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

FEBRUARY 2010

This publication was produced for review by the United States Agency for International Development. It was prepared by DAI.
COMMUNITY-BASED FOREST MANAGEMENT IN KALIMANTAN, INDONESIA: A STOCKTAKing OF LESSONS LEARNED

Program Title: Capitalizing Knowledge, Connecting Communities Program (CK2C)
Sponsoring USAID Office: USAID/Office of Acquisition and Assistance
Contract Number: EPP-I-00-06-00021-00/01
Contractor: DAI
Date of Publication: February 2010
Author: Stacy Crevello

The authors’ views expressed in this publication do not necessarily reflect the views of the United States Agency for International Development or the United States Government.
CK2C would like to acknowledge the work and dedication of the technical team – Rilus Kinseng, Lukman Yunus, Verania Andria, Irendra Radjawali, Erwan Nurindarto, and Elon Marnaek who conducted this research and analysis in Kalimantan, Indonesia. We would like to thank USAID/Indonesia for their support.
## CONTENTS

**CHAPTER 1: INTRODUCTION**

1.1 **OBJECTIVES**

1.2 **SITE SELECTION**

1.3 **METHODOLOGY**

   - Methods applied for gathering the information and data
   - Methods applied to data analysis

**CHAPTER 2: DESCRIPTION OF THE STUDY SITES**

**SPATIAL CONTEXT OF THE STUDY SITES**

- Spatial Planning Practices in Indonesia
- Spatial Plan of West Kalimantan Province
- Study Sites within Indonesian Spatial Plan

**STUDY SITE: SEMAUNG-SEPAPAN**

- Location
- Communities
- Main Activities: Socio-Economic, Livelihoods
- Natural Resource Governance

**STUDY SITE: SEMANGIT**

- Location
- Communities
- Main Activities: Socio-economics, Livelihoods

**STUDY SITE: SUNGAI UTIK**

- Location
- Communities
- Main Activities Socio-Economics, Livelihoods
- Natural Resource Governance

**CHAPTER 3: ANALYSIS OF SUCCESSFUL CBFM**

**DEFINING SUSTAINABILITY AND SOCIO-ECOLOGICAL APPROACH**

**UNDERLYING FACTORS CONTRIBUTING TO SUSTAINABLE FOREST MANAGEMENT**

- Semaung-Sepapan
Semangit ................................................................................................. 25
Sungai Utik ............................................................................................ 30

SUMMARY ............................................................................................... 35

CHAPTER 4: FINANCIAL OPPORTUNITIES AND ECONOMIC LEVERAGE FOR CBFM ................................................................. 37

CLIMATE CHANGE INITIATIVES ............................................................. 37
Regulated Carbon Markets ........................................................................ 37
Voluntary Carbon Markets ........................................................................ 38
Forestry ..................................................................................................... 39
Adaptation Fund ........................................................................................ 41
Payment for Environmental Service (PES) ................................................ 41

OPPORTUNITIES TO GENERATE REVENUE FROM CLIMATE CHANGE INITIATIVES ................................................................. 42
Semaung-Sepapan .................................................................................... 42
Semangit in Danau Sentarum National Park ............................................ 43
Sungai Utik ............................................................................................... 45
Potential for A/R CDM and REDD .............................................................. 45

ACCESS TO CREDIT FOR THE THREE STUDY SITES ............................................ 46
SUMMARY ............................................................................................... 46

CHAPTER 5: CONCLUSIONS AND RECOMMENDATIONS .............. 49

SUCCESS FACTORS BASED ON SOCIO-ECONOMIC TYPOLOGY .............................................................................................................. 49

SUCCESS FACTORS AND RECOMMENDATIONS FOR SCALING UP ............................................................................................................. 50
Underlying factors for the success of CBFM in terms of spatial management ................................................................. 50
Underlying factors for the success of CBFM within social subsystem ......................................................................................... 51
Underlying factors for the success of CBFM within economic subsystem ..................................................................................... 51
Underlying factors for the success of CBFM within natural resource subsystem ................................................................. 51
Underlying factors for financial incentives in climate change context ......................................................................................... 52

POLICY RECOMMENDATIONS .................................................................. 52

CONCLUSIONS AND RECOMMENDATIONS ........................................ 52
ANNEX 1. LITERATURE REVIEW AND JUSTIFICATION ..........57

ANNEX 2: EXISTING NATURAL RESOURCE MANAGEMENT AND SOCIO-ECONOMIC CONDITIONS........................................67

ANNEX 3: NATURAL RESOURCE INVENTORY AND RESOURCE POTENTIAL.................................................................81

ANNEX 4: SPATIAL PLANNING AND RECENT HISTORICAL DATA......................................................................................89

REFERENCES .................................................................................................................103
# TABLES & FIGURES

**TABLE**

1. Protected Areas (in Hectares) in West Kalimantan Province... 7
2. SWOT Analysis for Semuang-Sipapan.......................... 10
3. SWOT Analysis for Semangit ........................................ 14
4. SWOT Analysis for Sungai Utik ...................................... 17
5. Pattern of Utilization, Level of Sustainability, Potential for Development—SEMAUNG-SEPAPAN.......................... 25
6. Forestry and Fishery Pattern of Utilization, Level of Sustainability and Potential—SEMANGIT .......................... 29
7. Existing Utilization Patterns, Level of Sustainability, and Potential—Sungai Utik ........................................ 34
8. Socio-Economics and Underlying Success Factors to Sustainability CBFM........................................ 49

   1.1 Forest Management Best Practice Sites in Kalimantan (after PEACE, 2005) .................................................. 59
   1.2 Forest Products and Value – Forest-Based Systems (Deschamps & Hartmann, 2005) ........................................... 60
   1.3 Forest Products and Value – Agro-Based Systems (Deschamps & Hartmann, 2005) ........................................... 61
   1.4 Summary of Economic Benefits – Forest-Based, Agro-Based and Mixed Systems (Deschamps & Hartman, 2005) ...................................................................................... 62

   2.1 Estimated Value of Forest Resources Utilized from Protected Area per household annually ........................................ 68
   2.2 Estimated Value of Agriculture Products in Pandan Sembuat Village per Household annually ........................................ 69
   2.3 Estimated Value of Timber and NTFP in Semangit, per household, annually .................................................. 72
   2.4 Estimated Value of Fishery Products in Semangit, per household, annually .................................................. 74
   2.5 Estimated of Value of Forest Resource Extraction in Sungai Utik per household annually .............................. 77
   2.6 Estimated Value of Agriculture Products in Sungai Utik per household annually ........................................ 78
FIGURE

1. Spatial Plan of West Kalimantan Province............................... 6
2. Study sites Semaung-Sepapan, Semangit, and Sungai Utik... 8
3. Socio-Ecological System Boundary ....................................... 19
4. Back-loop interaction within human-forest system............. 20
5. Utilization of Natural Resources—SEMAUNG-SEPAPAN ..... 24
6. Utilization of Natural Resources—SEMANGIT .................... 27
7. Utilization of Natural Resources—Sungai Utik.................. 33
8. Comparison of CDM and Voluntary Project Types .......... 39
9. Seasonal Calendar of Semaung-Sepapan ......................... 43
10. Seasonal Calendar of Semangit ......................................... 44
11. Seasonal Calendar of Sungai Utik ...................................... 46
1.1. Changing forest cover of Borneo .................................. 64
4.1. Conceptual Map of Semaung-Sepapan Forest.............. 89
4.2. Commodity Networks of Sanjan Emberas Village ........... 90
4.3. Danau Sentarum National Park (Core Zone
    and Buffer Zone)............................................................. 91
4.4. DSNP during Wet Season in 2004 and Dry Season 1994... 91
4.5. Danau Sentarum National Park ...................................... 92
4.6. Working Areas of Association Periau Danau Sentarum ... 93
4.7. Map of DSNP Periaus Cooperatives............................. 93
4.8. Map of Commodity Distribution Semangit................... 94
4.9. Map of Managed Forest in Sungai Utik ......................... 95
4.10. Upstream Area of Jalai Lintang................................. 96
4.11. History of Recognized Forest Protection in
    Semaung-Sepapan......................................................... 97
4.12. Recent Time Line of NRM in Samangit and Danau
    Sentarum National Park............................................... 98
4.13. Recent Time of Sungai Utik Protected Forest Recognition.. 99
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. 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. This approach is based on ecosystems having complex adaptive systems; their governance requires flexibility and a capacity to respond to environmental feedback. 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.

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

---

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.


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\textsuperscript{5} was applied to understand NRM activities on an annual basis, critical to understanding livelihood activities.
- Rapid biodiversity assessments to identify 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.

\textsuperscript{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 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**

![Spatial Plan of West Kalimantan Province](image)
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

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

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

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
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>
<thead>
<tr>
<th>TABLE 2: SWOT ANALYSIS FOR SEMUANG-SIPAPAN</th>
</tr>
</thead>
</table>

| 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 |
## SWOT: To maintain ecosystem of customary protected forest in Semaung-Sepapan

<table>
<thead>
<tr>
<th>Strengths</th>
<th>Weaknesses</th>
<th>Opportunities</th>
<th>Threats</th>
</tr>
</thead>
<tbody>
<tr>
<td>Generations</td>
<td>No economic benefit from NTFP</td>
<td>Access to credit</td>
<td>Drop of palm oil price</td>
</tr>
<tr>
<td>Existence of strong customary adat law</td>
<td></td>
<td>Available alternative income</td>
<td>Climate change impact</td>
</tr>
<tr>
<td>Adaptive and participative customary law</td>
<td></td>
<td>Incentives providing water resource</td>
<td></td>
</tr>
<tr>
<td>Strong coordination among Adat leaders in area</td>
<td></td>
<td>Good accessibility</td>
<td></td>
</tr>
<tr>
<td>Legal recognition of protection forest.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Economic</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Existence of production zone</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Legal status as protected forest</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water catchment area</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Previously logged forest, over exploited</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low carrying capacity of production zone</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enrichment planting</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Natural Resource</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 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/km². 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. 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

---

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*, 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>
<thead>
<tr>
<th>TABLE 3: SWOT ANALYSIS FOR SEMANGIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>SEMANGIT COMMUNITY EXTRACTING AREA ECOSYSTEM in DANAU SENTARUM NATIONAL PARK (DSNP) (Malay communities; Selimbau subdistrict, Kapuas Hulu district)</td>
</tr>
<tr>
<td>SWOT: To maintain ecosystem in Semangit community working area within the association of honey farmers and fishermen group</td>
</tr>
<tr>
<td>Strengths</td>
</tr>
</tbody>
</table>
| 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/documentatio 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**

<table>
<thead>
<tr>
<th>Strengths</th>
<th>Weaknesses</th>
<th>Opportunities</th>
<th>Threats</th>
</tr>
</thead>
<tbody>
<tr>
<td>orientation to sustain environmental condition</td>
<td>Limited working capital</td>
<td>Alternative income from rubber</td>
<td>Limited area for agricultural activities</td>
</tr>
<tr>
<td>Economic</td>
<td>Lack of processing equipment (honey)</td>
<td>Potential market for honey products</td>
<td>Climate change impact</td>
</tr>
<tr>
<td>Diverse economic income from NTFP</td>
<td>Fluctuating price (fish) and limited market (honey)</td>
<td>Ecotourism development</td>
<td></td>
</tr>
<tr>
<td>Biocertified, recognized product</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Market networking</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aquaculture/floating fish farm system</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**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 3,667.2 ha is designated as a core area and no-take zone;
- **GALAO** (reserve forest) covering 1,510.7 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 place, the community could benefit from further extraction and commercialization of forest resources.

### TABLE 4: SWOT ANALYSIS FOR SUNGAI UTIK

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

<table>
<thead>
<tr>
<th></th>
<th>Strengths</th>
<th>Weaknesses</th>
<th>Opportunities</th>
<th>Threats</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Economic</strong></td>
<td>• Long-term orientation</td>
<td>• Limited income from NTFP generation</td>
<td>• Ecotourism development</td>
<td>• Economic transformation from subsistence to commercial economy</td>
</tr>
<tr>
<td></td>
<td>• Adaptive customary law</td>
<td>• Limited facilities, clean water, electricity</td>
<td>• Access to microcredit</td>
<td>• Climate change impact</td>
</tr>
<tr>
<td></td>
<td>• Strong social cohesion</td>
<td></td>
<td>• Premium price for forest products due to certification</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Local ecological knowledge</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Natural Resource</strong></td>
<td>• Clear forest boundary</td>
<td>• Practice of slash-burn/shifting cultivation</td>
<td>• Biodiversity potential</td>
<td>• The customary forest falls within timber concessionary area</td>
</tr>
<tr>
<td></td>
<td>• Less environmental pressure due to family planning program</td>
<td></td>
<td></td>
<td>• Pressure from external illegal logging</td>
</tr>
<tr>
<td></td>
<td>• High dependency on immediate natural resources</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
CHAPTER 3: ANALYSIS OF SUCCESSFUL CBFM

This chapter focuses on the sustainability of current CBFM at the three study sites. We have used 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. 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. Forces of change, disturbance, and

---


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, 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**

---

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 step 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.

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.

---

Forest Ecosystem Service: As Provider of Clean Water
The local people’s high level of dependence on water resources derived from the forest influences 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 runoff, make stream-flow more erratic, increase soil erosion and sedimentation in the river basins, thus increasing the risk of flooding that can cause 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 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).

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

<table>
<thead>
<tr>
<th>Parameters for Utilization</th>
<th>Pattern of Utilization</th>
<th>Sustainability of Forest Practices</th>
<th>Potential for Development</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dependence of function</td>
<td>High (as water source)</td>
<td>High, but still vulnerable to crop production losses and commodity price decreases (external factors)</td>
<td>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.</td>
</tr>
<tr>
<td>Variety of use of forest resources (timber and non-timber)</td>
<td>Very Low</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Main source of Income</td>
<td>Oil palm plantations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other alternative livelihoods</td>
<td>Both related and unrelated to forest exploitation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Actual level of income</td>
<td>High (Rp. 2.3 mil plantations and agriculture per family/month.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Motives for production</td>
<td>Commercial</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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’ 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: 8m³ 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>
<thead>
<tr>
<th>Parameters Utilization</th>
<th>Pattern of Use</th>
<th>Sustainability of Forest practices</th>
<th>Potential for Development</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dependence on function of forest area</td>
<td>High (forestry and fishery resources, transportation facilities, water sources, and so on)</td>
<td>High, due to the adaptation of populace toward resources. However, influenced by honey and fish price fluctuations, as well as alternative livelihoods.</td>
<td>Opportunity: Prospects exist with the development and support of alternative livelihoods in line with potential of area (example: sustainable harvesting of honey, ecotourism).</td>
</tr>
<tr>
<td>Variety of benefits of exploitation of forestry and fishery resources</td>
<td>High (wild honey, fish catches, fish husbandry)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Main source of income</td>
<td>Fishing and honey production</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other alternative livelihoods</td>
<td>Exist, but potential of area is limited</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Actual level of income</td>
<td>High (Rp. 1.5 million/family/month from fishing and honey production)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Production motives</td>
<td>Subsistence to commercial</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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
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 m³/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.

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

Sungai Utik

13.72%

86.28%

Consumption
Commercial

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 6 m³/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 m³/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>
<thead>
<tr>
<th>Parameters for Utilization</th>
<th>Pattern of Use</th>
<th>Sustainability of Forest practices</th>
<th>Potential for Development</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dependence on Function of Forest Area</td>
<td>High (timber and non-timber forest resources, water sources, etc.)</td>
<td>High due to adaptation of toward resources must be supported by development of livelihoods</td>
<td>Opportunity: In order to develop regions in which customary institutions remain strong, it is necessary to support through development of livelihoods for NTFPs</td>
</tr>
<tr>
<td>Benefits of Exploitation of Forestry Resources</td>
<td>High (timber and non-timber forest resources and cultivation of crop fields and plantations)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**TABLE 7: EXISTING UTILIZATION PATTERNS, LEVEL OF SUSTAINABILITY, AND POTENTIAL—SUNGAI UTIK**
<table>
<thead>
<tr>
<th>Parameters for Utilization</th>
<th>Pattern of Use</th>
<th>Sustainability of Forest practices</th>
<th>Potential for Development</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main Source of Income</td>
<td>Crops, rubber, and non-timber forest resources</td>
<td></td>
<td>and ecotourism.</td>
</tr>
<tr>
<td>Other Alternative Livelihoods</td>
<td>Limited</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Actual Level of Income</td>
<td>Low (Rp. 306,000/family/month from <em>ilipe</em> nuts and rubber)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Production Motives</td>
<td>Subsistence</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**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, 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. 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).

---

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 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 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 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 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 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.
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 met19. 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 provider20. 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.

---

18 Conservation Finance Alliance 2002
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**

<table>
<thead>
<tr>
<th>Month</th>
<th>Honey Harvest 3; Empay flower</th>
<th>Place Tikung</th>
<th>Samak, Masung flower</th>
<th>Honey Harvest 1; Kawi flower</th>
<th>Honey Harvest 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>No flower</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**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.
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 TYPOLGY

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

<table>
<thead>
<tr>
<th>SEMAUNG-SEPAPAN</th>
<th>SEMANGIT</th>
<th>SUNGAI UTIK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Socio-economic type: strong customary institution with market-dependent economy</td>
<td>Socio-economic type: no customary institution but strong community institutions exist with intermediate market-dependent economy</td>
<td>Socio-economic type: strong customary institution with subsistence economy</td>
</tr>
</tbody>
</table>

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
### 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

---

<table>
<thead>
<tr>
<th>SEMAUNG-SEPAPAN</th>
<th>SEMANGIT</th>
<th>SUNGAI UTIK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Socio-economic type: strong customary institution with market-dependent economy</td>
<td>Socio-economic type: no customary institution but strong community institutions exist with intermediate market-dependent economy</td>
<td>Socio-economic type: strong customary institution with subsistence economy</td>
</tr>
</tbody>
</table>

- 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

- Diverse economic income from NTFP
- Biocertified, recognized product
- Market networking
- Aquaculture
- Alternative income from rubber
- Potential market for honey products
- Ecotourism development

- 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

- Within the boundaries of DSNP (1990)
- Sustainable honey and fish harvesting system
- Explore NTFP such as medicinal plants

- Clear forest boundary
- Less environmental pressure due to family planning program
- High dependency on immediate natural resources
- Biodiversity potential
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.
STOCKTAKING ON COMMUNITY-BASED FOREST MANAGEMENT IN KALIMANTAN

SUMMARY
The CK2C Stocktaking activity was aimed at feeding experiential knowledge about current best practices into program and project designs aimed at conserving Kalimantan’s forests and Orangutan habitats. Forest management in Kalimantan reflects a broad array of different governance arrangements, management practices and livelihoods benefits. These forests are also of critical importance to the conservation of biodiversity – including critically endangered species such as the Orangutan – and to climate change mitigation. Recent studies of the major fires that occurred in Kalimantan in 1997 have shown that between 0.8 and 2.57 Gt of carbon were released into the atmosphere. This represents between about 13 and 40% of the mean annual global emissions from fossil fuels (Page et al., 2002; Langner et al., 2007). Clearly, forest fires in Kalimantan are a potentially huge influence on global climate change. We anticipate building upon the Guiding Principles for Developing Collaborative Management Initiatives that Deschamps and Paul Hartman (current Chief of Party for USAID DAI Orangutan Conservation Services Program) (2005) outlined:

Focus on the link between healthy ecosystems and sustainable livelihoods. The Segah collaborative management project showed that healthy forest ecosystems can provide higher levels of economic benefits than agro-based or even mixed forest/agro-based communities. To the host community, the greatest benefit of these functions is the livelihoods that they support. The stocktaking exercise identified the potential positive effects of economic improvements on natural ecosystems.

Let the community guide the process, but provide them with sufficient information and expertise to make informed decisions. The collaborative management projects in Kalimantan demonstrate that using existing management structures (i.e., Adat customary laws that dictate local aspects of daily lives and societal institutions including natural resource use) supported by focused external resources and the introduction of easily understood new concepts (e.g., management bodies, community conservation agreements) develops project ownership by the community and builds a long-term commitment to conservation (Deschamps, 2004). In order to ensure that communities are empowered with decision-making abilities, it is critical that land tenure/rights of use be formalized without detriment to host communities. The stocktaking will also assess whether community-based governing structures are representative and transparent and will explore how effective community-based organizations have been in managing NRM-based enterprises.

Develop and execute forest management initiatives with a long-term vision. Activities should be initiated in which the host community has the need, capacity and resources to continue post-intervention. Projects can easily become unsustainable as a result of high levels of external input with no clear strategy for supporting capital-intensive activities (e.g., infrastructure) once the primary donor agency has
withdrawn. In order to avoid such a dilemma, a comprehensive exit strategy must be developed by the primary project facilitator.

These are just three of the recommendations of recent studies. Undoubtedly, there are other conditions that have resulted in sound and sustainable management of forests in Kalimantan. The goal of the stocktaking was to identify the specific enabling conditions that have engendered successful forest management at different locations and to build a set of minimum principles for sound forest management that can be used to inform other forest management initiatives in the region.

**BACKGROUND**

Stocktaking was developed to complement conventional evaluations in getting experiential knowledge. It is a form of impact assessment that has been used to inform strategies, programs and projects; and to inform international discussions (e.g., the UN Convention to Combat Desertification). It was developed following the observation that critical impacts and lessons from a number of projects were (a) produced in the years following the end-of-project (EOP) and/or (b) unanticipated. In addition, it was noted that not all valuable impacts and lessons were the outcome of funded projects. Consequently, relying on conventional EOP evaluations was not sufficient to either capitalize the lessons or tell the full story.

Stocktaking starts with impacts and then works backwards to (a) identify the barriers that were overcome to achieve those impacts and (b) the actions taken to break down the barriers. Impacts can be measured in economic terms (revenues, yields, diversification of revenue sources, etc.), biophysical terms (degradation rates), or governance terms (rights and access to resources, decision making locus, etc.) Barriers would be obstinate policies and ineffective institutions, weak producer organizations, poor knowledge of knowledge options, etc.

In the forest sector in Indonesia, multiple systems of governance (including corruption and anarchy) prevail. The CK2C stocktaking aimed to select several successful approaches to forest management and to analyze the reasons for the successes.

Communities: Over the years there have been many examples in Indonesia in which community interest was not well represented in decision-making. By failing to account for the public interest, these narrowly based management regimes have often led to unsustainable development activities (Dutton, 2001).

Decentralization emboldened many communities to make claims to what they view as their customary use areas within timber concessionaires and national parks. However, as they lack information on their traditional land rights and possess weak negotiating skills, communities are often poorly equipped to stake their claims. In such cases, compromises are often reached that provide short-term fixes that only benefit select members of the community.

Decentralization Processes as they relate to Natural Resource Management and Governance: Today one of the main problems facing Indonesia’s forests is conflict with local communities resulting from:

- The weak tenures accorded customary communities under the Agrarian and Forestry laws;
- The lack of clear regulations setting out how to recognize these weak tenures;
- The lack of regulations for recognizing ‘rights forests’, ‘customary forests’ and ‘Special Purpose Areas’;
• The inadequacies of the process in which logging concession were gazetted and national parks created;

• Confusion over new laws that have decentralized some aspects of the state’s jurisdiction over lands, forests and other natural resources to district authorities; and

• New laws that recognize the legitimacy and rights of local communities, which have yet to be accommodated by revised land tenure and forestry laws.

Livelihoods: Many forest areas of Kalimantan there are examples of management systems that provide sources of livelihood while protecting the forest’s integrity. These may be based on natural products or other forms of NRM-based enterprises. These enterprises can be made more effective in terms of revenue generation if certain conditions are established (e.g., stronger access and use rights, better access to markets, better information about markets, greater organizational skills, a stronger stakeholder position in the value chain, etc). Indeed, the Asia-Pacific Forestry Commission’s study “In Search of Excellence” Exemplary Forest Management in Asia and the Pacific” (2005) identifies nine locations in Kalimantan (see Table 1.1) that have been nominated as best practice sites.

**TABLE 1.1: FOREST MANAGEMENT BEST PRACTICE SITES IN KALIMANTAN (AFTER PEACE, 2005)**

<table>
<thead>
<tr>
<th>Site</th>
<th>Location</th>
<th>Area (ha)</th>
<th>Objective</th>
<th>Managing entity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bukit Bangkirai Forest</td>
<td>E. Kalimantan</td>
<td>1,500</td>
<td>Ecotourism, research</td>
<td>PT Inhutani I</td>
</tr>
<tr>
<td>Kalok-Nahiang Rivers</td>
<td>C. Kalimantan</td>
<td>204,200</td>
<td>Sustainable timber</td>
<td>PT Sarmeito Prakantja Timber</td>
</tr>
<tr>
<td>Ketapang Timber</td>
<td>W. Kalimantan</td>
<td>294,000</td>
<td>Sustainable wood production</td>
<td>PT Suka Jaya Makmur</td>
</tr>
<tr>
<td>Concession</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Labanan Timber</td>
<td>E. Kalimantan</td>
<td>83,240</td>
<td>Sustainable timber</td>
<td>PT Inhutani I</td>
</tr>
<tr>
<td>Concession</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Long Bagun Timber</td>
<td>E. Kalimantan</td>
<td>269,000</td>
<td>Sustainable timber</td>
<td>PT Sumalindo Lestari Jaya</td>
</tr>
<tr>
<td>Concession</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mt. Semuang protection</td>
<td>W. Kalimantan</td>
<td>3,000</td>
<td>Watershed protection, ecotourism</td>
<td>Dayak Hibun local community</td>
</tr>
<tr>
<td>forest</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PT Ratah Timber</td>
<td>E. Kalimantan</td>
<td>97,690</td>
<td>Sustainable wood production</td>
<td>PT Ratah Timber</td>
</tr>
<tr>
<td>Concession</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rimba Berseri Forest</td>
<td>W. Kalimantan</td>
<td>16,490</td>
<td>Sustainable timber</td>
<td>Forest Cooperative “Rimba Berseri”</td>
</tr>
<tr>
<td>Cooperative</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sanggau Forest</td>
<td>W. Kalimantan</td>
<td>135</td>
<td>Multiple use, sustainable livelihoods</td>
<td>LKAD – Institution of Participative Forest Area Management</td>
</tr>
</tbody>
</table>

There are four other cases where community-based forest management initiatives have been implemented in Kalimantan – a study of Apo Kayan undertaken in the early 1990s; TNC’s work at Wehea in East Kutai; the work of BOS in Samboja Lestari in East Kalimantan and Mawas in Central Kalimantan; and the management of Sungai Udik in West Kalimantan on the border with Sarawak. In addition OCSP
grantees have started activities that include community conservation activities in Tanjung Puting in Central Kalimantan and FFI’s two carbon sites in West Kalimantan and the Batang Toru area in North Sumatra.

A preliminary trip to Wehea by Andrew Watson (CK2C Chief of Party) in May 2008 revealed the importance of “informal” transfer of rights to local communities. The local authorities have recognized the rights of the Wehea people to an area of about 38,000 ha of forest – some of it partially logged timber concession. A management council has been created comprising a 16-person Steering Committee made up of representatives of local government and the private sector as well as 4 community representatives and two from universities. In 2020, the community will take over full management responsibility: in the lead up to this, local people are being awarded scholarships to receive training through the school of forestry. Currently, the direct benefits of community management are fairly limited – about 10 local people receive salaried employment. Nevertheless, there is immense local pride in the community’s new rights and the visibility this has created. At this time, the community leadership sees little merit in extracting timber or converting forest lands to oil palm plantation (two of the main economic drivers in the area).

**Forest Products:** Dayak communities have traditionally relied heavily upon hunting wild game as a source of food. This represents an important protein source for the people in the upper reaches of the Kelay and Segah rivers. Of greatest importance is the consumption of the Bearded pig (*Sus barbatus*). According to the survey, agricultural households that hunt pig (i.e., Dayak households), consume an average of 89.2 kilograms of pig meat annually, or 15.4 kilograms per person. This estimate is very close to the 12 kilograms of wild meat per person consumed in Sarawak (MacKinnon *et al.*, 1996:380). Other forms of wild game were also recorded in the survey including deer, river turtles, monkeys and civets, although other species, such as sun bear and orangutan, are also known to be consumed.

Households in forest-based systems derived approximately Rp. 9.08 million (USD $1,058) in forest products (Table 1.2). Almost half of this value was either sold or traded, although most of the wild game gathered from the forest (i.e., meat and fish) was consumed in the home. Timber was the most important forest product in terms of value, and was sold along with gaharu (aloa wood) and honey as the most important sources of income.

<table>
<thead>
<tr>
<th>Product</th>
<th>Average Annual Production per Agricultural hh (kg)</th>
<th>Average Total Value (in Rp)</th>
<th>Used</th>
<th>Value</th>
<th>Sold/Traded</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bird nests</td>
<td>0.004</td>
<td>9,836</td>
<td>0.0%</td>
<td>0</td>
<td>100.0%</td>
</tr>
<tr>
<td>Damar</td>
<td>1.6</td>
<td>2,855</td>
<td>95.8%</td>
<td>2,736</td>
<td>4.2%</td>
</tr>
<tr>
<td>Fishing</td>
<td>164.9</td>
<td>1,082,898</td>
<td>78.8%</td>
<td>853,813</td>
<td>21.3%</td>
</tr>
<tr>
<td>Gaharu</td>
<td>1.0</td>
<td>2,324,859</td>
<td>0.0%</td>
<td>0</td>
<td>100.0%</td>
</tr>
<tr>
<td>Honey</td>
<td>33.0</td>
<td>817,725</td>
<td>33.3%</td>
<td>272,067</td>
<td>66.7%</td>
</tr>
<tr>
<td>Medicinal plants</td>
<td>0.6</td>
<td>902</td>
<td>97.3%</td>
<td>877</td>
<td>2.7%</td>
</tr>
<tr>
<td>Other hunting</td>
<td>0.5</td>
<td>140,328</td>
<td>49.3%</td>
<td>69,228</td>
<td>50.7%</td>
</tr>
<tr>
<td>Pig hunting</td>
<td>89.2</td>
<td>566,287</td>
<td>88.7%</td>
<td>502,244</td>
<td>11.3%</td>
</tr>
</tbody>
</table>

TABLE 1.2: FOREST PRODUCTS AND VALUE – FOREST-BASED SYSTEMS  
(DESCHAMPS & HARTMANN, 2005)
Households in agro-based systems derived approximately Rp. 2.90 million (USD $338) in forest products (Table 1.3). Timber was the most important forest product gathered, with household consumption being slightly more than that being sold or traded. The remainder of the forest products had more defined roles in the household economy; they were either used or sold/traded, but not both. Shrimp, other hunting (i.e., non-pig game), medicinal plants and rattan were consumed exclusively in the home (and fish nearly so). Gaharu was the only product gathered exclusively for sale.

TABLE 1.3: FOREST PRODUCTS AND VALUE – AGRO-BASED SYSTEMS (DESHAMPS & HARTMANN, 2005)

<table>
<thead>
<tr>
<th>Product</th>
<th>Average Annual Production per Agricultural hh (kg)</th>
<th>Average Total Value (in Rp)</th>
<th>Used %</th>
<th>Value</th>
<th>Sold/Traded %</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fishing</td>
<td>22.3</td>
<td>120,161</td>
<td>80.7%</td>
<td>96,930</td>
<td>19.3%</td>
<td>23,232</td>
</tr>
<tr>
<td>Shrimp</td>
<td>6.5</td>
<td>161,290</td>
<td>100.0%</td>
<td>161,290</td>
<td>0.0%</td>
<td>0</td>
</tr>
<tr>
<td>Pig hunting</td>
<td>0.0</td>
<td>0</td>
<td>N/A</td>
<td>0</td>
<td>N/A</td>
<td>0</td>
</tr>
<tr>
<td>Other hunting</td>
<td>0.1</td>
<td>8,065</td>
<td>100.0%</td>
<td>8,065</td>
<td>0.0%</td>
<td>0</td>
</tr>
<tr>
<td>Bird nests</td>
<td>0.0</td>
<td>0</td>
<td>N/A</td>
<td>0</td>
<td>N/A</td>
<td>0</td>
</tr>
<tr>
<td>Damar</td>
<td>0.0</td>
<td>0</td>
<td>N/A</td>
<td>0</td>
<td>N/A</td>
<td>0</td>
</tr>
<tr>
<td>Gaharu</td>
<td>0.9</td>
<td>427,335</td>
<td>0.0%</td>
<td>0</td>
<td>100.0%</td>
<td>427,335</td>
</tr>
<tr>
<td>Honey</td>
<td>0.0</td>
<td>0</td>
<td>N/A</td>
<td>0</td>
<td>N/A</td>
<td>0</td>
</tr>
<tr>
<td>Medicinal plants</td>
<td>0.5</td>
<td>532</td>
<td>100.0%</td>
<td>532</td>
<td>0.0%</td>
<td>0</td>
</tr>
<tr>
<td>Rattan</td>
<td>1.5</td>
<td>1,226</td>
<td>100.0%</td>
<td>1,226</td>
<td>0.0%</td>
<td>0</td>
</tr>
<tr>
<td>Timber (m³)</td>
<td>9.1</td>
<td>2,183,871</td>
<td>57.8%</td>
<td>1,261,792</td>
<td>42.2%</td>
<td>922,079</td>
</tr>
<tr>
<td>Total</td>
<td>2,902,480</td>
<td>52.7%</td>
<td>1,529,835</td>
<td>47.3%</td>
<td>1,372,646</td>
<td></td>
</tr>
</tbody>
</table>

Source: Agricultural Producer and Water User Survey, 2002
Note: USD $1 = Rp. 8,575 (June, 2002 – similar to 2008). Totals may not add up exactly due to rounding.

The socio-economic profiles show that almost all rural residents have an income associated with local natural resource consumption, with some households completely dependent upon natural resources for their livelihoods. It estimated that forest-based activities can contribute up to 75% of a total local cash economy, as well as provide high levels of basic foodstuffs and building materials while enabling residents of forest-based communities to attain a lifestyle that is superior to those in other rural areas in the watershed (Table 1.4). The fact that the system is based on traditional Adat is a definite strength,
making it a valid planning approach. Formal recognition of Adat is an important condition for replicating the collaborative model elsewhere.

TABLE 1.4: SUMMARY OF ECONOMIC BENEFITS – FOREST-BASED, AGRO-BASED AND MIXED SYSTEMS (DESCHAMPS & HARTMAN, 2005)

<table>
<thead>
<tr>
<th></th>
<th>Agricultural Production</th>
<th>Livestock Consumption</th>
<th>Forest Products</th>
<th>Total Economic Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forest-based</td>
<td>$324 (22.7%)</td>
<td>$41 (2.9%)</td>
<td>$1,058 (74.4%)</td>
<td>$1,423</td>
</tr>
<tr>
<td>Agro-based</td>
<td>$260 (35.7%)</td>
<td>$130 (17.8%)</td>
<td>$338 (46.5%)</td>
<td>$728</td>
</tr>
<tr>
<td>Mixed Agro/forest</td>
<td>$318 (46.8%)</td>
<td>$68 (10.0%)</td>
<td>$293 (43.2%)</td>
<td>$679</td>
</tr>
</tbody>
</table>

The most economically productive form of land use is to retain forests for long-term harvesting of non-timber forest products and timber under a sustainable-yield regime. Several studies also indicate that the total financial value of forest resources harvested in this manner is considerably higher than the market value of one year’s harvest if all the merchantable timber were extracted in one operation, which is currently common practice (MacKinnon et al., 1996). The information presented above support this research, and logic dictates that a collaborative management approach would ensure the sustainability of the system.

However, as an economic system, forest-based economies such as those in Berau have some vulnerable points. The remoteness and lack of access to major centers make the local market for forest products vulnerable to manipulation by traders and middlemen. Higher-level income-generating activities can involve unsustainable levels of timber extraction and forest clearing for cash crop farming. Over-indulgence in these activities can put stress on the ecosystem. This can affect the ability of the ecosystem to provide services to communities, with noticeable impacts on human welfare and health.

The dependency of forest-based communities on forest goods forms the crux of the collaborative management approach. Furthermore, tenure of these forests by the dependent communities is the key to sustaining livelihoods and alleviating poverty. Whereas much of the capital held in agro-based communities is in the form of livestock, the vast majority of capital for forest-based communities is held in the forests that comprise their traditional land bases.

The socio-economic profile indicates that mixed agro/forest-based communities are more closely correlated to agro-based communities in terms of their emphasis on agricultural products and livestock inventories. This is largely the cumulative result of ‘imported’ agricultural practices from non-indigenous cultures, decreasing areas of natural forests available to mixed communities to establish natural capital and the lack of understanding of the potential benefits to be had from the sustainable exploitation of forest products. It also illustrates the need for resource-based Adat as a means to enable and manage these opportunities. Other examples where reforestation has been undertaken to support the development of Adat-based management systems exist in Indonesia.

In the context of the forests of Indonesia stakes are high for both the population and the global climate. And, we know that many are working on schemes to conserve the forests against being over-logged and converted to oil palm plantations. Some of these schemes – such as a recent initiative for Ulu Masen in Aceh – rely heavily on avoided deforestation payments (REDD) and annual payments for carbon sequestration to promote or support conservation. While these may be effective, they also depend upon outside sources of funds only indirectly linked to the health of the forests. We propose to assess
opportunities for strengthening economic activities within the forests that both improve livelihoods and increase the incentives for the conservation of the forest ecosystems.

Kalimantan has seen massive deforestation over the past 50 to 60 years (see Figure 1.2). This has in part been the result of planned logging of designated production forests and conversion to agriculture in areas zoned for such conversion but many areas designated as protection forest have also been deforested\(^\text{21}\). Recent studies have also shown that burning is a major cause of forest loss but, even more importantly, most fires occur within about 5 kilometers of roads and forest margins. There are strong indications that the destruction of forests by fire occurs mainly where the forest has already been degraded by logging and by conversion activities\(^\text{22}\). Extensive areas of forest in Kalimantan are located in peatlands that are susceptible to degradation and fires when the forest cover is degraded. These peatlands are important sources of water for agriculture and they store large volumes of carbon – more in the peat deposits than in the standing trees (Boehm and Frank, 2008). The degradation of the peatland forests through logging and conversion to agriculture and plantations has important consequences for local communities, agriculture and climate change (Miettinen et al., 2007).

In many ways, the chaotic state of forest management in Indonesia is the result of overlapping and contradictory policies, laws and regulations. There is inconsistency across sectoral policies, legislation, local regulations, and practices differ from province to province and community to community. While in the overall scheme of things this situation is untenable because it creates opportunities for abuse, at the local level, it has also created opportunities for adopting creative solutions to the forest crisis. Several local governments and a number of timber concessionaires have implemented innovative forest management initiatives that draw on local knowledge and community participation. Some of these “experiments” have been operating for ten years or more and several have a successful track record. The intention of the CK2C stocktaking will be to select several of these best-practice cases and try to assess why they have been successful.

A study by Vince Deschamps and Paul Hartman compiled a comprehensive list of community-based forest management activities in Indonesia and explored some of the strengths and weaknesses of the different initiatives. The following sections are taken from this work.

**COMMUNITY-LEVEL FOREST MANAGEMENT IN INDONESIA**

Small rural communities have existed in and around forested areas in Indonesia since prehistoric times. Over the centuries, complex societies evolved with sophisticated relationships to the natural world. Societal values developed over time that not only enabled individuals and communities to survive, but also allowed them to do this on a sustainable basis. Sustainable practices became common practice and eventually were ‘institutionalized’ as traditional law, or *Adat*. Throughout Indonesia, Adat forms the basis for forest tenure by traditional communities that are dependent upon the sustainable exploitation of natural resources for their livelihoods.

**Basic Principles of Adat:** Adat is a set of traditional laws that regulate nearly all aspects of life in the community, and are not necessarily restricted to natural resource use. In many societies with a long...
history and presence in forested areas, such as the Dayak groups in Berau Regency, resource-based Adat has a clearly defined purpose. One definition of resource-based Adat that has been developed through previous studies is as follows:

“The protection role and use of communal forests is based on balanced conservation and use of natural resources considering cultural conditions, economy and equal distribution, and the well-being of present and future generations” (Deschamps, 2000).

**FIGURE 1.1: CHANGING FOREST COVER OF BORNEO**

---

**Formulation of Rules and Regulations:** Adat regulations are laws created by the community and administered by a local council of Adat elders. These regulations have both traditional and legal laws, and control the rights, responsibilities and legal sanctions of people residing inside and outside of the host community.

**Rights of Ownership and Use:** The extraction of forest products from the traditional use area is restricted to residents of the host community. Although private land-holdings are not permitted in the forest, individuals may lay claim (*hak milik*) for the use of land, or even specific trees, within the area with permission from the appropriate representative. Often, this right can be passed along to family members or traded/sold to other members of the same village. In the case of dry-field gardens, the right of use may be taken away from the user and redistributed among other residents of the host community, at the discretion of the Adat council, should the area remain unused for an extended period of time.

**Implementation and Jurisdiction:** Adat details rights and responsibilities with regards to resource extraction. These are based on the principle that residents have equal rights to a healthy environment, namely to use and protect the community forest and participate in the planning, implementation and planning process. It also defines the size, location, area boundaries and harvest locations of forest products.
Amendments to Adat: Amendments to Adat must go through the Adat council before being approved. Because the specific rules and regulations regarding Adat are developed by the residents of the host community, there is no need to seek outside approval for the plan unless it involves major expansion of the land base. However, before changes to the Adat are made, extensive discussions of the nature and need for the change must be held before an Adat council makes a decision.

This literature review highlights the significant numbers of communities in Kalimantan who are currently practicing sustainable forestry often times tied to Adat customary law regulations. The field components of this research gave additional validation that communities given the necessary tools can effectively and sustainably manage their forest resources.
ANNEX 2: EXISTING NATURAL RESOURCE MANAGEMENT AND SOCIO-ECONOMIC CONDITIONS

1. SEMAUNG SEPAPAN

ECOLOGICAL IMPACT
The ecological impacts on the protected forest/customary forest in Semaung Sepapan include: (1) protecting the water catchment area, (2) providing flora and fauna habitat, (3) protecting the watershed area, and (4) carbon absorbance and storage function.

Protecting the Semaung Sepapan forest has had a positive impact on the local community by providing clean water. The community uses the clean water daily to clean, cook, and bathe. The water produced in the protected forest area also protects the river basin, which has ecological and economical functions for the surrounding areas.

The protected forest is critical in preserving local species of flora and fauna that would be otherwise lost to the conversion of land into agricultural or plantation areas. The push for this conversion is evidenced by the fact that the forest is surrounded by palm oil plantations (PT. MAS, PT. KGP, and PTPN XIII).

The Semaung Sepapan protected forest also plays an important role in the absorption and storage of carbon. Increasing land conversion has caused limited the ability of the areas plant-life to absorb carbon.

ECONOMIC IMPACT
The existence of protected /customary forest in Semaung Sepapan has three economic main benefits:

- Clean water for the community, the river basin’s hydrological planning, flora, fauna, and habitat protection, carbon absorbance and storage function on the plants
- Local consumption of forest resources (timber for building, fire wood, boar hunting, farming).
- Commercial purposes (rubber and palm oil plantations).

FOREST PRODUCT UTILIZATION
According to an interview with several village leaders the most important benefit from protected forest area is its ability to provide clean drinking water to the local community. The water is used by both the local community as well as the Sanggau District’s Drinking Water Regional Company (PDAM) which works to provide people in Sosok Sub-district with clean water.
The cost of drinking water varies from one hamlet to another. Sanjan Embras is charged IDR 5,000.-/month, while Bunut is charged IDR 15,000.-/month. Sanjan has a less expensive tariff because its clean water facility is still in a trial period it was built at the end of 2007). From the example on the calculation of clean water economic benefit value, the community is charged IDR 83/m³ of clean water (in Sajan Embras) and IDR 250.-/m³ (in Bunut). The local price of water per meter cubic is very low, if compared to the average cost of Sanggau District PDAM that charges IDR 3000/m³ (Statistical Data of Sanggau District, 2008). The utilization of water using the price of IDR 250/m³ and the average water need of 180 m³/year sets the waters local economic value at IDR 45,000/year (Table 2.1). This value is very low because if the average price is calculated from PDAM (IDR 3000/m³) that gives an economic value of IDR 540,000/household/year. The difference of price value indicates that the current water utilization has not been projecting the true value. However, if it can be seen from efforts to protect the area, then the low price of water charged to the community is one of the compensations for their effort to protect the forest.

### TABLE 2.1: ESTIMATED VALUE OF FOREST RESOURCES UTILIZED FROM PROTECTED AREA PER HOUSEHOLD ANNUALLY

<table>
<thead>
<tr>
<th>No</th>
<th>Benefits</th>
<th>Annual Production (m³)</th>
<th>Price (IDR/Unit)</th>
<th>Annual Benefit Value (IDR/Household)</th>
<th>Current Utilization</th>
<th>Purpose of Utilization</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Clean Water</td>
<td>180</td>
<td>250</td>
<td>45,000</td>
<td>Water Sources from protected forest areas</td>
<td>Consumption</td>
</tr>
<tr>
<td>2</td>
<td>Firewood (¹)</td>
<td></td>
<td></td>
<td></td>
<td>rubber wood and timber from swidden agriculture land</td>
<td>Consumption</td>
</tr>
<tr>
<td>3</td>
<td>Timber Housing (¹)</td>
<td></td>
<td></td>
<td></td>
<td>Utilized according to hh consumption but rare</td>
<td>Consumption</td>
</tr>
<tr>
<td>4</td>
<td>Hunting Animals (¹)</td>
<td></td>
<td></td>
<td></td>
<td>Utilized according to hh need but rare</td>
<td>Consumption</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Value in Rupiah</th>
<th>45,000</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Value in Dollar (US$ 1 = IDR 10,000)</td>
<td>4.5</td>
</tr>
</tbody>
</table>

Notes: (1) Information on the amount of the community’s utilization is not available. Others potential of NTFP have not been considered in this valuation. (2) Based on the amount of utilization per household (daily or monthly). (3) Based on the water price paid by the local communities to consume of clean water per meter cubic, (4) Benefit values not including the cost of production.

The potential forest products in the protected forest area such as timber for building houses and firewood as well as non-timber products like animals (hunting) are used to fulfill household consumption needs. The high income in the palm oil plantations area have concrete impact on the community’s low dependency on the forest products whether timber or non-timber products.

²³ The value of clean water per cubic meter comes from dividing the clean water tariff that has to be paid by every household (IDR 5000/month and IDR 15,000/month) with the average need of clean water by the local community (0.5 m³/household/days x 30 days), with average of 4 people in a household.
AGRICULTURE AND PLANTATION UTILIZATION

Small scale farming is one of the activities conducted by the communities surrounding the protected forest in Semaung Sepapan. The community’s fields are between 0.5 ha to 1 ha/household and the level of productivity is 0.5 ton/ha/year. The economic benefit value per farm is equal to IDR 3,000,000/ha/year (using rice’s price of IDR 6,000/kg) (Table 2.2).

The community’s rubber plantations are located in the buffer area of the protected/customary forest and around the community’s settlement. There has been a decrease in the amount of land used in the production of rubber as some land has been converted into palm oil plantations. The average plantation size in Pandan Sembuat Village is between 0.7-1 hectare/household. The rubber productivity is 20kg/ha/month (15 working days) with a total production of 80 kg/household/year (4 month harvesting time). If it is calculated with the current rubber price of IDR 5,000/kg, the economic benefit value of rubber is IDR 400,000/ha/year. This potential income continues to decrease as the price of rubber declines. The majority of people focus on work in the palm oil plantations as they provide the majority of income with an average of IDR 1 million/month/2 ha (Table 2).

The main economic activity of the communities surrounding the forests of Semaung Sepapan is the cultivation of palm oil. The average land dedicated to palm oil growth per household is 2 ha (1 unit) with a productivity level of two to three tons/unit/month. Given the current palm price of IDR 1,150/kg, this nets an average income of IDR 1 million/unit/month.

With such high income from the palm oil, the community is less reliant on the forest’s timber and non timber products, which cannot compete directly with palm oil. The community only relies on the forest as a source of water. However, the cultivation of palm oil (and the conversion of rubber in to palm oil plantations) has negative environmental impacts. The river is experiencing an increase in sedimentation, and rich in diverse flora and fauna is quickly receding.

The 2008 village monograph provides a glimpse of the rice fields of the Pandan Sembuat Village. These fields are roughly 202.5 ha with an average productivity level of 1.5 ton/ha and an average ownership of 0.5 ha/household. The production level of these fields is quite low due to a lack of maintenance and the limited irrigation network. Rice cultivation is estimated to provide the community with IDR 3 million/year.

The common livestock rearing animals are chickens and pigs. The number of livestock per household is estimated at 10 chickens with an average of 2 pigs. However, not every household has both chickens and/or pigs. However not every household has both chicken and pigs. In Sanjan Embras, 30 households raise chickens while pigs are only found in 10 households. The majority of this livestock is raised for household consumption and is rarely sold commercially.

<table>
<thead>
<tr>
<th>No</th>
<th>Types of Benefit</th>
<th>Annual Production(2)</th>
<th>Price (IDR/Unit)(3)</th>
<th>Annual Benefit Value (IDR/hh)(4)</th>
<th>Existing Utilization</th>
<th>Utilization Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Palm Oil Plantation</td>
<td>2000 kg</td>
<td>1150</td>
<td>27,600,000</td>
<td>Main livelihood with ave size of 2 ha/hh</td>
<td>For sale</td>
</tr>
<tr>
<td>2</td>
<td>Agriculture</td>
<td>500 kg</td>
<td>6000</td>
<td>3,000,000</td>
<td>Located in the buffer zone dry land farm limited in size.</td>
<td>Consumption and some for sale</td>
</tr>
<tr>
<td>No</td>
<td>Types of Benefit</td>
<td>Annual Production(^{(2)})</td>
<td>Price (IDR/Unit)(^{(3)})</td>
<td>Annual Benefit Value (IDR/hh)(^{(4)})</td>
<td>Existing Utilization</td>
<td>Utilization Purpose</td>
</tr>
<tr>
<td>----</td>
<td>------------------</td>
<td>-----------------------------</td>
<td>-----------------------------</td>
<td>----------------------------------------</td>
<td>----------------------</td>
<td>--------------------</td>
</tr>
<tr>
<td>3</td>
<td>Rubber Plantation</td>
<td>80 kg</td>
<td>5000</td>
<td>400,000</td>
<td>livelihood source located around settlement and in the buffer zone</td>
<td>For sale</td>
</tr>
<tr>
<td>4</td>
<td>Rice Field</td>
<td>500 kg</td>
<td>6000</td>
<td>3,000,000</td>
<td>Located in the farming area, but very limited.</td>
<td>Consumption and some for sale</td>
</tr>
<tr>
<td>5</td>
<td>Livestock Production (Chickens And pigs)(^{(1)})</td>
<td>Located in settlement -very limited</td>
<td>Consumption and for sale</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Amount (Indonesian Rupiah) IDR</td>
<td>34,000,000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Amount (1 USD= IDR 10,000)</td>
<td>3,400</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes: (1) Information of community’s utilization is not available, (2) Based on the number of utilization per household (monthly or annually), (3) Price used is the local and district market prices. Above price calculation has not considered market price fluctuation and currency exchange rate, (4) Economic benefit value has not considered the production cost.

The estimated economic value of natural resources per household in Pandan Sembuat Village is to be IDR 34,045,000.-/year (see Table 2.1 and Table 2.1), it consists of agriculture and plantation natural resource products (99.87%) and water sources from the protected forest (0.13%). Timber and non timber forest products hold high values, but could not be included in the economic utilization calculation as these resources are rarely utilized by the community. The total economic value of the forest and agriculture resources has mostly improved income through the cultivation and sale of products such a palm oil and rubber (82%), while other products from rice fields and dry fields provide for family consumption (18%). The community’s reliance on high income generated from palm oil plantations, rice fields and farming has reduced reliance on the forest’s natural resources.

The community has access to credit financing through the union credit and the availability of access for road to market agricultural products. The high incomes generated from palm oil plantations may provide opportunities to convert existing rubber plantations and/or fallow fields into palm oil plantations. However such conversion leaves communities vulnerable to a dip in palm oil prices. Such a price reduction might cause the community to utilize the timber and non-timber products in the protected/customary forest area. Therefore, the role of customary institution in guarding the protected forest is crucial.

**SOCIO-CULTURAL IMPACT**

The positive impact of the Semaung Sepapan protected forest from a socio-cultural aspect is the dedication of the community to protect the area due to its function as a water resource as well as the sacred and protected areas within the forest. The strong will to protect the area is in a form of increased sanctions or fines for community members that cause damage or degradation of the area, such as illegal
logging, over exploitation, etc. The regulations ensuring the protection of the forest area has a positive impact on the strengthening of customary law.

The stipulations of protected forest area have a positive direct impact towards the strengthening of the customary law. A community un-reliant on the forest tends to be individualist and more economically based. The low community dependency on the protected forest from an economic perspective, also impacts the relationship pattern between the community and nature.

2. SEMANGIT

ECOLOGICAL IMPACT

The ecological impacts of natural resources management in Semangit include: (1) protection of forest coverage area, (2) protection of habitat for flora and fauna, (3) protection of water catchment area in lakes as well as fresh water fisheries resources, (4) carbon absorbance and storage.

The good condition of the forest has much to do with the community’s long-term dependency on the on it, particularly to facilitate a healthy environment for cultivating forest honey. The direct impact of forest protection can be seen in the robust condition of the flora and fauna. There are a variety of tree species found in this area, including kawi (Shorea balangeran), tembesu (Fagraea fragrans), kelansau (Dipterocarp sp), emesung (Syzigium claviflora), putat (Barringtonia acutangula), etc. Meanwhile, the freshwater habitat is home to a variety of fish, including biawan (Helostoma temmincki), lais (Kryptopterus spp), toman (Ophiocephalus micropeltes), baung (Mystus nigriceps), pian (Leptobarbus melanotaenia), lele (Clarius batrachus), etc.

The existence of protected forest area also plays an important role in supporting the national park function as a water catchment area. The integrity of this function has positive impacts for fisheries transportation, and everyday water resources. However the stilt villages have no waste management system and much of the water below the houses is very polluted from household waste.

The forest area surrounding Semangit and TNDS generally plays an important role in carbon absorbance and storage, especially in the vegetation that grows near the water and in the mountainous area (Mount Semujan), where the vegetation absorbs CO2 emissions from the air and creates carbon stock.

ECONOMIC IMPACT

The forest and freshwater areas in Semangit positively affect the community, helping meet daily needs, as evidenced by the high dependency on natural resources potential for consumption and commercial income generation. There are three different kinds of natural resources that are used by the community, though not all are currently used to their full potential: (1) timber and non-timber forest products, (2) freshwater fisheries, and (3) farm land.

FOREST PRODUCT UTILIZATION

The most popular non-timber product of the forest is honey, while other non-timber products such as dammar and bird’s (swallow) nests in the Semujan Mountain have not been yet been utilized by the community.
According to an interview with Basriwadi, the chief of Semangit’s honey cooperative the number of periau association members in Semangit is 32. Each tikung or constructed hive can produce about 5 kilogram or equivalent of 175 kilogram of honey/year. The probability of success for a tikung to become a productive beehive is about 30%. The forest honey business directly increases community income because the products are sold. The honey from the community is bought by the Sentarum Lake Honey Farmers Association (Asosiasi Periau Danau Sentarum - APDS) and then sold to Riak Bumi Foundation in West Kalimantan and PT. Dian Niaga in Jakarta.

According an interview with the president of APDS, the amount of forest honey production tends to increase each year, from 4,329 kilograms in 2006 to 16,040 kilograms in 2008, with an exception in 2007 when flooding caused harvest failure and a final production of only 163 kilograms. There are several factors that cause the production increase, such as the ever-increasing number of periau members, the amount of honey produced, and the flower blossoms season. The amount of APDS income in the last 3 years is an average of IDR 219,706,333 per year, or 1.5 million /person/year, with the average number of periau members at 141 people.

The amount of forest honey sold by PT Dian Niaga and Riak Bumi Foundation in 2008 was only 80% of the total production, as more was produced than specified in the contract. The overproduction quantity is planned to go into the next year’s contract, APDS is trying to expand its market to Malaysia, a potential consumer of forest honey beyond the domestic market in West Kalimantan and Jakarta.

Forest timber is utilized by the community in Semangit to build and repair houses, canoes, fish baskets (karamba), firewood, and tikung. Locals usually take timber from the forest in the foothills of the mountains (such as Mount Semujan) and the forest area surrounding the community’s hamlet. The timber utilization is limited to household needs and not for sale, which they must replace after 5-10 years. The timber used to build houses, canoes, fish baskets and tikung for each head of household totals 2 trees/year, with an average of 2.4 m³/tree or in equivalent of 4.8 m³/year. The usage for firewood is about 4 m³/year.

The economic benefit analysis from natural resources management was estimated using the production approach, or the utilization in the community over the course of a year – the average amount of production or timber and non-timber forest product utilization multiplied by the unit price of each product. The price attributed to forest honey follows the market price in the locality, while the price of forest timber is the district market price, as timber is not sold in the local market.

The estimation of economic benefits from the timber and non-timber forest products (forest honey) for the community in Semangit hamlet is IDR 11,125,000/household/year (USD 1,113). Based on the utilization analysis, we can see that the value of non-timber forest product (forest honey) sold is bigger than the timber product utilized by the community (Table 2.3).

<table>
<thead>
<tr>
<th>No.</th>
<th>Type of Benefit</th>
<th>Annual Production(1)</th>
<th>Price (IDR/Unit)(2)</th>
<th>Annual Value (IDR/hh) (3)</th>
<th>Current Utilization</th>
<th>Purpose of Utilization</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Forest honey</td>
<td>175 kgs</td>
<td>35,000</td>
<td>6,125,000</td>
<td>natural resources and technology adaptation to using tikung</td>
<td>Sold and Consumption</td>
</tr>
<tr>
<td>No.</td>
<td>Type of Benefit</td>
<td>Annual Production(^{(1)})</td>
<td>Price (IDR/Unit)(^{(2)})</td>
<td>Annual Value (IDR/(\text{hh})) (^{(3)})</td>
<td>Current Utilization</td>
<td>Purpose of Utilization</td>
</tr>
<tr>
<td>------</td>
<td>-----------------</td>
<td>-----------------------------</td>
<td>-----------------------------</td>
<td>---------------------------------</td>
<td>---------------------</td>
<td>----------------------</td>
</tr>
<tr>
<td>2</td>
<td>Timber (houses, boats, fish basket, tikung)</td>
<td>4.80 m(^3)</td>
<td>1,000,000</td>
<td>4,800,000</td>
<td>Not sold limited usage</td>
<td>Consumption</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Firewood</td>
<td>4 m(^3)</td>
<td>50,000</td>
<td>200,000</td>
<td>hamlets in area and Semujan Mount</td>
<td>Consumption</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Value in Indonesian Rupiah (IDR)</td>
<td></td>
<td></td>
<td>11,125,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Value in Dollar (US$ = Rp. 10,000)</td>
<td></td>
<td></td>
<td>1,113</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes: (1) Based on the utilization and production of household (daily or monthly), (2) Price calculation has not considered market price fluctuation and currency exchange rate, (3) Benefit value is not net of cost of production processing.

Processing of honey and commercial business orientation has had positive impact on increasing the actual income of the community, so the economic impact in Semangit is relatively ‘opened.’ This has led to a fairly good livelihood for the community.

To increase the honey business on a broader scale, the following actions are needed: quality improvement of the forest honey to decrease the water level which currently at 25-27% to 21% is required for international export, development of bee wax production and expansion of honey and wax marketing, provision of work capital for business development and expansion or joint ventures with TNDS management. Additional support from the Kapuas Hulu district government is also needed, especially in providing the working capital and technical assistance for improving the quality of honey for the community and the Association of Honey Farmers in Sentarum Lake (APDS).

**FISHING AND AQUACULTURE**

Most of the area in Semangit hamlet is fresh water (swamps). The community’s fishery resources utilization takes two forms: fishing and aquaculture raising fish in *karamba*.

Fishing is one of the main livelihoods in Semangit. The amount fish caught household averages 15-25 kg per month, or about 300 kg/year, if fishing takes place every day. Most of the fish are for household consumption, but some is sold, and the remainder is used as food for the *toman* fish raised in *karamba*. The high frequency of fishing and the usage of certain unsustainable equipment has become a threat to the long-term fishery potential of Semangit hamlet and TNDS. This trend is supported by observations by the community that every year there is a decrease in TNDS’ fishery stock.

The *toman* fish aquaculture (in *karamba*) also comprises a key income source for individuals. The number of karamba owned per household is 2-3 units, with a production of 500-1000 kg/year/household or the average of 750 kgs/year. Toman are fed by small fish caught by fisherman and parts of other fish that are not consumed. The toman serve as a source of savings when the community needs income and sold to traders.
The estimation of the fisheries’ economic value is conducted using a production approach, or the amount of the community’s utilization in a year – the average amount multiplied by the price of each product. The price used in this analysis is the local market price. The result of economic benefit value of fishing in Semangit is an average of IDR 18,750,000/household/year (USD 1,875). According to the utilization purposes, the sale of toman fish results in larger economic benefits than fishing, which is mostly for consumption only (Table 2.4).

### TABLE 2.4: ESTIMATED VALUE OF FISHERY PRODUCTS IN SEMANGIT, PER HOUSEHOLD, ANNUALLY

<table>
<thead>
<tr>
<th>No.</th>
<th>Type of Benefit</th>
<th>Annual Production (1)</th>
<th>Price (IDR/Unit) (2)</th>
<th>Annual Benefit Value IDR/hh (3)</th>
<th>Current Utilization</th>
<th>Purpose of Utilization</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Fishing</td>
<td>300 kgs</td>
<td>20,000</td>
<td>6,000,000</td>
<td>daily but limited during wet season</td>
<td>Consumption, for sale and as food for toman</td>
</tr>
<tr>
<td>2</td>
<td>Aquaculture</td>
<td>750 kgs</td>
<td>17,000</td>
<td>12,750,000</td>
<td>Main livelihood and functions as savings</td>
<td>For sale and some for consumption</td>
</tr>
<tr>
<td></td>
<td>(Toman fish in karamba)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Value in Indonesian Rupiah (IDR)</td>
<td></td>
<td></td>
<td>18,750,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Value in Dollar (US$ = Rp. 10,000)</td>
<td></td>
<td></td>
<td>1,875</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes: (1) Based on utilization or production of household (daily or monthly) (2) Above price calculation has not considered market price fluctuation and currency exchange rate. (3) Benefit value is not net of cost of production.

In the long term, some efforts to maintain and increase fisheries potential for the community are needed including: continuous supervision by the fishermen’s group to ensure no prohibited fishing equipment is used; and development of fish product processing that could increase the value of the fish, such as making fish powder, fish balls, etc. Alternative income activities are very important, especially in the dry season, when the price of fish falls due to the high levels of fishing.

### FARM LAND UTILIZATION

The extent of Semangit farming there are small scale rubber plantations and crops grown for household consumption. Rubber plantations are managed by the community on land surrounding the protected forest and at the foothill of Semujan Mountain. One way to increase the community’s income from agriculture would be using a better quality of rubber seedlings to increase production. However, there is concern that land utilization be limited to avoid a complete conversion of forest land into plantation land.

From the results of the economic benefit calculation showed in Tables 1 and 2, we could conclude that the average annual economic value of natural resources is IDR 29,875,000 (USD 2,987) per household. This calculation includes the economic value of timber and non-timber forest products (37%) and fish products (63%). Because there is more commercial than consumption value in both of these sectors, this shows that the community is focused on commercial activities.
The community’s income could be increased by: (a) improving the quality of forest honey, (b) developing bee wax products, (c) fish product processing, (d) duck farm development, and (e) ecotourism development related to the program from TDNS and the Kapuas Hulu regional government development program.

The objective of ecotourism development is to increase the value of the entire area, when the Badau border opens (between Indonesia and Malaysia) in 2010, it has the potential become one of the tourist destinations for Malaysian and domestic tourists. One of the ecotourism products to be promoted is the sustainable, nature-friendly, forest honey farming, in addition to Semojan Mountain, and other potential tourist objects in the Sentarum Lake National Park.

**SOCIO-CULTURAL IMPACT**

The forest honey product utilization (NTFP) and the prevalence of water for aquaculture development, has created positive impact for the socio-cultural life of the community, the protection of the community’s local knowledge in utilizing the non-timber forest product (forest honey) and fish products, (2) strong ties among communities in the *periau* system coordinated by APDS, (3) establishment of good communication amongst communities, particularly among cooperative members, and (4) increased exposure to new knowledge and technologies in improving livelihoods and income.

Socially, the sustainable system in forest honey farming and fishing means that the community has a long-term stake in co-existing with nature by adapting nature-friendly technologies (i.e. *tikung*, *karamba*) in resources utilization.

Other impacts that could threaten the existence of the natural resources from social perspectives of the community are (1) potential jealousy between *periau* members and non-members, and (2) potential conflict between the communities that use the environmentally damaging tuba system or poisoning for fishing. The threats can be mitigated in two ways: (1) expanding the membership of *periau* and *periau* groups that exist in the surrounding area of TNDS, (2) improving monitoring and regulation on the tools used by the fishermen. The monitoring should be conducted by each fishermen’s group, involving the local village/government and the TNDS management, as well as the regional government of Kapuas Hulu District.

### 3. SUNGAI UTIK

**ECOLOGICAL IMPACT**

Ecological conditions of the protected forest in Sungai Utik: (1) A well maintained forest, (2) Habitat for flora and fauna, (3) Protection of watershed, (4) Protection of microclimate, (5) Carbon absorbance and storage.

Customary law proscribes strict limitations for activities in different zones of the forest. This includes zones for extraction and production as well as no take zones. Monitoring is conducted once every two years, and protects the forest from illegal logging and other ecologically disturbing activities.

The forest serves as a habitat for flora and fauna. This is evidenced by the wide diversity of flora and fauna. Based on the participative inventory conducted by Program Pemberdayaan Sistem Hutan Kemasyarakatan (PPSHK) – West Kalimantan in 2002-2003, there are 77 different kinds of timber, 18
species of rattan, 9 types of palms, 6 varieties of roots, and 8 species of fruit trees. In addition there is a large diversity of fauna such as monkeys, pigs and birds.

The forest protects the river basin of Sungai Utik, the main water resource for the community. However, according to the field assessment the river water during the rainy season is murky, while during the dry season the water is very clear. The water level also can vary 1.5 meters depending on the amount of rainfall.

The microclimate of the Sungai Utik is relatively cool compared to other areas that do not have forest coverage area. The protection of the forest also preserves the ability to absorb and store carbon, helping to alleviate the acceleration of global warming.

ECONOMIC IMPACT
The ability of forest to directly provide food for the community creates a high dependency on the forest’s resources, particularly non-timber products. Aside from the non-timber products, the community also utilizes the timber products for building houses, canoes, and to be use as firewood. Although the community is highly dependent on the forest products, extraction is very limited. Natural resources that have the potential to be utilized are timber and non-timber forest product extraction and agriculture.

FOREST PRODUCT UTILIZATION
Timber is generally obtained when fields are opened for farming swidden agriculture and within the production forest area. Timber cut to build houses and canoes for every household is limited to 30 trees/year. The extraction of timber to repair houses and build canoes is rare and canoe can last between 5-20 years. The timber extracted for building or repairing canoes per household is 3 trees every 5 years or equal to 2.4 m³/year. Meanwhile, the firewood utilization for cooking is an average of 1 m³ for 2-3 months or equal to 4 m³/year.

The extraction of non-timber forest product is only for household consumption and only certain types of timber can be sold. Some of the non-timber forest products utilized include *tengkawang* fruit, rattan, sugar palm, *durian*, pig, fish, *labi-labi* (fresh water turtle), medicine plants, etc. Non-timber forest products are taken within the production forest area, the limited use, and reserve area.

The extraction of *tengkawang* fruit, rattan, and sugar palm is for household consumption and also sold in small amounts. Tengkawang is harvested once every 5 years with an average production level of 4 tons/household, equal to 800 kg/household/year. Rattan is extracted by the community to produce mats, baskets, and ropes for household needs, with an average extraction of 10-20 pieces/year or an equivalent of 50kg/year. Sugar palm fruit is one of the raw materials to make local liquor (tuak) the amount of consumption is between 30-50 liters/month/household or equal to 480 liters/year.

Boar and fresh water turtle hunting is limited to once every 3 months with a probability of getting 1-2 boars or an average of 80 kg/year. The pork meat is used for home consumption, while the fresh water turtle is sold or consumed. Durian, medicine plants, and fish are consumed at the household level. The amount extracted by each household is difficult to identify as they are consumed as needed and seasonally.
The economic benefit value gained by the community from forest product utilization in Sungai Utik is estimated to be IDR 12,335,000 household/year (USD 1,234). The economic value of products for household consumption is larger (74%) than the value of products for sale (26%) (Table 2.5).

### TABLE 2.5: ESTIMATED VALUE OF FOREST RESOURCE EXTRACTION IN SUNGAI UTIK PER HOUSEHOLD ANNUALLY

<table>
<thead>
<tr>
<th>No</th>
<th>Product</th>
<th>Annual Production</th>
<th>Price (IDR/Unit)</th>
<th>Annual Utilization Value (IDR/hh)</th>
<th>Existing Utilization</th>
<th>Purpose of Utilization</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Timber (House and canoe)</td>
<td>2.40 m³</td>
<td>1.000.000</td>
<td>2.400.000</td>
<td>not sold, limited to hh need</td>
<td>Consumption</td>
</tr>
<tr>
<td>2</td>
<td>Firewood</td>
<td>4 m³</td>
<td>50.000</td>
<td>200.000</td>
<td>timber from farming fields or from production areas</td>
<td>Consumption</td>
</tr>
<tr>
<td>3</td>
<td>Tengkawang fruit</td>
<td>800 kg</td>
<td>4000</td>
<td>3.200.000</td>
<td>Harvest every 5 years</td>
<td>For Sale</td>
</tr>
<tr>
<td>4</td>
<td>Rattan</td>
<td>50 kg</td>
<td>3.500</td>
<td>175.000</td>
<td>To make mats, baskets, ropes</td>
<td>Consumption</td>
</tr>
<tr>
<td>5</td>
<td>Sugar palm</td>
<td>480 liter</td>
<td>5.000</td>
<td>600.000</td>
<td>Located around long house and farm land to make liquor</td>
<td>Consumption</td>
</tr>
<tr>
<td>6</td>
<td>Meat (pork)</td>
<td>200 kg</td>
<td>18.000</td>
<td>3.600.000</td>
<td>hunted every 2-3 months</td>
<td>Consumption</td>
</tr>
<tr>
<td>7</td>
<td>Fresh water turtle (labi-labi)</td>
<td>80 kg</td>
<td>27.000</td>
<td>2.160.000</td>
<td>Need based and as additional income</td>
<td>Consumption and for sale</td>
</tr>
<tr>
<td>8</td>
<td>Medicine Plants (¹)</td>
<td></td>
<td></td>
<td></td>
<td>Need based</td>
<td>Consumption</td>
</tr>
<tr>
<td>9</td>
<td>Fishing in the river (¹)</td>
<td></td>
<td></td>
<td></td>
<td>Need based</td>
<td>Consumption</td>
</tr>
<tr>
<td>10</td>
<td>Durian (¹)</td>
<td></td>
<td></td>
<td></td>
<td>family consumption</td>
<td>Consumption</td>
</tr>
</tbody>
</table>

Indonesian Rupiah value: 2.335.000

Value in US Dollar (US$ 1= IDR 10,000): 1.234

Notes: (1) Information on utilization amount by the communities is not available. Others potential of NTFP have not been considered in this valuation. (2) Based on the utilization per household (daily or monthly). (3) Price used is the district market price, except for tengkawang and fresh water turtle is the local market price. Timber price is based on the market price in the district because it is not sold in the local market, and forest honey is using the market price of farmer. Above price calculation has not considered market price fluctuation and currency exchange rate. (4) The economic benefit value is not included the cost of production.

The diverse forest products solely serving household consumption affects the low income of the community, thus further affecting the ‘closed’ economic system. The community’s economic activities are still at the subsistence level. Alternative income activities that can be developed to improve the community’s earnings include the processing of timber products felled during the opening of a field. The wood could be used to sell as timber and or to create crafts or furniture.

Non-timber forest products that could be utilized include: (1) handicraft products from rattan (mats, baskets, bracelets, etc.), (2) durian and its processed products, (3) processed sugar palm, (4) Ecotourism developments using the customary forest and longhouse traditional living structure.
The community’s alternative business development utilizing timber and non-timber forest products must be supported with training, the provision of product processing tools, electricity, product marketing, clear marketing support, the strengthening of business capital through the utilization of available credit unions, and other funding sources from the government and other related parties.

**AGRICULTURAL FIELD UTILIZATION**

The community’s agricultural practices are swidden agriculture and small scale rubber plantations. Although there is the potential for rice fields of ± 100 ha, the community has not been developing wet rice fields due to limited technology and expertise.

Slash and burn agriculture is practiced primarily within the production zone, and smaller amounts in the limited utilization zone. The average size of the fields per household is two hectares with an average productivity of one ton of hill rice and vegetables/ha/year.

One of the income generating activities is rubber cultivation that has long been developed using local rubber tree species. The plantations are located within the production forest area or in the dry field. The average size of rubber plantation by every household is between 2-5 ha. The average productivity level is 40 kg/month/ha and is harvested for 4 months (dry season) or 160 kg/year. New development of rubber cultivation in the area was done with the assistance of Betung Kerihun National Park by creating a 2 ha ‘kebun entris’ together with the community. The seedlings from the ‘kebun entris’ have not been utilized because the technology assistance program has not been made sustainable and the community is still accustomed to using local seedlings.

Rubber cultivation has long been a small income generating activity for the community. Rubber farmers have traditionally cultivated a local rubber tree species. These plantations are located inside the production forest field, or dry fallow fields. The average size of a rubber plantation is 2.5 hectares with a productivity level of 40 kg/month/ha harvested for 4 months (dry season) or 160 kg/year. The low level of productivity is due to the fact that the rubber trees are very mature and produce less rubber.

The economic benefits derived from agriculture in Sungai Utik are estimated to be IDR 14,480,000 household/year (USD 1,448) from dry farming and rubber plantation. Products consumed at the household level exceed those sold for the creation of capital.

The majority of dry farm production goes to household food consumption with small amounts for reserved for sale. Meanwhile rubber is sold and functions as the main income source for the community (Table 2.6). Other agricultural products that have been cultivated but have not been valued economically are vegetables (pumpkin, eggplant, cassava, etc). Vegetables are a main staple in Sungai Utik.

**TABLE 2.6: ESTIMATED VALUE OF AGRICULTURE PRODUCTS IN SUNGAI UTIK PER HOUSEHOLD ANNUALLY**

<table>
<thead>
<tr>
<th>No</th>
<th>Types of Benefit</th>
<th>Annual Production¹</th>
<th>Price (IDR/Unit)²</th>
<th>Annual Benefit Value (IDR/hh)³</th>
<th>Existing Utilization</th>
<th>Utilization Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Swidden agriculture</td>
<td>2</td>
<td>7.000</td>
<td>14.000.000</td>
<td>Main livelihood for the community, mostly for consumption, for</td>
<td>For Consumption and sale</td>
</tr>
</tbody>
</table>

78 COMMUNITY-BASED FOREST MANAGEMENT IN KALIMANTAN, INDONESIA: A STOCKTAKEING OF LESSONS LEARNED
## Types of Benefit

<table>
<thead>
<tr>
<th>No</th>
<th>Types of Benefit</th>
<th>Annual Production(^1)</th>
<th>Price (IDR/Unit)(^2)</th>
<th>Annual Benefit Value (IDR/hh)(^3)</th>
<th>Existing Utilization</th>
<th>Utilization Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Rubber</td>
<td>160</td>
<td>3.000</td>
<td>480.000</td>
<td>A dry season activity</td>
<td>For sale</td>
</tr>
</tbody>
</table>

Total Indonesian Rupiah (IDR)

<table>
<thead>
<tr>
<th>(1 US Dollar = IDR 10,000)</th>
</tr>
</thead>
<tbody>
<tr>
<td>14,480,000</td>
</tr>
</tbody>
</table>

Total (1 US Dollar = IDR 10,000)

<table>
<thead>
<tr>
<th>(3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,448</td>
</tr>
</tbody>
</table>

Notes: (1) Based on production per household (monthly or annually). (2) Rubber price is quoted using local market price, while the rice price is using the district’s market price because it is not sold in the local market. Above price calculation has not considered market price fluctuation and currency exchange rate. (3) The economic value is not including the cost of production.

The analysis of customary forest product utilization indicates that 86% of natural resources are used for household consumption while 14% are sold commercially. To improve the community’s livelihood and earnings in the agricultural sector, the following improvements can be made: (a) the planting of a superior quality of rubber seedlings, (b) wet rice field development in the area of ± 100 ha located in the production forest area, (c) the development of vegetable products that have market value (such as cabbage), and (d) the development of commercial pig farming. As the Sungai Utik forest is already recognized for its forest management practices, a market development strategy is needed to utilize the national and international networks that focus on sustainable forest management practices.

## SOCIO-CULTURAL IMPACT

There are many positive socio-cultural effects resulting from the protection of the Sungai Utik forest. These include: 1) pride in the community in preserving their customary forest area that also fulfills daily subsistence needs, (2) preservation of local customs and culture from the outside influence that can result in the cultural degradation, (3) stronger ties between customary law communities, (4) good leadership and strong customary institutions in the community, (5) preserved local knowledge of natural resources and the environment.
1. SEMAUNG SEPAPAN
Semaugn Sepapan is composed of secondary forest with a history of heavy logging activities. Local economic activity revolves around plantations – oil palm, rubber and small scale agriculture. Plantations are both corporate and community owned.

TIMBER
The forest in the Sepapan Hills is home to trees from the Dipterocarpaceae family, from the Shorea Genus. Other trees found in the area include Bangkirai, Boh, Bonte and Bonti botu. While these forest trees have been subject to heavy logging in the past, steep terrain makes timber extraction difficult. Abandoned felled trees testify to logger’s difficulty in the forest. Currently, timber extraction is a highly restricted activity and is limited by permits issued by the adat leader.

RATTAN
Rattan, a palm like plant useful for cane work was identified in the area, however the plants were still immature. When mature, rattan is used to weave baskets and create plaited sleeping mats. Varities of Rattan identified included Rattan jahe, Rattan Wibobuk/Tikus (Calamus minahassae), Rattan Penyalung and Rattan Pelanduk/Wi Ponok (Calamus laevigatus).

LIANAS AND OTHER USEFUL PLANTS
Lianas long stemmed woody vines, some of which are edible and can be used for medicinal purposes, have also been identified in the area. Other useful plants found in the forest include Sampo, which is believed to protect children from evil spirits, Engkolah, which is used to treat abscesses, Ongkoh mole/jantuk, useful for its edible fruit, Ongkoh colok, used to compress sprains, Ongkupido, used to make the handles of “belayung” (traditional axes), and Akar Ponggong, the young sprouts of which are edible.

In addition, the local people also make use of Biho (palmae), which produces edible fruit, Dao Kontuk (a type of scrub plant), which provides strong-smelling but edible leaves, Sabung pakis (a type of fern), whose young sprouts are used for treating burns, the edible Songgong Himbo, and Bohu (bamboo), which is used to make household utensils, and also has edible young sprouts.

Other plants were identified during the field visit that serves important local uses. Some examples include:

- *Sampo* - a plant believed to protect children from evil spirits.
- *Engkolah* – used in the treatment of abscesses
• **Ongkoh mole/jantuk** – edible fruit
• **Ongkoh colok** – used to compress sprains
• **Ongkupido** – used to make handles of traditional axes known as “belaying”
• **Akar Ponggong** – edible as young sprouts
• **Biho (Palmae)** – edible fruit
• **Dao Kontuk** – fragrant, edible leavles
• **Sabung Pakis** – fern used in the treatment of burns
• **Songgong Himbo and Bohu (bamboo)** – edible young sprouts, also used in the manufacture of utensils.

**FAUNA**

Conversations with villagers and local guides indicated that animals that previously populated the Semaung Sepapan area are gradually disappearing. Animals previously hunted by villagers in the area included wild boar (*Sus barbatus*), sun bear (*Helarctos malayanus*), suwi/uncu dahan (*Neofelis nebulosa*) and deer (*Muntiacus muntjak*). Villagers reported that beruk (*Macaca nemestrina*) and kera (*Macaca fascicularis*) monkeys can be seen moving down from the forested hills to scour the farms for foods like corn, rice and beans. *(Source: Interview with Alexander Antoli, April 1, 2009)*

**OIL PALM PLANTATIONS**

Oil Palm Plantation has spread tremendously and have become very profitable in the region over the past 20-30 years. Most people in the local villages have a stake in the production of Palm Oil. For instance, in the Sanjan Emberas region, the average villager owns 2 hectares of palm oil producing land.

Much of the palm oil farming is done on contract with a palm oil company. In these schemes, families will make available their land to plant palm while the company will provide the resources necessary to establish planting, including clearing, planting and maintenance. Once the oil palm fruit is harvested by the community members, the oil palm fruit is sold back to the company. Three large oil palm plantations are active in the Semaung Sepapan area. These three stakeholders are PTPN 13, the Salim Group, and PT.MAS (Malaysia). These companies have worked with the communities in the area long term and have developed mechanisms give access to palm seedlings and to facilitate expansion.

**RESOURCE POTENTIAL**

The ability of the local community to use Semaung Sepapan as a resource for their personal timber needs has been hindered by heavy timber extraction. In order to restore Semaung Sepapan to an ecological state capable of sustainably supporting the surrounding villages, a moratorium on heavy timber extraction should be enacted.

**ENRICHMENT OF FOREST RESOURCES**

While the large scale harvesting of trees will not be allowed during the moratorium, the forest can still provide resources for trade for the people of Semang Sepapan. Forest Resources that may be cultivated include:
**The Gaharu Tree:** The Gaharu tree (*Aquilaria malaccensis Lamk*) can be specially cultivated to provide an especially fragrant wood that can be used in making wooden decorative items. In the cultivation of this high value tree, parts of the tree are intentionally infected with a fungus which promotes fragrance in the wood. The Gaharu tree is infected at 7 years old when holes are drilled around the trunk and fungus is deposited inside the trunk. After 6-12 months the tree is then ready to harvest for its fragrant wood.

**Rattan and Fruit Cultivation:** Another potential resource of the forest is Rattan. There are a number of marketable species of Rattan, including Rotan Sega (*Calamus caesius*), Rotan Manau (*Calamus manan*) and Rotan Irit (*Calamus trachycoleus*). Fruits such as Durian (*Durio sp*), Mangosteen (*Garcinia mangostana*), and Langsat (*Lansium sp*) are also suitable for cultivation in the area.

**Medicinal Plants:** Also commercially viable are plants used for their therapeutic properties. Pasak Bumi (*Eurycoma longifolia*) is one example.

**Fruit Cultivation:** Fruits such as Durian (*Durio sp*), Mangosteen (*Garcinia mangostana*), and Langsat (*Lansium sp*) are suitable for cultivation in the area.

---

**WATER RESOURCES**

The Forestry Service of West Kalimantan has installed 2 km of water pipes running from the Sungai Muru to houses in the village of Sanjan Emberas. Managed by the Perusahaan Daerah Air Minum (Local Government Water Utility), Sungai Pamp provides clean water to Sanggau District and Sosok Sub-District.

It is possible that the Sanjan Emberas village could use these water resources to establish a spring bottling plant in the future. The creation of a valuable economic resource would create an incentive for the community to better protect the Semaung Sepapan forest.

---

**2. SEMANGIT**

The village’s surrounding area is primarily wetlands, with water lying 2-7 meters deep in the wet season, and then falling to ground level in the dry season. The rest of the area consists of the low lying dry area of the Semangit and Semojan foothills, which can experience seasonal flooding, and the Semangit and Semojan uplands. The primary economic activities are fishing and honey production. The typical Semangit house is constructed 4 meters above water level on wooden stilts. These stilt-frame houses are constructed from Tembesu timber for the stilts, Kawi for the floor, and Meranti for the walls. The main modes of transportation are motorboats and sampan (canoes made from Kawi or Tekam wood), equipped with engines.

**WETLAND & RIVERINE AREAS**

The Semangit wetlands are located in the central part of the Danau Sentarum National Park. The size and depth of the swamps and seasonal lakes are dependent on the flow of the Kapuas river. Plant species, such as the Putat, Emesung, Temirit, Kawi, and Timba Tawang – all found in the wetland areas—play a critical role in the production of honey. Putat trees, standing 2-4 meters above the water level, act as platforms for “tikung” – or artificial bee hives.
In the Danau Sentarum the Malay live in hamlets along the riverbanks. The Dayak prefer drier locations for their settlements, upstream of the Sungai Pleik. Plants found in the Leboyan riverine area include Rengas (Gluta renghas), Bungur (Lagerstroemia sp), Jabai (Ficus microcarpa), Kelansau (Dipterocarp sp), Empai (Crudia teysmannia) and Merawan (Hopea mengerawan).

Rengas trees play an important role in honey production in riverine areas. Rengas trees will house between 5-10 natural bee hives. These hive-filled trees are referred to locally as Lalau. While “Lalau” can also refer to Bangkirai and Kapur trees containing hives, bees seem to prefer the better natural protection of the 20 meter tall Rengas trees. In addition to serving as a good protector of bee habitat, the Rengas tree has a therapeutic sap which is useful in the treatment of bee stings.

DRY LOWLANDS
Many Sebar Pauh trees which produce abundant white flowers are found in the dry lowland areas in the foothills of Semojan – at an elevation 40 meters above sea level. The area also is home to other tree species such as the Kayu Lawang, the Kayu Segi, Biai Bintangur Kunyit, Kayu Samak (Syzygium sp) and Kayu Berus. The area has been subject to logging in the past. Kayu Segi and Biai are the two main species of tree that have been exploited by illegal loggers in the area (Source: Interview with Supriyanto/Iyan, Semangit villager, April 6, 2009).

ABANDONED IBAN LANDS, AND THE SEMANGIT AND SEMOJAN UPLANDS
The Dayak Iban had originally settled into the Semojan valley but the combination of tribal war and disease caused them to leave the area. Now those areas that were inhabited by Iban settlements contain many mature fruit trees. These trees including Durian (Durio sp), Hambawang, Keranji, Cempedak (Artocarpus champedan), Rambai, Lengkeng/Mata Kucing, Langsat (Lansium sp), Tarap (Artocarpus sp) and Empakan/pampakin (Durio sp). Next to these ancestral Iban lands, the people of Semangit have established farms and rubber plantations at the base of the Semojan foothills. Rubber, a new crop to the area, is an attractive potential source of income for residents of Semangit. Unfortunately, rubber cultivation is still at a rudimentary stage of development, and would benefit from training in proper clonal selection and best practices.

FISHING
Semangit villagers primarily fish during the dry season (May-August) when the water level is low. The principle species of fish caught are Toman (Ophiocephalus micropeltes), Biawan (Helostoma temmincki), Gabus, Sepat (Trichogaster leeri), Baung (Mystus nigriceps) and Lais (Kryptopterus spp). In the dry season, villagers fish in swamp ponds known as “Kerinan”. Each Kerinan is governed by a strict governance system which is followed by all community members. Several Kerinan, known to the Semangit people as Senampun, Tanjung Kayat, Bekaka, Kenan Kecil and Belensan, each contain an average of 4–5 tons of fish (Source: Interview with Mulyadi head of Dusun Semangit, April 4, 2009).

The Semangit village also practices fish farming, most often farming the fish species “Toman” an ornamental fish. Small toman are first nurtured in “karamba” (floating fish enclosures), and take a year to grow to maturity. A karamba will contain 1000-2000 small Toman fish at the beginning of the year, which will be harvested a year later. Karamba enclosed fish are fed a meal of chopped fish each morning. A single karamba is capable of producing 500-1000 kg of Toman, which were priced at RP 17,000/kg at the time of the interview. (Source: Interview with Raharjo, Semangit villager, April 4, 2009).
HONEY
Honey harvesting is the main livelihood in Semangit. Villagers breed the Apis Dorsata honey bee, a species capable of producing honey in artificial rafters known as ‘tikung’. Tikung are constructed from Tembesu wood (Fagraea fragrans). The principal species of flowering plants that supply nectar to the honey bees are most often from the Putat (Barringtonia acutangula), Emasung (Syzigium claviflora), Kawi (Shorea balangeran) and Temirit.

RESOURCE POTENTIAL
Management of the Danau Sentarum National Park, within which Semangit is located, is the responsibility of the national government. The park’s sustainability should be promoted by encouraging practices that align with National Park policy and functions.

ECOTOURISM
Semangit has a unique ecosystem which has the potential to operate as an ecotourism destination in the future. The following infrastructure for tourism would need to be established:

- **Water transportation;** Semangit requires proper water transportation facilities for tourists, such as boats that offer protection from the elements.

- **Forest walkways;** Forest walkways could be established in selected areas offering good views as part of a tourist trail within the dry land areas of the park.

- **Accommodation;** Lodging facilities that are clean and safe, but not necessarily luxurious, would need to be established.

- **Waste management;** All households in Semangit need to be made more aware of their role in waste management.

SMALL-SCALE FISH PROCESSING
Fish processing practices are currently confined to basic salting and smoking. However other processing methods could expand the economic opportunities of the local fish industry. It was documented that fish prices drop during the fishing season (dry season) as the supply of fish flood the market. If the villagers were able to process their fish into a product such as fish flour, nuggets, or shredded fish, it would give them the ability to control the supply and influence the price of fish in the market.

3. SUNGAI UTIK
Sungai Utik is well known for its success in protecting and certifying its 9,000 hectares of forest. The majority of village residents are Dayak Iban. The village was awarded certification in the category of CBFM. This certification was awarded by PT Mutu Agung Lestari, a certification body accredited by the Lembaga Ecolabel Indonesia (LEI).

The Sungai Utik forest is divided into three main zones. The first zone is the 36667 hectare Taroh zone, which is classified as a protected forest, and where activities such as timber extraction and land clearance are forbidden. The second zone, the Galaua, is 1510 hectares and is a limited protection forest the only activities permitted are the extraction of medicinal plants non-timber forest products. The last zone, the Embor Kerja, is 4,276 hectares and is classified as a production area. In the Embor Kerja farming and
timber extraction are permitted. This zoning system follows the course of the utik river with the protected forest in the north, limited production forest in the middle, and production area in the south.

**TEMBAWAI**
The term ‘Tembawai’ is used to describe the abandoned farms or fallow land (now scrubland) and settlement areas whose inhabitants in the past had cultivated fruit trees, such as Tengkawang (Shorea sp)), and rubber. Large Tengkawang trees, with diameters of 50–80 cm and heights of 15–20 meters up to the first branches, are still abundant in Tembawai areas. The Dayak Iban have long recognized the Tengkawang tree’s fruit – it provided an oil used in cosmetics and food processing – as good sources of income. With this in mind, the residents of Sungai Utik decided to re-plant Tengkawang trees on abandoned farms, or ‘ladang,’ for the benefit of future generations. Tengkawang fruit in Sungai Utik are harvested once every 5 years.

Tembawai areas also play host to other resources used by the people of Sungai Utik. These include fruit trees such as Durian, Cempedak & Rambai, a palm species called Panto, which is used to make palm cabbage, and Bamboo, which is used as a raw material for making household utensils. Some other useful plants also found in Tembawai areas are Manyam (Glochidion sp), which provides a black dye, Engkerbai (Psychotria woodii), which provides a red dye, Beto, which can be used for treating burns, Daun Pelas, which is used to encourage infants to suckle, Kayu Pakar, which provides a natural antiseptic, and Kayu Tuba, which is used to shock fish.

**PULAU KAYU**
Pulau kayu (pulau = Island; kayu = timber) is a term used by the Iban people of Sungai Utik to refer to areas that contain timber that can be harvested by the community. Inconsistencies were found in the amount of land said to be dedicated to pulau kayu. The pulau kayu areas are located in the production zone of Sungai Utik. Most of the trees found in Pulau kayu areas are from the Dipterocarp family, measuring on average 60–100 cm in diameter and 25 m in height to the first branches when mature. They include Tengkawang (Shorea pinanga), Resak, Meranti merah and Kapur (Dryobalanops lanceolata).

The timber harvesting management system in Sungai Utik allows the felling of 30 trees per household per year, or around 150 m³ of timber. Trees that are felled must have a diameter of at least 40 cm in the production forest (downstream) and at least 60 cm in the limited production forest. Trees may only be felled in the limited production forest for a household’s own needs. The commercial sale of trees for timber is allowed from the production forest, for which the kampong charges a fee of Rp. 30,000 for every felled tree. The tree-felling equipment permitted in Sungai Utik includes chainsaws, manual saws, machetes, and axes.

**WILD AND DOMESTICATED ANIMALS**
The people of Sungai Uti primarily hunt Wild Boar (Sus barbatus). Other wild animals are also hunted for their meat, skin, fangs or claws, including deer, wild cats, sun bears and civets.

- Wild boar (Sus barbatus); meat for consumption and tusks for ornamentation
- Sambar deer (Cervus unicolor); meat for consumption
- Porcupine (Hystrix crassispinis); spines used for ritual offerings on farms (‘ladang’) to prevent pests and diseases.

- Sun Bear (Helarctos malayanus); gall for medicine; skin, claws and fangs for ornamentation.

- Anteater (Manis javanica); meat for consumption and skin for selling.

- Flying squirrel (Pteromyscus pulverulentus); meat for consumption, skin for ornamentation.

- Clouded Leopard/Macan dahan (Neofelis nebulosa); meat for consumption, skin, claws and fangs for ornamentation.

- Snails/lab-labi (Tryonia cartilagenous); meat for consumption

The people of Sungai Utik also keep domesticated animals in their long houses (rumah panjang) for several purposes. Dogs are kept for hunting, pigs and chickens are raised for meat and/or ritual purposes, and cats are kept as household pets.

**RESOURCE POTENTIAL**

Several factors support the sustainability potential of the Sungai Utik forest. These include documented customary law, cultural life of the forest’s inhabitants, and natural resources’ potential.

**ENAU**

Another important plant for the people of Sungai Utik is the Aren or Enau (Arenga undulatifolia). This species of palm tree produces a sweet liquid sap that is tapped at the flower’s stem. Boiling this sap produces a red sugar. The sap can also be fermented to create an alcoholic beverage called Tuak. Most of the Enau palms are found close to the long houses (rumah panjang), or in the Tembawai areas. However there is no estimate of the number of Enau trees in the area. If cultivated on a much larger scale, the sap of the Enau tree could also possibly be used to produce bioethanol, which could be used to fuel boat engines and electric generators.

**RUBBER**

Rubber is a well-known resource to the people of Sungai Utik. In addition to Tengkawang, rubber forms the main source of income (Although not very high) for many households. Most of the productive rubber plants in Sungai Utik were first planted 20 years ago using local seedlings. However natural rubber production is a relatively slow process. Tapping can only take place after a tree is about 10 years old. Rubber tree cloning was first introduced by Betung Kerihun National Park Authority. (Source: Interview with Pak Janggut, April 9, 2009). Rubber sample plots were established and several people were trained in the techniques of mass propagation. The introduction of these rubber trees resulted in an increase in the amount of latex produced, and a reduction in the time needed until the first tapping (6 years). However, cultivation techniques still need to be improved. With expansion and further promotion, rubber could reduce the dependency of the people of Sungai Utik on other forest resources, and allow them to pay more attention to the protection of their forest.
HARNESSING THE UTIK RIVER FOR HYDROPOWER
The community is responsible for protecting and managing the watershed along the entire course of the Utik River. The Sungai Utik long houses are located around 100 meters from the 25 meter wide Utik River. People use the river as a source of water for washing and bathing, and for boat transportation into the forest and to their farms (‘ladang’). At present, a limited electricity supply is provided to the long houses by generators. It would be possible to establish a mini-hydro power project on the river to generate a more reliable and less expensive power supply.

CULTURAL RESERVE
Sungai Utik is a place where the local people continue to lead a traditional way of life. The long-house architecture is also interesting, as are other aspects of traditional life. Regular traditional events called Gawai Adat are held in Sungai Utik, and the area is home to large collections of old porcelain jars and other unique artifacts. Sungai Utik should not only be promoted as a centre of nature conservation, but also as a cultural reserve that would be of interest to tourists.
ANNEX 4: SPATIAL PLANNING AND RECENT HISTORICAL DATA

1. SEMAUNG SEPAPAN

According to the West Kalimantan Province Spatial Plan Semaung-Sepapan is assigned for dry land-based agriculture “kawasan budidaya” not “kawasan lindung” (protected area). 3,000 hectares protected by the surrounding hamlets not the under that national land use plan comprises 3.1% of the total projected forest in Sanggau Regency (94,298 hectares total). This is roughly .13% of the total protected forest in West Kalimantan Province (2,163,853 Hectares in total) Spatial Plan 2004. The figure below shows the conceptual spatial settings of the study area based on the participatory mapping practice with the community from the Sanjan Emberas hamlet. There are 8 hamlets surrounding the forest which are: Sumbuat, Bunut, Sanjan Emberas, Selesung, Kedondong, Siran, by Dayak Hibun.

FIGURE 4.1: CONCEPTUAL MAP OF SEMAUNG-SEPAPAN FOREST

Source: Participatory Mapping with Community in Sanjan Emberas Village

There is several income generating activities in this area. The most important of these are palm cultivation (sawit) and rubber cultivation (karet). Both of these products are produced on plantations and have market networks which spread up to Pontianak (the capital city of West Kalimantan Province). Figure 4.2 depicts the network of trade for rubber and palm oil which support the community’s livelihood. The majority of
the palm-oil goes to city of Tayan and then on to Pontianak, whereas most of the rubber goes directly to Pontianak. The area has two palm oil processing factories. PT. Emas’s factory is located in the Bunut village. The second factory, known as Parindo, is located in the middle of Sanggau-Ngabang.

FIGURE 4.2: COMMODITY NETWORKS OF SANJAN EMBERAS VILLAGE

2. SEMANGIT

According to the West Kalimantan Province Spatial Plan, the area of Danau Sentarum National Park (DSNP), including Semangit, is designated as protected area, given the status of National Park by the Decree of the Minister of Forestry and Plantation No.34/Kpts-II/1999.

DSNP covers a 132,000 hectare area in the floodplain of the upper Kapuas River in West Kalimantan Province, Indonesian Borneo. DSNP consists of a series of interconnected seasonal lakes interspersed with swamp forest, peat swamp forest, and dry lowland forest on isolated hills. DSNP is the key conservation area of Borneo, supporting about 250 fish species (12-26 endemics), about 250 bird species, Borneo’s largest inland population of proboscis monkey, one of the largest remaining populations of orangutan, possibly three crocodile species, and several dozen endemic plants (Giesen et al, 2000).
Figure 4.4 shows the differing conditions of Danau Sentarum between seasons. During the wet season, the lakes and the water channels are flooded, whereas during the dry season the lake and much of the channels are empty of water.
The lakes support a large traditional fishing industry, utilized by over thousands of fishermen from 55 villages (BTNDS, 2007). Forests are heavily utilized as well, both for construction timber and for a wide variety of non-timber forest products (Giesen et al., 2000). Figure 4.5 taken from Google Earth shows the area of DSNP and the surrounding existing forest. The brownish area is the area of plants where the bees feed from during the blooming time (between September and January).

**FIGURE 4.5: DANAU SENTARUM NATIONAL PARK**

Semangit is located in the core area of DSNP, in the corner of Leboyan River, which connects several other hamlets. Semangit has been chosen as the location for processing the forest honey from the bee species *Apis dorsata*, as well as the main office of Asosiasi Periau Danau Sentarum (APDS), the Association of Forest Honey Harvester communities in Danau Sentarum. It is an ideal place to coordinate all the activities of APDS, given its easy access for reaching periaus (forest honey harvester communities) in other kampong, as well as markets, via water. Figure 4.6 shows the working areas of the member periaus of APDS and the location of Kampung Semangit. There are 33 periaus in the area of DSNP, and so far 8 have become the members of APDS. As APDS members, the periaus must adhere to its regulations, which stipulate guidelines for the forest honey harvesting process and clearly delineate the boundaries of each periau. As seen in this figure, the surrounding area of DSNP is under a potential threat from plans to open a palm oil plantation (area with pink colour).
FIGURE 4.6: WORKING AREAS OF ASSOCIATION PERIAU DANAU SENTARUM

Source: APDS

FIGURE 4.7: MAP OF DSNP PERIAUS COOPERATIVES

Map of Working Area of Periaus in DSNP
As described in the previous chapters, livelihoods in this area rely on fishing and forest honey harvesting, in addition to some small-scale agriculture and rubber. The fish and forest honey are distributed to Pontianak the provincial capital. The freshwater fish from this area account for 70% of the freshwater fish consumption in West Kalimantan Province. Figure 4.8 shows the networks of forest honey and rubber. Most of those commodities go to Pontianak and are then distributed to Jakarta. A small part of the forest honey is distributed to the city of Putussibau for local demand.

**FIGURE 4.8: MAP OF COMMODITY DISTRIBUTION SEMANGIT**

Modified from RTRW Kalimantan Barat 2004

3. SUNGAI UTIK

Since 1997 the Dayak Iban people of Sungai Utik have been preserving their 9,452 hectares of forest through the implementation of customary law (adat). This process began with the 1997 mapping of the village land area from upstream to downstream which was supported by a local NGO working in participatory mapping. Through the use of customary law, the community protects its forests and maintains its livelihoods. This practice of preservation has been recognized by Lembaga Ekolabel Indonesia (Indonesian Eco-label Institution) as a “Best Practice” of community-based forest management.
The community of Sungai Utik manage their area through a customary law version of land-use zoning. Their area is divided into several types of zones: pemukiman (land used for settlement), tembawai (fallow fields), enkabang, keramat (sacred places), kebun karet (area used for rubber plantations), damon (area used for swidden-agriculture), danau (lake), payak, and rimba (forest). The community divides their forest into three general categories which are protected forest (hutan taruh) 3667.2 hectares, reserve forest (galau) 1510.7 hectares, and production forest (embro kerja) 4274.5 hectares. The community is basically subsistence farmers practicing swidden agriculture planting rice and vegetables. Some villagers harvest rubber and sell it through distributors. However rubber cultivation is a very small portion of the Sungai Utik economy.

The success of Sungai Utik in preserving their forest is rooted in their agreement to implement strict zoning regulations derived from Adat law. Villagers respect this customary law, thereby legitimizing the means of forest preservation. Each zone has specific restrictions on the types of activities that can be conducted there. In the upstream, activities like logging which are harmful to the environment are strictly prohibited. In the down-stream swidden-agriculture as well as rubber tree planting is permitted. Limited numbers of trees can be cut for use in the building of village homes and other personal construction.

**FIGURE 4.9: MAP OF MANAGED FOREST IN SUNGAI UTIK**
The forest preservation practices of the Sungai Utik people succeed due to villager’s recognition of the need to preserve the quality of water and soil. There have been challenges to the community fighting against logging concessions and outside illegal logging activities. Several other hamlets in the area that have exploited much of their natural resource base now want to become involved in conservations practices in Sungai Utik. Jalai Lintang one of the nearby hamlets has had issues with logging but some of the forest area is still fairly intact.

FIGURE 4.10: UPSTREAM AREA OF JALAI LINTANG

Modified from Google Earth, accessed April 2009

ACKNOWLEDGEMENT
Some of the maps used for Sungai Utik were created by Pemberdayaan Pengelolaan Sumber Daya Alam Kerakyatan (PPSDAK) – Pancur Kasih. The map of Semangit Village was made by Asosiasi Periau Danau Sentarum (APDS).
RECENT TIME LINE ANALYSIS

FIGURE 4.11: HISTORY OF RECOGNIZED FOREST PROTECTION IN SEMAUNG-SEPAPAN

1980

1982-83: Transferring land from community to PTPN XIII (previously PTP VII) for palm-plantation.

1991/2 – Development of HTI Plantation in West Kalimantan

1994 – Legal conflict with PTPN XIII asking for compensation, lost in the lower and higher court Kalimantan. Not finished in Supreme Court.

1991/2 – Workshop of Adat Dayak West Kalimantan organized by AMA Kalimantan Barat

September 1999 – Governor Decree stated Semaung-Sepapan Forest as Protected Forest

May 2001 – Semaung-Sepapan Forest as Protected Customary Forest based on community consensus of 8 villages and 28 hamlets

April 2003 – Governor Decree stated Semaung-Sepapan Forest as Protected Forest

PTPN : PT. Perkebunan Nusantara
HTI : Hutan Tanaman Industri
AMA : Aliansi Masyarakat Adat
1981 - Cagar Alam (Decree of Direktur Jendral Kehutanan No.2240/DJ/I/1981), (80,000 Hectares).

1982 - Suaka Alam (Decree No.757/Kpts/Um/10/1982), (80,000 Hectares), Managed as Suaka Margasatwa by Dept. of Forestry represented by BKSDA Kalimantan Barat – Pontianak.

1994 - Established as RAMSAR area in Indonesia. (Flooded Lake Ecosystem).

1999 - Wetlands International began conservation programs in Danau Sentarum

1999 - Danau Sentarum National Park (Decree Minister of Forestry and Plantation No.34/Kpts-II/1999, (132,000 Hectares)

2005 - Assessment by Riak Bumi, Dian Tama, PRCF, AOI and JKTI in Nanga Leboyan

2006 - Training on Internal Control System for forest honey harvesters.

May 2006 – Mapping Periaus

July 2006 – BIOCert for 4.3 tons forest honey.

July 2006 – APDS Formed (P.Danau Luar, P. Suda, P. Mersak, P. Semangit, P. Semalah)

PRCF : People Resources and Conservation Foundation
AOI : Aliansi Organis Indonesia (Indonesian Organic Alliance)
JKTI : Jaringan Kearifan Lokal Indonesia (Indonesian Local Wisdom Network)
BIOCert : Board of Indonesian Organic Certification

COMMUNITY-BASED FOREST MANAGEMENT IN KALIMANTAN, INDONESIA:
A STOCKTAKEING OF LESSONS LEARNED
FIGURE 4.13: RECENT TIME OF SUNGAI UTIK PROTECTED FOREST RECOGNITION

1980

1981 – Pancur Kasih Foundation established (Institut Dayakologi, PPSHK)

1980

1991/2 – Development of HTI Plantation

1993 – LBBT, PPSHK (Pancur Kasih) established

1994 – PPSDAK established

1997-1998: Conflict with PT. BRU on logging

1996 – Participative Community Mapping (PPSDAK)

1998 – West-Kalimantan Indigenous People Alliance (AMA)

September 1999 – Workshop of Adat Dayak West Kalimantan organized by AMA Kalimantan Barat

March 1999 – AMAN established

March 2008 – Ecolabel to Sungai Utik from LEI (SCBFM)

LBBT: Lembaga Bela Banua Talino
AMAN: Aliansi Masyarakat Adat Nusantara
PPSHK: Program Pemberdayaan Sistem Hutan Kemasyarakatan
PPSDAK: Pemberdayaan Pengelolaan Sumber Daya Alam Kemasyarakatan
LEI: Lembaga Ekolabel Indonesia
AMA: Aliansi Masyarakat Adat – Kalimantan Barat
SCBFM: Sustainable Community Based Forest Management

COMMUNITY-BASED FOREST MANAGEMENT IN KALIMANTAN, INDONESIA: A STOCKTAKEING OF LESSONS LEARNED
Historical analysis is an important approach to understand the shifts, the transformation, and to address the factors enabling to those shifts and transformations. Three sites of best practices in community-based forest management Semaung-Sepapan, Semangit forest inside the Danau Sentarum National Park, and Sungai Utik have been recognized by various stakeholders that communities in those sites have been sustaining their environment and livelihoods.

BRIEF HISTORY OF SEMAUNG-SEPAPAN COMMUNITY-BASED PROTECTED FOREST
The recent history timeline of CBFM for the purposes of this research in Semaung-Sepapan started in 1982-1983 when the communities were asked to transfer land to the PTPN XIII a state run oil palm plantation (previously PTP VII). PTPN XIII was allocated an area of 48,000 Hectares. It was then followed by the development of HTI plantation. In 1994 the community of Dayak Hibun requested compensation for the land that had been allocated to the palm oil cooperative. The community pursued legal action but lost in the lower and higher court in Kalimantan. This case was brought up to the Supreme Court, but no clear decision was ever concluded. In 1999, there was a conference on the indigenous peoples movement, organised by an NGO and Dayak leaders. In 2001, the community of Dayak Hibun from 8 villages and 28 hamlets received legal recognition for Semaung-Sepapan as a protected customary forest. This was very locally driven by the Dayak Hibun in the area with almost no outside assistance from NGOs or official government bodies.

BRIEF HISTORY OF SUNGAI UTIK COMMUNITY-BASED PROTECTED FOREST
The history of CBFM in Sungai Utik was analyzed from 1981 when the Foundation of Pancur Kasih was established. This foundation was built to focus on preserving and promoting the customary law of Dayak people. It was followed by the establishment of PPSHK (Program Pemberdayaan Sistem Hutan Kemasyarakat) an NGO whose task is promoting practices of CBFM. It was followed by the establishment of PPSDAK (Pemberdayaan Pengelolaan Sumber Daya Alam Kemasyarakat) whose focus is on implementing participative community mapping activities. In 1996 PPSDAK supported the Dayak Iban to map their indigenous lands and use zones. LBBT (Lembaga Bela Banua Talino) work focuses on social strengthening and laws to support indigenous groups. In 1998, the Indigenous People Alliance (Aliansi Masyarakat Adat) was established, and in 1999, AMA supported the establishment of AMAN (Aliansi Masyarakat Adat Nusantara) also with the focus of indigenous people. A workshop was organized by these various organizations on strengthening the Dayak movement in Kalimantan. Initially through this workshop the process began to establish a recognized protected forest for Sungai Utik. In 2008 the Dayak Iban in Sungai Utik received the certificate from LEI (Lembaga Ekolabel Indonesia) for their effort in protecting forest areas through customary law. All of these NGO’s assisted this community in their effort to become recognized for their forest management practices.

BRIEF HISTORY OF KAMPONG SEMANGIT COMMUNITY-BASED PROTECTED FOREST
Recent history of CBFM in Semangit can be analyzed from 1981 when the Danau Sentarum was established as a National Reserve of 80,000 hectares. In 1999, the Government through the Ministry of Forestry and Plantations established Danau Sentarum as a National Park of 132,000 hectares. Semangit is located at the core zone of the National Park. In 2005, there was an assessment by 3 NGOS Riak Bumi, Dian Tama and PRCF supported by AOI and JKTI in order to implement an Internal Control System (ICS) for the forest honey harvesting. In February 2006, they conducted training for ICS for the forest honey harvesters. In July 2006 five community groups of harvesters formed the APDS (Asosiasi Periau
Danau Sentarum), an organisation to manage the forest honey harvesting. These five Periaus agree set to set up regulations for forest honey harvesting, such as using a tikung as an innovative tool for forest honey production. Boundaries were set up by the group in order to regulate use zones. Agreements were made to maintain and protect the forest to ensure the sustainability of livelihoods based on forest honey harvesting and production. In 2007 the honey was certified as an all natural bio-product. This has increased the value of the honey and income has increased dramatically in the villages.

TRANSFORMATION, ADAPTATION, AND THE STRUGGLE CONTINUES…

The three sites used for this research have been identified as conducting sustainable forest management which has allowed for communal protection of the ecosystems and at its current state providing sustainable livelihoods. The communities have passed through several stags to get to this point. There are several interesting findings through the historical analysis regarding best practices of community-based natural resources management.

- **External influence.** The emerging of the Indigenous right movement in Indonesia, particularly in West-Kalimantan Province has the direct and indirect impact to the community-based natural resource management in the three study sites. For the community of Dayak Hibun in Semaung-Sepapan and Dayak Iban in Sungai Utik, the workshop on empowerment of indigenous groups and customary laws held in Pontianak 1999 raised awareness of the importance of documenting efforts in managing and protecting the natural resources. While in Semangit, involvement of several NGOs particularly Riak Bumi Foundation have introduced practising sustainable forest honey harvesting.

- **Legal recognition.** The practice of documenting community’s efforts in managing and protecting natural resources had been invaluable in the stage of achieving legal recognition from the state. Each community in the three study sites have the documentation of sustainable forest management practices and to some extent have been recognized legally by the state. For the community of Dayak Hibun in Semaung-Sepapan the legal recognition process started in 2001 establishing the protected customary forest and achieved legal recognition in 2003. The Dayak Iban of Sungai Utik, documentation process started in 1996 with community mapping activities. They now have recognition from LEI- an influential NGO certified on sustainable community-based forest management that was recognized by the Ministry of Forestry in 2008. However they are still struggling to achieve the legal recognition from the local government. Legal recognition by government bodies and changes in the national land use plan are critical in the success of communities fully managing natural resources although it is something they have in fact been practicing for centuries. Legal recognition of these forests protects outside encroachment and land grabs for timber concessions and Palm oil plantations.
REFERENCES


Kantor Balai Taman Nasional Danau Sentarum (2007), Buku Informasi Taman Nasional Danau Sentarum.
