediary.

OPPORTUNITIES TO GENERATE REVENUE FROM CLIMATE CHANGE INITIATIVES

SEMAUNG-SEPAPAN

Potential for A/R CDM and REDD

Semaung-Sepapan protected forest covers 3,000 ha divided into three zones: a no take zone (2,161 ha) and a limited utilization zone and production zone (both covering a total of 839 ha). According to the West Kalimantan provincial spatial plan, this protected forest is intended for dry land agriculture. In 2003, the communities, through their customary institution, made a proposal to local government to designate the forest area as a protected forest under the law. This forest has experienced heavy logging activity in the past, even the *no take zone* area is secondary forest. Furthermore, surrounded by oil palm concessions and threatened by community pressure for swidden agriculture, the forest is under threat of deforestation. Funding is needed to replant and restore the forest and to avoid deforestation. Such support would improve the carbon storage capacity and compensate people for the loss of production. These efforts could be supported by the incentives from A/R or REDD carbon credits. Such financial incentives could be appropriate if the land's legal status and ownership was fully recognized by the government in the official spatial plan.

Payment for Environmental Services

Different from the A/R CDM and REDD, the financial rewards derived through PES might be applicable to Semaung-Sepapan area. According to customary law, the no take zone of this protected forest serves as a catchment that supplies clean water, mitigates flooding, provides habitat for wildlife, acts as a reserve valuable woods, and provides spiritual services as the resting place of the spirits. There are no commercial economic activities in this zone. The provision of these environmental services encourages the local communities to maintain the protected forest. The local water municipality (PDAM) currently takes water from springs in the area. It is possible that through socialization of the PES concept, the PDAM and the community could create a PES market. Moreover, if PES schemes were to be developed, they could help strengthen the customary institutions that have been setting regulations aimed at sustaining forest management.

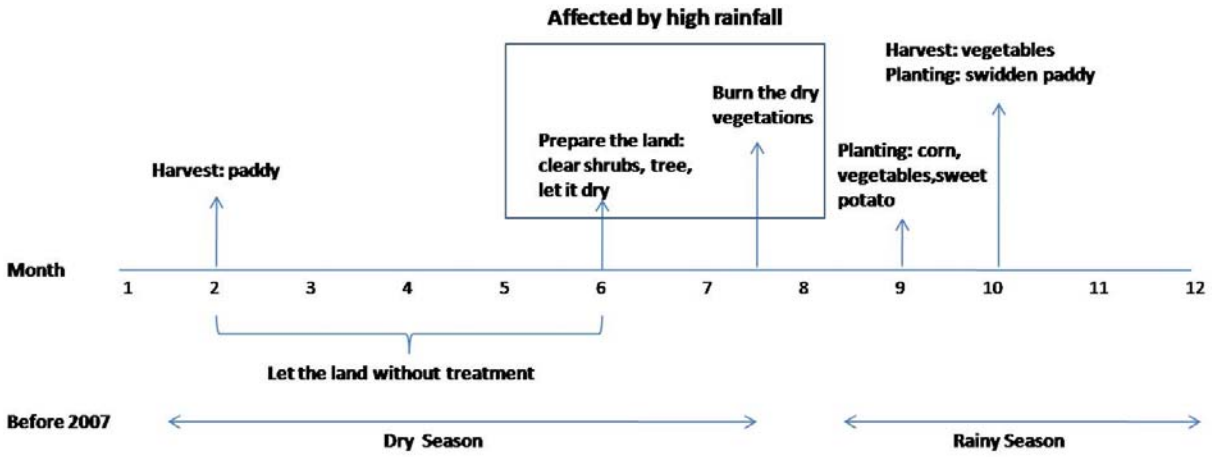
It is clear that many communities are already motivated to manage the forest sustainably because they receive environmental services and/or direct income. It is crucial that future efforts avoid an influx of exogenous incentives – which might include PES initiative - that could undermine the existing, endogenous services. There are far too many examples from around the world where local people are encouraged to start doing things because outsiders want something done. This can lead to local populations assume an employee's attitude instead of an owner's attitude. If viable opportunities for PES exist, they should be used to strengthen the incentives for people to manage the forests well. For example, for increasing their capacity to manage forests, water, natural resources and ecosystem services.

Adaptation to Weather Pattern Fluctuation

Livelihoods of communities in Semaung-Sepapan forest area have been adversely affected in the past three years by frequent rainfall, longer rainy seasons, and unpredicted yearly seasonal changes (see Figure 9). In 2007, the rainy season started early and lasted longer than usual, so it was not possible to prepare the land for swidden agriculture plots. This caused delays to planting and the harvest failed. Based on the seasonal calendar below, such weather patterns are perceived to be the primarily effect of land clearing.

To cope with these changes that are possibly the result of changing climate, the communities may need access to new methods of land clearing and to water-tolerant vegetables and rice varieties when rainfall is expected to increase. The communities could seek funding from international adaptation funds to help increase resilience to climate change, which will indirectly reduce the threat to the forest.

FIGURE 9: SEASONAL CALENDAR OF SEMAUNG-SEPAPAN



Potential Financial Mechanisms

The community managing the Semaung-Sepapan protected forest could benefit from climate changes' financial mechanisms that combine PES and adaptation funding. Existing customary institutions related to forest management must be involved in the design and implementation, as well as in benefit sharing of any such schemes. The presence of a credit union in this area may create potential as mechanism for distributing earnings to the communities.

SEMANGIT IN DANAU SENTARUM NATIONAL PARK

Potential for A/R and REDD

The primary forest managed by the Semangit *periau* (group of honey farmers) is located within DSNP. This primary forest has potential for marketing carbon storage and since the legal status of the national park is clear, REDD schemes may be applicable. However, if, the threat of deforestation and degradation of the National Park is low, this could invalidate the claim for REDD credits.

Payment for Environmental Services

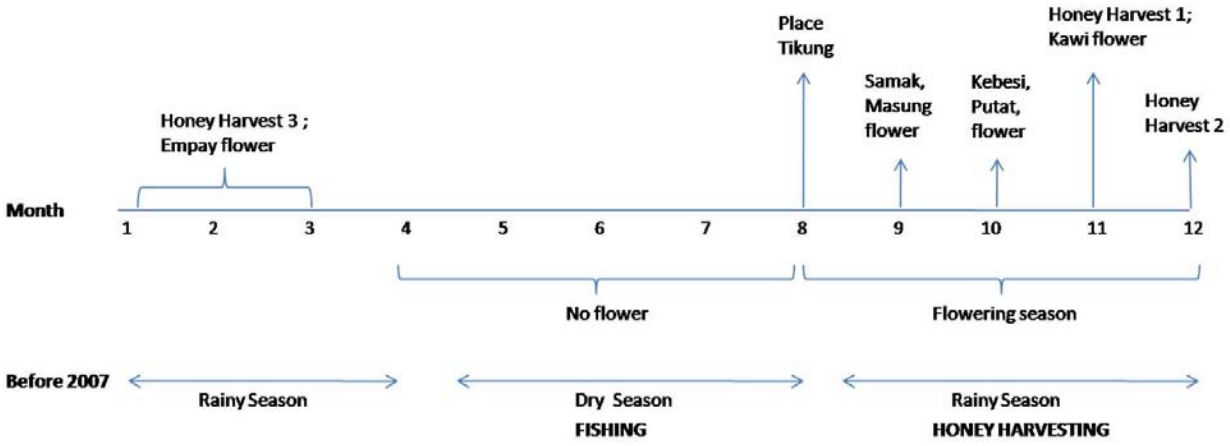
The main economic activities in Semangit are harvesting forest honey and fishing. Since these two activities rely heavily on the quality of forest and water resources, the communities actively protect the resources. The working area of APDS *periau* covers 25 percent of DSNP, which is about 33,000 ha. There is no formal customary law in this area but the community has established consensus on forbidding burning of the forest, promoting sustainable honey harvesting, managing fisheries, and forbidding the use of poison for fishing. Formal documentation of these agreements is distributed to other villages in the area and it is expected that everyone abides by the rules. This represents good governance in the management of community natural resources. In addition to honey and fish, the forest ecosystem also provides a source

of timber for house and boat construction, building floating fish ponds and firewood. The forest creates habitat for wildlife and provides valuable plants for consumption. Due to economic interest, the communities will voluntarily maintain the current forest. The condition and sustainability of the existing local NRM governance should be supported and improved. PES by downstream users or carbon credits could play a significant role to support this community.

Adaptation to Climate Fluctuation

In Semangit, weather fluctuations are perceived to be causing longer wet (high tide) seasons and unpredictable seasonal changes in the weather patterns (see Figure 10). Over the last three years, there has not been a dry season in the area. This adversely affects honey harvesting and fishing activities. The long wet season causes flooding. In 2007, water levels reached most of the *tikung* (wooden bee rafters that are placed on a tree branch about two to three meters above water surface) and the honey harvest failed. The long wet season also results in honey having a higher water content requiring that the honey be dehumidified to meet market standards and prevent spoilage. Flooded fishing areas are a disadvantage for the fishers because the fishing grounds become too large and, consequently, the fishing efforts are less productive. The community needs to adapt to these changes as they affect their main economic activities. The loss of income in combination with limited livelihood alternatives could trigger increased forest exploitation leading to degradation in the area. If this is anticipated as a genuine vulnerability, an adaptation fund could support the communities and provide access to improved honey processing techniques and alternative sources of income.

FIGURE 10: SEASONAL CALENDAR OF SEMANGIT



Potential Financial Mechanism

In Semangit, accessing Adaptation Funds may be a possible mechanism for creating financial incentives for continued sustainable forest management. Additional adaptation fund schemes might also be pursued, specifically to address the vulnerability to climate change impact and adaptation needs. Since customary institutions do not exist in this area, the present community associations such as APDS and fisher groups should be involved in design, implementation, and, perhaps, in managing profit sharing in the communities since they are proving effective in assisting local communities improve their livelihoods.

SUNGAI UTIK

POTENTIAL FOR A/R CDM AND REDD

The customary forest of Sungai Utik covers 9,452 ha and is divided into protected forest (3,667 ha); reserve forest with limited timber utilization (1,510 ha); and production forest (4,275 ha). The first two zones are primary forest with *Dipterocarp* trees as the dominant species. The daily life of community in Sungai Utik highly depends on their immediate environment. Customary law is practiced on a daily basis in this community and guides the way people interact with the ecosystem. This has created strong incentives for sustainable forest management across all three zones. Moreover, according to the West Kalimantan provincial spatial plan, the northern part of Sungai Utik forest, where the protected zone is located, it is a legally protected area; the rest of the area is designated for dryland agriculture. The provincial spatial plan is in line with the community's customary plan.

Since sustainable management of the protected forest is a legal requirement, an A/R CDM scheme may be applicable only in the production zone. A REDD scheme might be possible since the southern part of the Sungai Utik forest is categorized in the national land-use plan as a timber concession area. The timber company that has right to the timber concession, though, has not been active in the community forests due to conflict with the villagers over the past several years. In the past, the area in proximity to this forest was logged by the concession. Illegal logging is a threat in the northern part of the forest, which is a formally protected area under the national land use plan. Since CBFM is supported under strong local regulations, a REDD payment scheme could help the Sungai Utik community protect portions of their remaining forest.

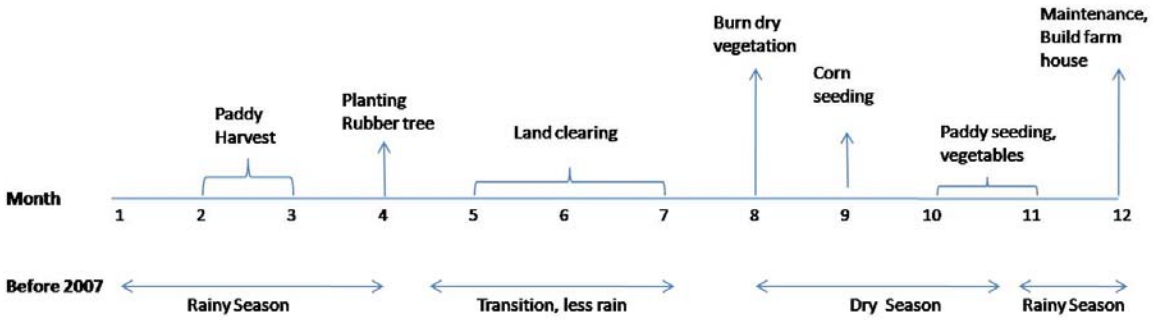
Payment for Environmental Service

Sungai Utik forest provides an ecological service in maintaining the watershed—it provides clean water, maintains the fertility of soils in adjacent agriculture areas, has a high capacity for carbon storage and harbors habitats for valuable plants and animals. The surrounding area has rubber tree plantations and swidden agriculture that generate economic benefits. The high dependence on the immediate environment for meeting daily needs and the existence of strong customary laws promoting forest management (proven by the SCBFM certification issued by LEI), have created incentives for the community to manage their forest in a sustainable manner. However, the limited income generating opportunities in Sungai Utik maintain a subsistence economy.

Adaptation to Fluctuation in Weather Patterns

The community in Sungai Utik has experienced an increase in problems caused by agricultural pests over the last two years. Over this same time period, they experienced higher rainfall and longer rainy seasons (see Figure 11). Fortunately, the Sungai Utik community keeps stock of more than one hundred varieties of paddy rice and this allows them to select suitable varieties to help cope with these changes. Vulnerability could increase with potential changes in climate but the indigenous adaptation strategies can help mitigate these provided that the pest management problems can be addressed.

FIGURE 11: SEASONAL CALENDAR OF SUNGAI UTIK



Potential Financial Mechanisms

Sungai Utik has the potential to access financial incentives using REDD mechanisms, PES and adaptation funds. A REDD scheme could be a standalone initiative but since mechanisms for REDD do not yet have full international backing or national guidelines, the options are limited. An alternative would be to design a package of interventions that would be combined to provide initiatives based on PES for downstream users and voluntary carbon market schemes. Additional funding could be pursued, specifically to address the adaptation needs related to climate change. Key factors that support sustainable forest management in the area are the strong customary institutions and system of governance that are respected and obeyed by community members. Therefore, the design, implementation, and profit sharing must involve the customary institutions to ensure sustainability and to ensure that the communities that practice sound stewardship of the forest derive tangible benefits from their efforts.

ACCESS TO CREDIT FOR THE THREE STUDY SITES

At the time this study took place (Spring 2009), most of the available credit had been used by the Semaung Sepapan community to buy luxury items such as motor scooters. Access to credit to purchase oil palm seedlings is available through the large plantations that the communities are already dependent on to buy their oil palm fruit. Because area has a market-based economy, there is more disposable income and access to credit than in the other locations. Although villagers in Sungai Utik do have access to credit, it use has not been optimized by the community. Microlending could assist the communities in developing markets as well as intensifying production of rubber in all three study sites.

SUMMARY

Various financial incentives for climate change initiatives and other activities such as PES are available to communities to assist them in maintaining their current CBFM practices and incentivize them to continue these efforts.

In Indonesia, PES for watershed management has advanced over the last five years whereas REDD is still in the pilot phase. It is possible that, through PES, the communities who are good stewards of the land will be recognized and compensated for practicing conservation activities that lead to protecting water

sources. Socializing this concept and setting up schemes such as PES takes coordination and long-term commitment. At the time of the field work for this study (Spring 2009), communities did not have enough access to information needed to pursue financial incentives. Although minimal credit was available in two of the study sites, it could be better utilized in the future for business development.

CHAPTER 5: CONCLUSIONS AND RECOMMENDATIONS

The goal of this stocktaking has been to identify enabling conditions that engendered successful forest management in different locations in order to inform a process that would establish a set of principles for sound forest management. The intention has been to isolate the factors that have led to success across a broad array of ecological and socio-cultural conditions. Our vision is that these finding will help to inform a broad-based discussion of ways in which the policy framework and the implementation mechanisms for forest management in Indonesia can be improved. The findings suggest that there are several – perhaps many – examples of community-based forest management that are not only ecologically sustainable but which also contribute significantly to people's economic and social well-being. The challenge is now to discuss these findings with a broader audience of people that can influence the way in which policy makers, local authorities and implementing agencies perceive the value of forest and forest lands in the development of the country.

SUCCESS FACTORS BASED ON SOCIO-ECONOMIC TYPOLOGY

Since each study site showed different socio-economic typologies, the underlying factors leading to the success of CBFM efforts can also be classified based on these typologies. The classification can also be used to assist in scaling up of successful practices as it helps identify the underlying factors for success based on the specific socio-economic typology. The success factors are drawn from the Strengths and Opportunities from the SWOT analysis.

TABLE 8: SOCIO-ECONOMICS AND UNDERLYING SUCCESS FACTORS TO SUSTAINABILITY CBFM

SEMAUNG-SEPAPAN **Socio-economic type: *strong customary institution with market-dependent economy***	**SEMANGIT** **Socio-economic type: *no customary institution but strong community institutions exist with intermediate market-dependent economy***	**SUNGAI UTIK** **Socio-economic type: *strong customary institution with subsistence economy***
Social: • Spiritual beliefs • Strong internal leadership initiatives • Long-term environmental vision for future generations • Existence of strong customary law (*hukum Adat)* • Adaptive and participative customary law • Strong coordination among Adat leaders in area • Legal recognition of protection forest	**Social:** • Existing community consensus for NTFP resources • Strong organization and coordination • Local ecological knowledge • Strong social cohesion • Long-term orientation to sustain environmental condition • Promotion/documentation of NRM • External support/intervention (NGO) • Enlargement of honey association members and production	**Social:** • Certification of sustainable CBFM • Participatory mapping process • Existence of strong customary written law (*hukum Adat*) • Strong internal leadership initiatives • Strong commitment to preserve forest; long-term orientation • Adaptive customary law • Strong social cohesion • Local ecological knowledge

SEMAUNG-SEPAPAN Socio-economic type: ***strong customary institution with market-dependent economy***	SEMANGIT Socio-economic type: ***no customary institution but strong community institutions exist with intermediate market-dependent economy***	SUNGAI UTIK Socio-economic type: ***strong customary institution with subsistence economy***
• Participation of local people in higher level politics		
Economic: • Existence of production zone • Access to credit • Available alternative income • Incentives for providing clean water resource • Good accessibility	**Economic:** • Diverse economic income from NTFP • Biocertified, recognized product • Market networking • Aquaculture • Alternative income from rubber • Potential market for honey products • Ecotourism development	**Economic:** • Economic potential from timber and NTFP • Ecotourism development • Access to microcredit • Premium price for forest products due to certification
Natural Resources: • Legal status as protected forest • Ecosystem functions as water catchment area • Enrichment planting may provide alternative income	**Natural Resources:** • Within the boundaries of DSNP (1990) • Sustainable honey and fish harvesting system • Explore NTFP such as medicinal plants	**Natural Resources:** • Clear forest boundary • Less environmental pressure due to family planning program • High dependency on immediate natural resources • Biodiversity potential

SUCCESS FACTORS AND RECOMMENDATIONS FOR SCALING UP

The stocktaking exercise was conducted by analyzing similarities in the factors leading to successful CBFM practices across the study sites. The success factors are categorized in terms of spatial management; social, economic, and natural resources subsystems; and climate change. The recommendations for how to scale-up these activities were developed as "minimum enabling conditions" or "minimum enabling tools" that other sites should have to sustain and strengthen successful CBFM.

UNDERLYING FACTORS FOR THE SUCCESS OF CBFM IN TERMS OF SPATIAL MANAGEMENT

- Community mapping that is driven by community consensus. This practice receives assistance from external parties directly (as in Sungai Utik and Semangit) or indirectly (as in Semaung-Sepapan). The resulting maps are used by communities as a physical tool for achieving legal recognition of the forest area.

Recommendation for scaling up:

In order to avert possible conflicts over land use, it is essential to ensure that clear spatial arrangements are agreed by community members and government agencies. Government-led land-use planning has

deep roots in Indonesia and there is a well-established system of governance. The challenge is to encourage a move toward local participation in decision making, which will require a concomitant shift away from top-down planning. To be successful, local communities and local authorities will have to gain access to spatial planning tools and skills. Such skills will allow the key stakeholders to engage in detailed community mapping that provides crucial input to the formal governmental spatial planning process. In addition, however, local communities will require better negotiating skills in order to have an equal voice in participatory land-use modeling that explores future scenarios.

UNDERLYING FACTORS FOR THE SUCCESS OF CBFM WITHIN SOCIAL SUBSYSTEM

- Existing long-term orientation toward CBFM.
- Existence of local natural resource governance, implementing regulations of sustainable NRM ("green governance").
- Adaptive and participative institutions and processes.
- Leadership (internal and external).

Recommendation for scaling up:

It is critical to ensure that there is active and effective leadership and community/customary governance (institution, vision, comply with established regulations) in relation to NRM. To accomplish this, it is essential to gain the support of official government institutions, such as the Ministry of Forestry, provincial and district governments, and the Development Planning Agency.

UNDERLYING FACTORS FOR THE SUCCESS OF CBFM WITHIN ECONOMIC SUBSYSTEM

- Benefits derived from the use of forest resources—it creates dependency at different scales.
- Potential alternative income generating activities.

Recommendation for scaling up

It will be necessary to enhance and further develop the economic benefits provided by the forest ecosystem. One the one hand, this will entail creating strong linkages to markets and tackling constraints and inefficiencies along the value chain. In some cases, it may be possible and appropriate to develop the economic potential of alternative natural assets, which will entail developing new patterns of resource use.

UNDERLYING FACTORS FOR THE SUCCESS OF CBFM WITHIN NATURAL RESOURCE SUBSYSTEM

- Presence of valuable natural resources for use within the community.
- Clear utilization of the area and natural resources.
- Available forest environmental services for the community.

Recommendation for scaling up:
It is important to prepare inventories of local assets – particularly natural resources and environmental services. It is even more important, however, to build on existing values and sustainable management activities by enhancing what is already working well.

UNDERLYING FACTORS FOR FINANCIAL INCENTIVES IN CLIMATE CHANGE CONTEXT

- Existing forest area either intact (carbon sequestered) or under threat of deforestation and degradation (opportunities for REDD).
- The communities practice sustainable forest management, which is promoted through customary law or community consensus that reflects local good governance
- The communities experience adverse impacts of climate change that threaten their livelihoods. In the long term, the integrity of the forest is threatened by outside encroachment and land conversion.

Recommendation for scaling up:
This stocktaking exercise has reiterated that each site is unique and no single project design is applicable for all sites. Each location must be assessed individually to elucidate the particular characteristics of the community and its natural assets.

Local governments are key players in the process of devolving authority for community-based management of forest resources but they themselves may lack the power to implement such actions. It is essential to negotiate for more authority for local government (provincial and district) to make decisions on revenue sharing mechanisms including possible carbon credit initiatives. It will be incumbent on government and donors to work closely with validating agencies to create 'new' standards that integrate carbon financing schemes and address issues of social, economic, and environmental sustainability.

The donor community continues to play a major role in promoting and supporting environmental management initiatives in Indonesia. Individually and as a group, major donors should promote sustainable NRM practices as an essential component of all investments in rural development.

POLICY RECOMMENDATIONS

The Ministry of Public Works and BAPPENAS (Indonesia's National Planning Development Agency) require a derivative regulation providing clear mechanisms for community involvement in the spatial planning process following the Law no. 26/2007, which guarantees community participation in spatial planning.

The Ministry of Forestry, National Commission for Climate Change (DNPI), Ministry of Environment, and Ministry of Less Developed Area need to develop an integrated regulation on procedures and tools for the valuation of forest ecosystems—taking into account sustainability of social-cultural-economy of local communities, forest ecosystem services, and biodiversity—in order to take advantage of the growing opportunities to access carbon markets.

CONCLUSIONS AND RECOMMENDATIONS

This stocktaking has described how three communities in Kalimantan are effectively managing their forest resources for social purposes, for economic reasons, and to meet broader environmental goals that

include maintaining a variety of ecosystem services. The three communities are only a small sample of many areas in Kalimantan and elsewhere in Indonesia where communities are managing natural resources, conserving biological assets, and maintaining the integrity of forest ecosystems.

Importance of Local Economies. Samangit provides a good example of how local economics can play a large part in helping maintain healthy forests. The income from forest honey has increased by 10,000 Rupiah/kg as a result of organic certification of the product. This is a significant increase in value and communities are now much more aware of the importance of maintaining a healthy ecosystem since their livelihoods are increasingly reliant on the sale of forest honey. People recognize that if the ecosystem is degraded, the value and sale of the honey will decrease thus reducing income.

Importance of Community Buy-In. Another important dimension is that there must be broad-based community buy-in to measures that are intended to protect the resources derived from the forest. In Samangit, the APDS association has put in place strict regulations to ensure that the biocertification is maintained. This measure will help sustain the income generating activity. But as these three case studies indicate, such systems of governance are most effective when they are built upon traditional forms of governance, provided its authority is still widely accepted. In communities where economic pressures or an influx of migrants has undermined traditional *Adat* authority, the base upon which to build or strengthen improved management of natural resources can be weak.

Importance of Intact and Threatened Landscapes. Within the context of new and proposed climate change initiatives in Indonesia, it is important that government, local authorities, and prospective funding agencies learn from the examples set by communities that are actively maintaining their forest resources. These communities should be considered as partners in conservation efforts. Large, well-funded programs are currently being set up to reforest extensive tracts of land such as the area covered by the former "Mega Rice" project in Central Kalimantan. These initiatives are extremely expensive and target degraded landscapes while intact but threatened forest landscapes are attracting significantly less investment in conservation. Efforts to strengthen programs that strive to save existing forest ecosystems and that build on local initiatives should be given greater attention. The case studies indicate that forest communities are acutely aware of the importance and value of the services that these ecosystems provide—not just provisioning of food and other natural products but also regulating services that ensure availability of clean water, and healthy wetlands and reduce the incidence of natural disasters such as drought, flooding, and landslides. The findings of this study suggest that forest communities often attribute higher value ecosystems services than to economic incentives for forest management. Nevertheless, "market drivers" can undermine these values and create disincentives for sound management if governance is weak or "non-economic" values are lost as a result of social change.

Importance of Vulnerability Assessments. Efforts to help forest communities in Indonesia tackle the likely consequences of climate change must look beyond short-term "fixes" aimed at addressing water shortages, mitigating impacts on agriculture, and engineering solutions to disaster management. Designing adaptation strategies that are effective and sustainable requires that we undertake rigorous, well-designed vulnerability assessments. These assessments should consider the vulnerability of project beneficiaries to different aspects of climate change and the likelihood that project impact may be compromised. There are some standard procedures for assessing vulnerability to climate change but there is considerable scope to improve upon the existing guidelines and practices. To date, few vulnerability assessments have examined potential resilience to climate change—for example, agricultural practices that can ameliorate the socioeconomic impact of extreme events such as drought. In Sungai Utik, for

example, the maintenance of a seed-bank of over 100 varieties of rice is a significant local asset upon which adaptation strategies can be developed. Social safety nets and economic "hedge" strategies are common in many rural communities. Any vulnerability assessment should identify such resilience and explore the potential for using it in developing adaptation strategies. We must adopt a thoughtful approach that values local knowledge and practices—while acknowledging that climate change is likely to create conditions rarely experienced in the recent past.

Importance of Developing PES. There is an important distinction between valuing ecosystem services, as described above, and deriving income from ecosystem services, which is referred to as Payments for Ecosystem (or Environmental) Services or PES. Opportunities to implement PES initiatives in the forest sector in Indonesia are still in their infancy but recent developments in the climate change arena appear to offer some promise—and some threats. It is possible that an approach can be developed to reward communities who are good stewards of the land and natural resources and compensate them for their management efforts that lead to conserving water sources and biodiversity and sequestering carbon. It is crucial that these "rewards" are seen to be more an acknowledgement of the communities' commitment to improving their own well-being than a gesture of thanks from outsiders who have their own motives for biodiversity conservation. In Indonesia, PES for watershed management has made some significant strides over the past five years. Most PES schemes for watershed management work at a sub-catchment level where results can be seen in a fairly short period of time. In the case of broader, landscape-scale conservation initiatives, it is possible that communities and organizations protecting critical watersheds could intensify their conservation efforts with financial support from public and private sector investments in PES schemes. Socializing this concept requires considerable coordination and long-term commitment. If appropriate schemes can be developed, PES could provide win-win opportunities for communities, local public and private sector interests, and national conservation efforts.

One potential form of PES—financial transactions built on carbon trading based on REDD models—has received considerable attention in the lead-up to the Copenhagen COP-15. As discussions of post-Kyoto models of emissions trading progress, REDD appears to be a likely candidate for international support. In order for REDD to be a viable approach for CBFM and effective conservation of biodiversity, individual initiatives must be built on the enabling conditions that have been identified in this study: good local governance and a recognition of the importance of non-economic benefits such as maintaining ecosystem services. At this time it is not clear that REDD benefits will genuinely improve forest management unless the forest is valued in other ways. Since current REDD schemes generate payments based on success at reducing rates of forest loss, the model is perhaps less useful in areas where forests are well managed and not under obvious threat. Hence, community forest management initiatives that are already working are unlikely to benefit from REDD as it is currently conceived.

Overarching Recommendations. Our vision of helping promote framework of policies, legislation and implementation guidelines that supports participatory management of forests and forest lands in Indonesia, can be realized only through broad-based discussion of the results of this stocktaking. The limited number of sites that were studied in this stocktaking exercise and the small geographical scope of the study should not constrain the utility of the findings. The subject matter for this study and the selection of the sites were made purposely with the goal of avoiding myopic conclusions. The situation in Kalimantan with regard to approaches to sustainable forest management is diverse in the extreme—exactly why we selected Kalimantan as the focal area. What we hope to have demonstrated here is that there are common threads in the way people have addressed local challenges. These commonalities cut across different ecological, cultural, social, and economic landscapes. Hence, we feel that the conclusions

that we have drawn from these analyses are valid across a broad array of environments. The following recommendations pertain not only to the specific sites nor to Kalimantan alone: they are pertinent to much of Indonesia and elsewhere in Southeast Asia.

Building on functional systems of local governance provides a solid foundation of community support and local authority buy-in. These systems of governance may be traditional rules and regulations that are not acknowledged by national laws but they still hold sway locally.

By emphasizing the importance of ecosystem services, forest management initiatives can avoid the potential pitfalls inherent in emphasizing market-based incentives for conservation. If well managed, the market-based incentives provide powerful motivation for sound management of forest resources but they can also drive overexploitation of resources if strong systems of governance are not in place. Balancing market-based incentives (economic values) with non-economic cultural, option (conserving for future needs) and bequest (conserving for future generations) values can reinforce local commitment to sustainable management. It is critically important to distinguish approaches that are based on maintaining "ecosystem services" and those that promote payment for ecosystem services (PES). They are *not* the same thing.

While REDD appears to offer many opportunities to support forest management initiatives, there is a danger that a market-driven strategy could undermine ecosystem-based approaches that place tangible, though "non-economic" values on the forest.

When assessing opportunities for integrating forest management initiatives with climate change adaptation work, vulnerability assessments must be grounded in the best available understanding of likely patterns of climate change and must identify existing resilience such as socio-economic safety nets and cultural adaptations that already exist. These can provide potential models or building blocks for adaptation strategies.

Site-specific stocktaking analyses and vulnerability assessments must be designed in a way that the results can be applied at scale. Moreover, the results of these analyses must be disseminated using media and messages that reach a large audience of relevant decision makers and practitioners. CK2C will continue to use FRAMEweb to help the participants in the Kalimantan stocktaking engage a broad array of stakeholders in further discussions on the subject of community-base forest management in Indonesia and the region.

CK2C is in the process of conducting similar stocktaking exercises in other parts of the world in order to gain experiential knowledge about best practices in community-based management of natural resources. When this exercise is complete, the CK2C team will have gathered and analyzed a wide range of shared learning experiences in NRM at the local, national, and regional scales. Comparisons of the challenges that people have faced in different locations across diverse landscape and the identification of commonalities in the way people have overcome these challenges will add a wealth of information on community-based NRM. Moreover, with local experts as advocates for sustainable NRM policies and conservation practices in their countries, we believe that USAID's CK2C initiative will make a positive contribution to community-based NRM across the globe.