

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

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ANNEX 1. LITERATURE REVIEW AND JUSTIFICATION

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)

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

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 (aloe wood) and honey as the most important sources of income.

TABLE 1.2: FOREST PRODUCTS AND VALUE – FOREST-BASED SYSTEMS (DESCHAMPS & HARTMANN, 2005)

Product	Average Annual Production per Agricultural hh (kg)	Average Total Value (in Rp)	Used		Sold/Traded	
			%	Value	%	Value
Bird nests	0.004	9,836	0.0%	0	100.0%	9,836
Damar	1.6	2,855	95.8%	2,736	4.2%	119
Fishing	164.9	1,082,898	78.8%	853,813	21.3%	230,379
Gaharu	1.0	2,324,859	0.0%	0	100.0%	2,324,859
Honey	33.0	817,725	33.3%	272,067	66.7%	545,658
Medicinal plants	0.6	902	97.3%	877	2.7%	24
Other hunting	0.5	140,328	49.3%	69,228	50.7%	71,099
Pig hunting	89.2	566,287	88.7%	502,244	11.3%	64,043

Product	Average Annual Production per Agricultural hh (kg)	Average Total Value (in Rp)	Used		Sold/Traded	
			%	Value	%	Value
Rattan	5.2	5,338	94.2%	5,030	5.8%	307
Shrimp	0.3	6,352	100.0%	6,352	0.0%	0
Timber (m ³)	10.3	4,118,668	72.2%	2,972,929	27.8%	1,145,739
Total		9,076,048	51.6%	4,685,276	48.4%	4,392,063

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.

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 (DESCHAMPS & HARTMANN, 2005)

Product	Average Annual Production per Agricultural hh (kg)	Average Total Value (in Rp)	Used		Sold/Traded	
			%	Value	%	Value
Fishing	22.3	120,161	80.7%	96,930	19.3%	23,232
Shrimp	6.5	161,290	100.0%	161,290	0.0%	0
Pig hunting	0.0	0	N/A	0	N/A	0
Other hunting	0.1	8,065	100.0%	8,065	0.0%	0
Bird nests	0.0	0	N/A	0	N/A	0
Damar	0.0	0	N/A	0	N/A	0
Gaharu	0.9	427,335	0.0%	0	100.0%	427,335
Honey	0.0	0	N/A	0	N/A	0
Medicinal plants	0.5	532	100.0%	532	0.0%	0
Rattan	1.5	1,226	100.0%	1,226	0.0%	0
Timber (m ³)	9.1	2,183,871	57.8%	1,261,792	42.2%	922,079
Total		2,902,480	52.7%	1,529,835	47.3%	1,372,646

Source: Agricultural Producer and Water User Survey, 2002

Note: USD \$1 = Rp. 8,575 (June, 2002). 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 is 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)

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

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 deforested¹. 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 activities². 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

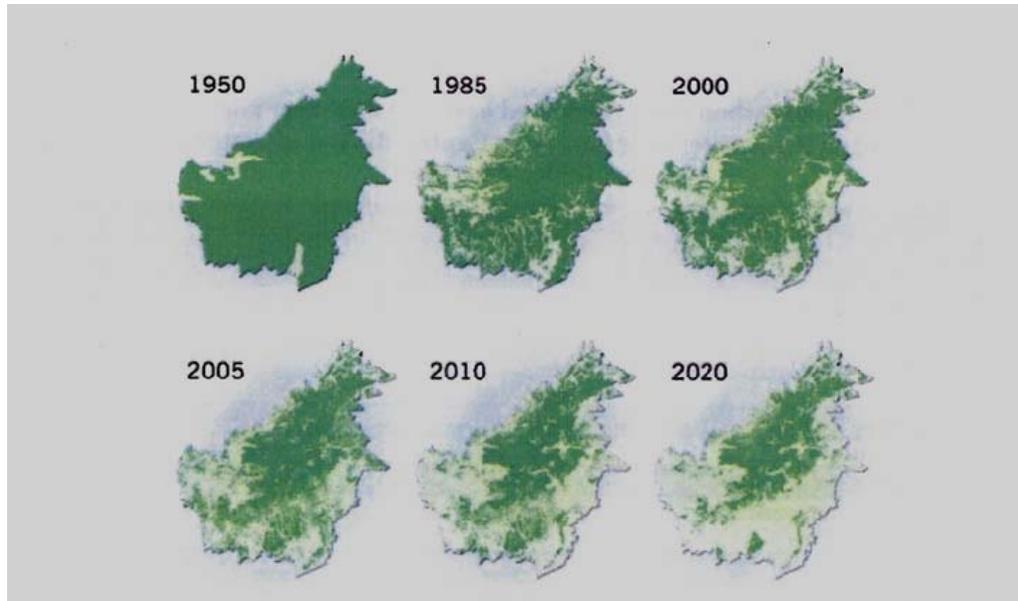
¹ See PEACE (2007) - Indonesia and Climate Change: Current Status and Policies.

² See, for example, Langner, A., Miettinen, J. and Siegert, F. (2007) – Land cover change 2002-2005 in Borneo and the role of fire derived from MODIS imagery. *Global Change Biology*, 13: 2329-2340; and Bechteler, A. and Siegert, F. (2004). Recurrent fires in tropical peatlands in Central Kalimantan. 12th International Peat Congress, Tampere: draft.

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)³. 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

No	Benefits	Annual Production ⁽²⁾	Price (IDR/Unit) ⁽³⁾	Annual Benefit Value (IDR/Household) ⁽⁴⁾	Current Utilization	Purpose of Utilization
1	Clean Water	180 m ³	250	45,000	Water Sources from protected forest areas	Consumption
2	Firewood ⁽¹⁾				rubber wood and timber from swidden agriculture land	Consumption
3	Timber Housing ⁽¹⁾				Utilized according to hh consumption but rare	Consumption
4	Hunting Animals ⁽¹⁾				Utilized according to hh need but rare	Consumption
	Value in Rupiah			45,000		
	Value in Dollar (US\$ 1 = IDR 10.000)			4.5		

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.

³ 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 2.2: ESTIMATED VALUE OF AGRICULTURE PRODUCTS IN PANDAN SEMBUAT VILLAGE PER HOUSEHOLD ANNUALLY

No	Types of Benefit	Annual Production ⁽²⁾	Price (IDR/Unit) ⁽³⁾	Annual Benefit Value (IDR/hh) ⁽⁴⁾	Existing Utilization	Utilization Purpose
1	Palm Oil Plantation	2000 kg	1150	27.600.000	Main livelihood with ave size of 2 ha/hh	For sale
2	Agriculture	500 kg	6000	3.000.000	Located in the buffer zone dry land farm limited in size.	Consumption and some for sale

No	Types of Benefit	Annual Production ⁽²⁾	Price (IDR/Unit) ⁽³⁾	Annual Benefit Value (IDR/hh) ⁽⁴⁾	Existing Utilization	Utilization Purpose
3	Rubber Plantation	80 kg	5000	400.000	livelihood source located around settlement and in the buffer zone	For sale
4	Rice Field	500 kg	6000	3.000.000	Located in the farming area, but very limited.	Consumption and some for sale
5	Livestock Production (Chickens And pigs) ⁽¹⁾				Located in settlement -very limited	Consumption and for sale
	Amount (Indonesia n Rupiah) IDR			34.000.000		
	Amount (1 USD= IDR. 10.000)			3.400		

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 2.3: ESTIMATED VALUE OF TIMBER AND NTFP IN SEMANGIT, PER HOUSEHOLD, ANNUALLY

No.	Type of Benefit	Annual Production ⁽¹⁾	Price (IDR/Unit) ⁽²⁾	Annual Value (IDR/hh) ⁽³⁾	Current Utilization	Purpose of Utilization
1	Forest honey	175 kgs	35,000	6,125,000	natural resources and technology adaptation to using <i>tikung</i>	Sold and Consumption

No.	Type of Benefit	Annual Production ⁽¹⁾	Price (IDR/Unit) ⁽²⁾	Annual Value (IDR/hh) ⁽³⁾	Current Utilization	Purpose of Utilization
2	Timber (houses, boats, fish basket, <i>tikung</i>)	4.80 m ³	1,000,000	4,800,000	Not sold limited usage	Consumption
3	Firewood	4 m ³	50,000	200,000	hamlets in area and Semujan Mount	Consumption
	Value in Indonesian Rupiah (IDR)			11,125,000		
	Value in Dollar (US\$ = Rp. 10.000)			1,113		

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 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

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

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 OF VALUE OF FOREST RESOURCE EXTRACTION IN SUNGAI UTIK PER HOUSEHOLD ANNUALLY

No	Product	Annual Production ⁽²⁾	Price (IDR/Unit) ⁽³⁾	Annual Utilization Value (IDR/hh) ⁽⁴⁾	Existing Utilization	Purpose of Utilization
1	Timber (House and canoe)	2,40 m ³	1.000.000	2.400.000	not sold, limited to hh need	Consumption
2	Firewood	4 m ³	50.000	200.000	timber from farming fields or from production areas	Consumption
3	<i>Tengkawang</i> fruit	800 kg	4000	3.200.000	Harvest every 5 years	For Sale
4	Rattan	50 kg	3.500	175.000	To make mats, baskets, ropes	Consumption
5	Sugar palm	480 liter	5.000	600.000	Located around long house and farm land to make liquor	Consumption
6	Meat (pork)	200 kg	18.000	3.600.000	hunted every 2-3 months	Consumption
7	Fresh water turtle (<i>labi-labi</i>)	80 kg	27.000	2.160.000	Need based and as additional income	Consumption and for sale
8	Medicine Plants ⁽¹⁾				Need based	Consumption
9	Fishing in the river ⁽¹⁾				Need based	Consumption
10	Durian ⁽¹⁾				family consumption	Consumption
	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

No	Types of Benefit	Annual Production ⁽¹⁾	Price (IDR/Unit) ⁽²⁾	Annual Benefit Value (IDR/hh) ⁽³⁾	Existing Utilization	Utilization Purpose
1	Swidden agriculture	2	7.000	14.000.000	Main livelihood for the community, mostly for consumption, for	For Consumption and sale

No	Types of Benefit	Annual Production ⁽¹⁾	Price (IDR/Unit) ⁽²⁾	Annual Benefit Value (IDR/hh) ⁽³⁾	Existing Utilization	Utilization Purpose
					sale when overproduction is occurred	
2	Rubber	160	3.000	480.000	A dry season activity	For sale
	Total Indonesian Rupiah (IDR)			14.480.000		
	Total (1 US Dollar = IDR. 10.000)			1.448		

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 \pm 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.

ANNEX 3: NATURAL RESOURCE INVENTORY AND RESOURCE POTENTIAL

1. SEMAUNG SEPAPAN

Semaung 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. Varieties 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 leaves
- *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 in 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/labi-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 Tengkwang, 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

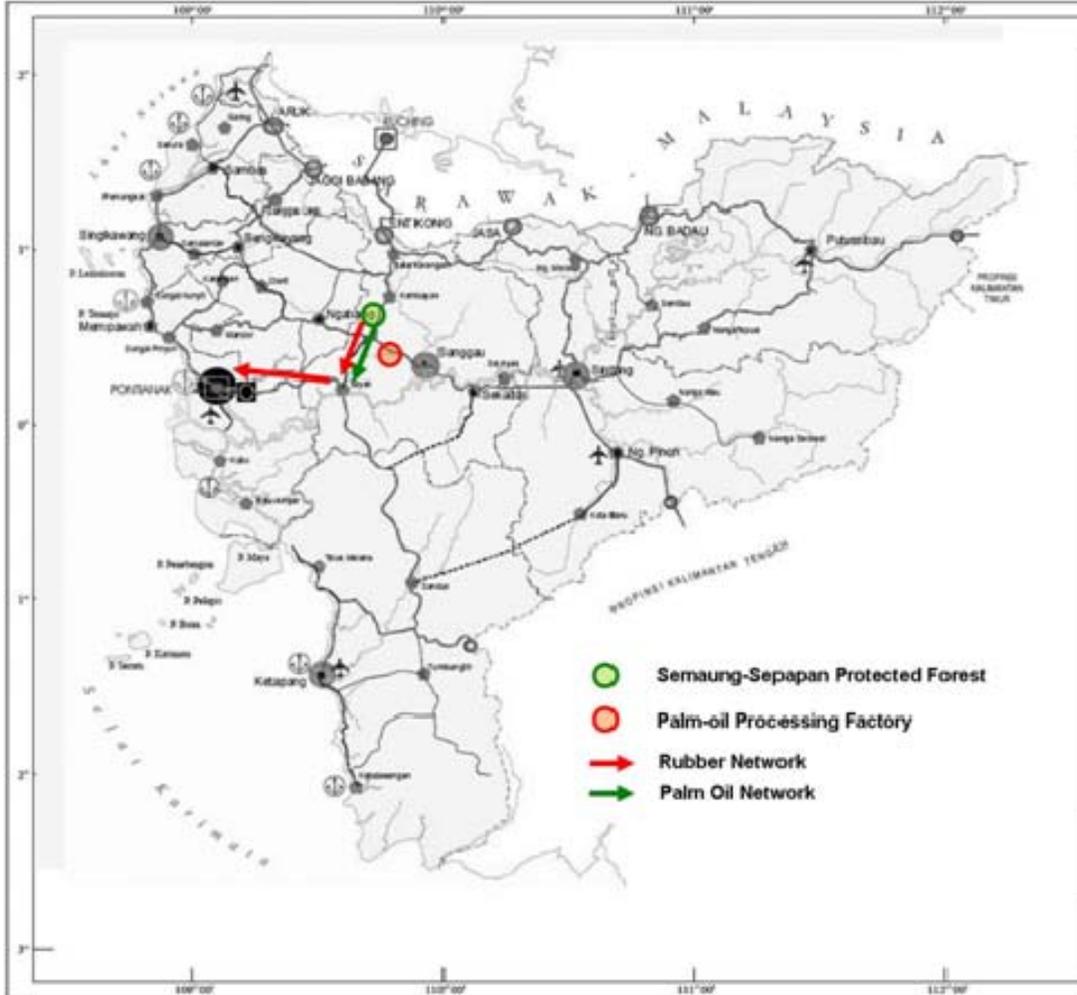
The community is responsible for protecting and managing the watershed along the entire course of the Utik River. The Sungai Utik long houses are located around 100 meters from the 25 meter wide Utik River. People use the river as a source of water for washing and bathing, and for boat transportation 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.

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



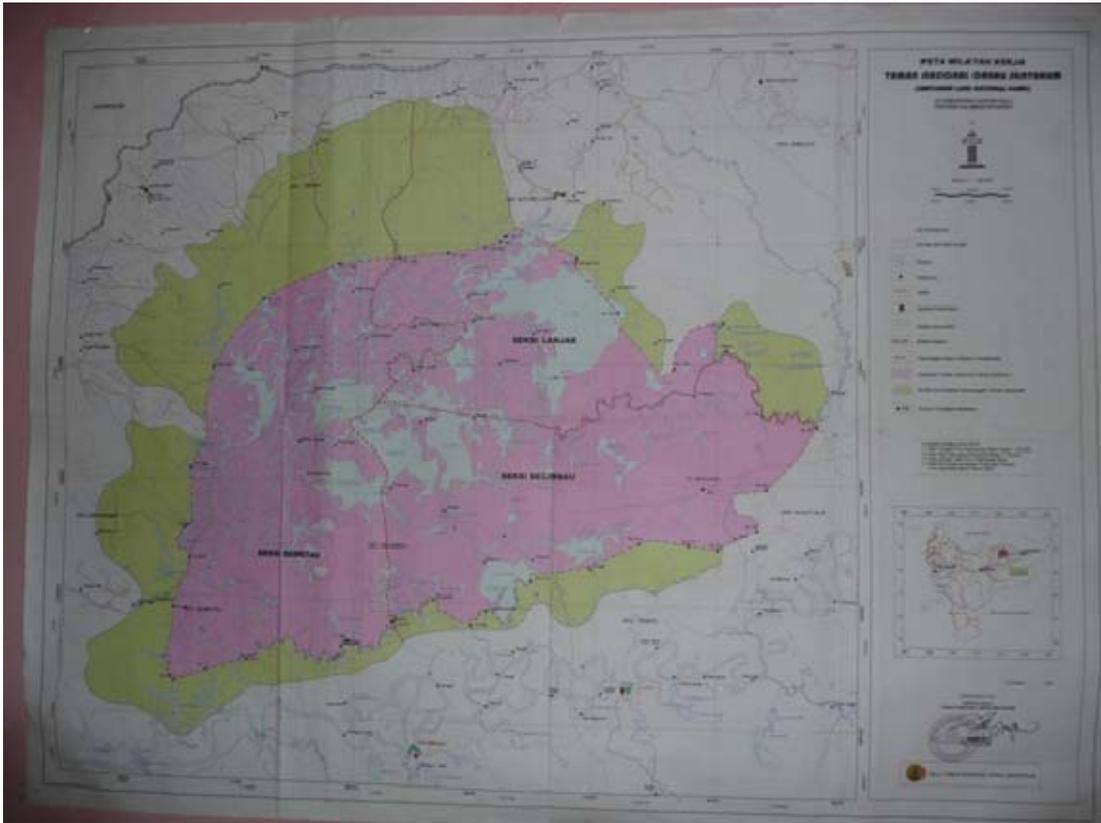
Modified from RTRW Kalimantan Barat 2004

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 4.3: DANAU SENTARUM NATIONAL PARK (CORE ZONE AND BUFFER ZONE)



Source: BKSDA Propinsi Kalimantan Barat

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.

FIGURE 4.4: DSNP DURING WET SEASON IN 2004 AND DRY SEASON 1994

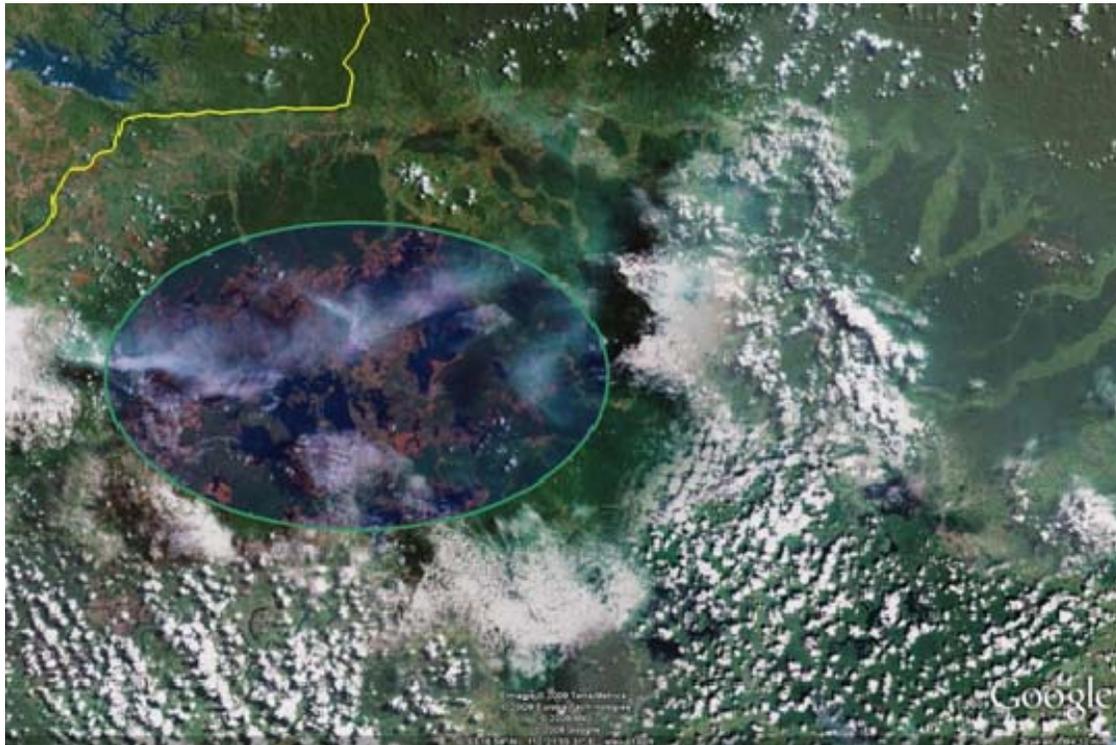


Photo by Anshari (Anshari GZ, 2006)

Photo by R. Dennis (Anshari GZ, 2006)

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).

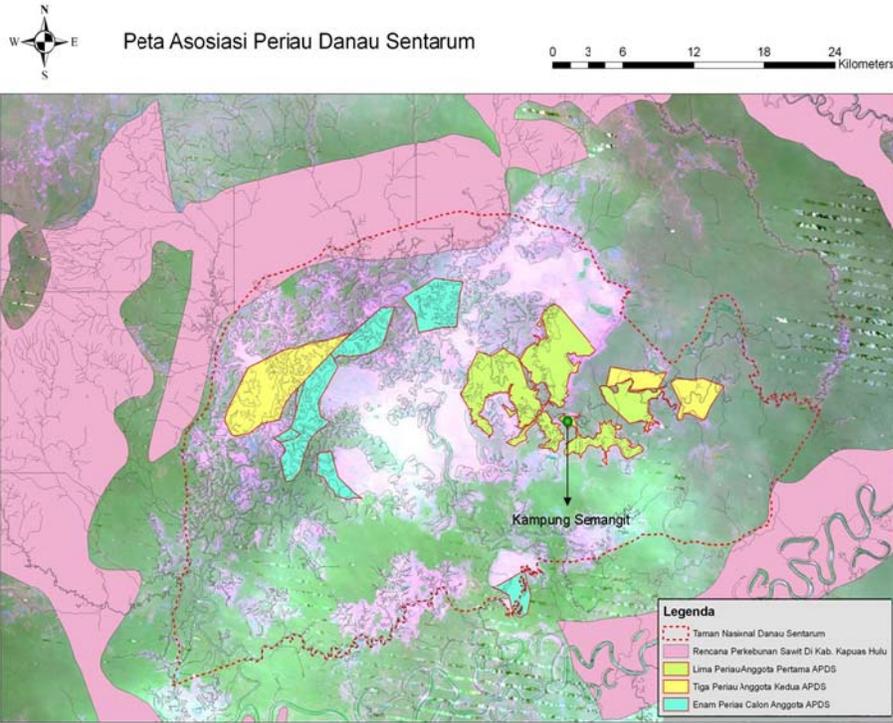
FIGURE 4.5: DANAU SENTARUM NATIONAL PARK



Edited from Google Earth

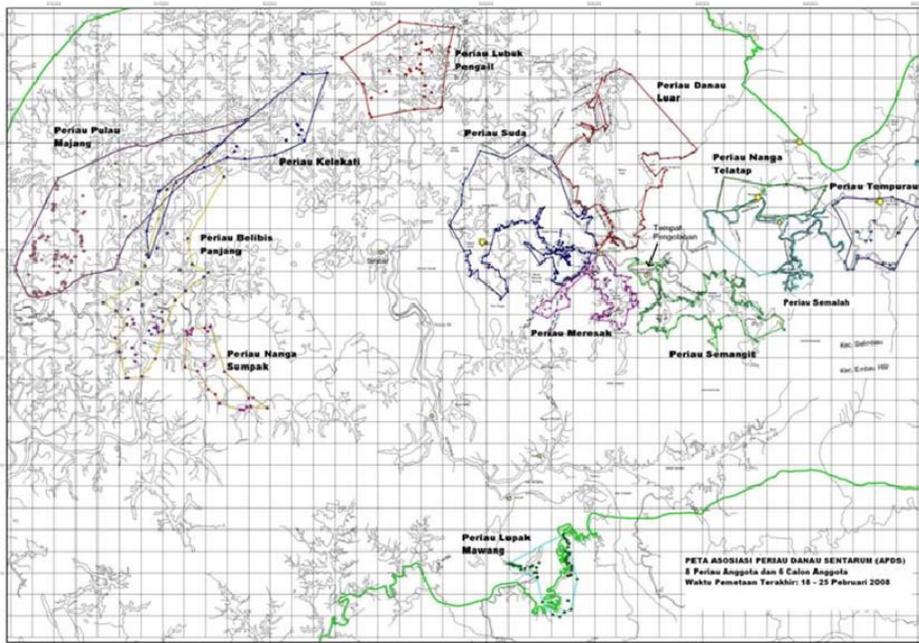
Semangit is located in the core area of DSNP, in the corner of Leboyan River, which connects several other hamlets. Semangit has been chosen as the location for processing the forest honey from the bee species *Apis dorsata*, as well as the main office of Asosiasi Periau Danau Sentarum (APDS), the Association 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

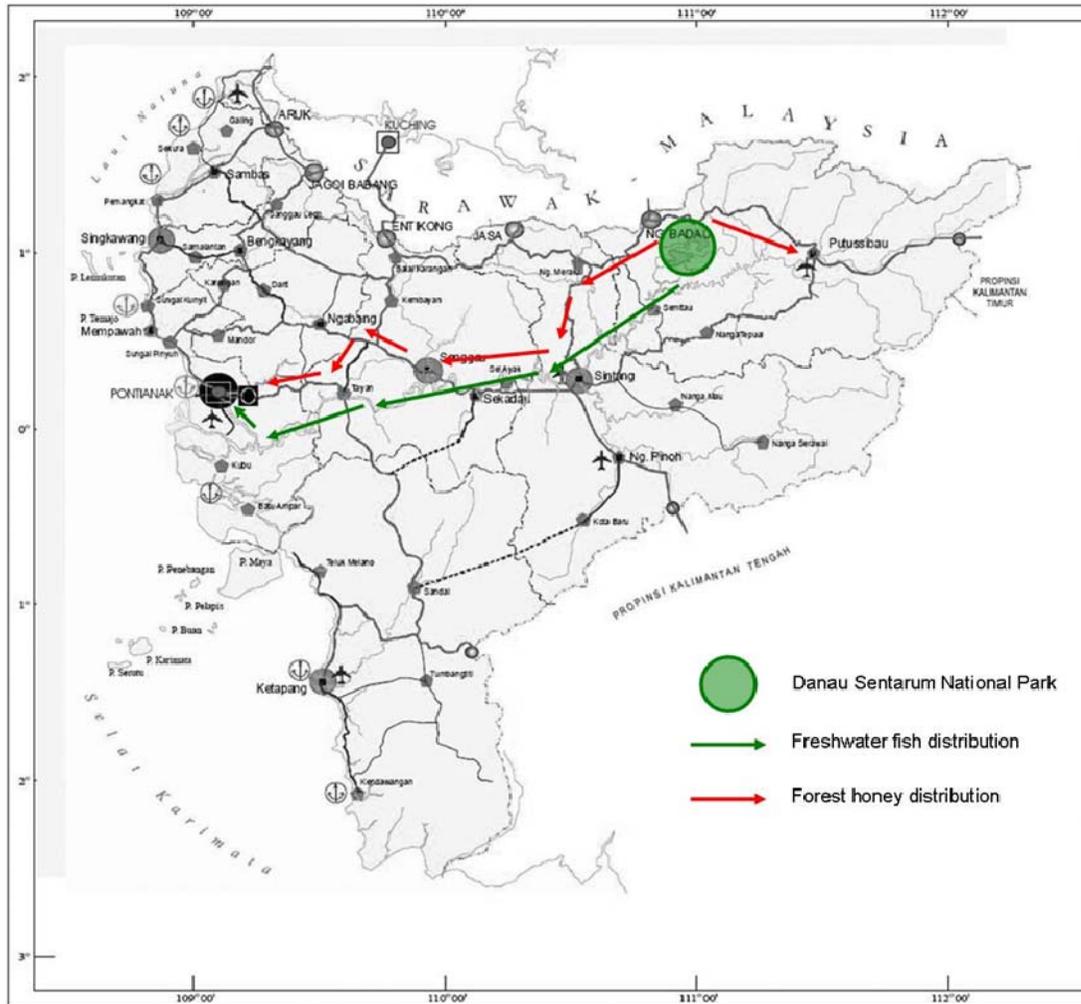
FIGURE 4.7: MAP OF DSNP PERIAUS COOPERATIVES



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

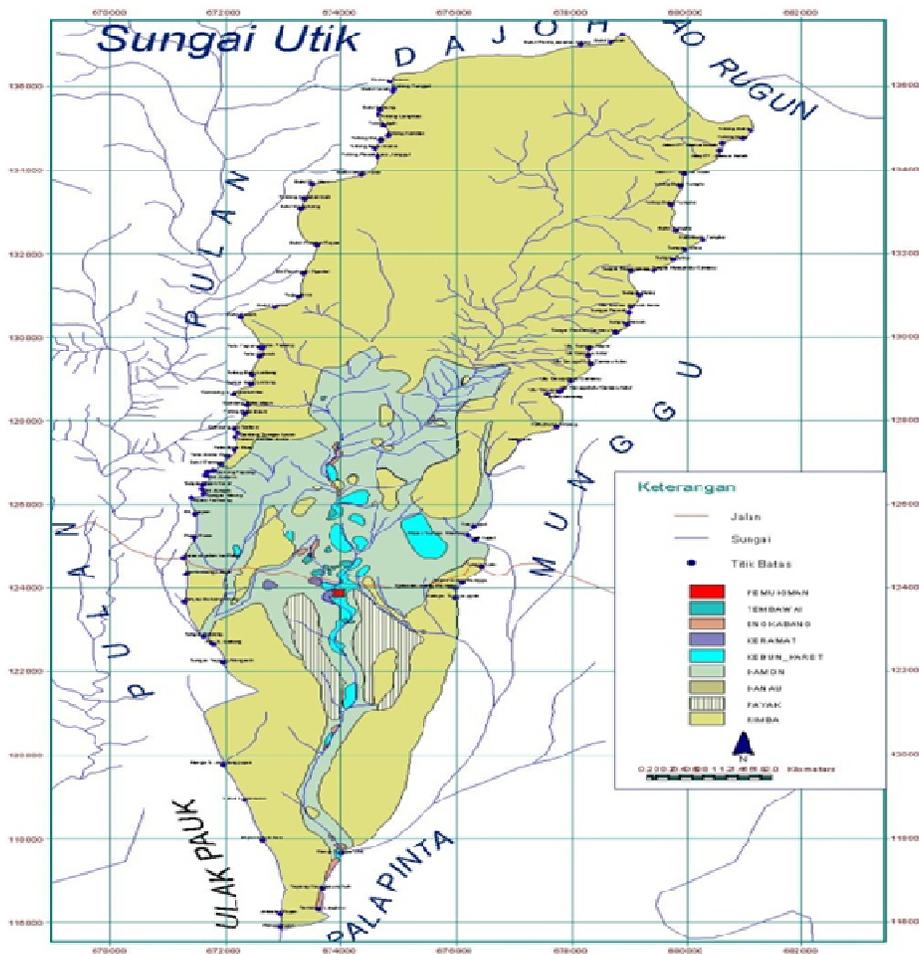
3. SUNGAI UTIK

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 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 (embor 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.

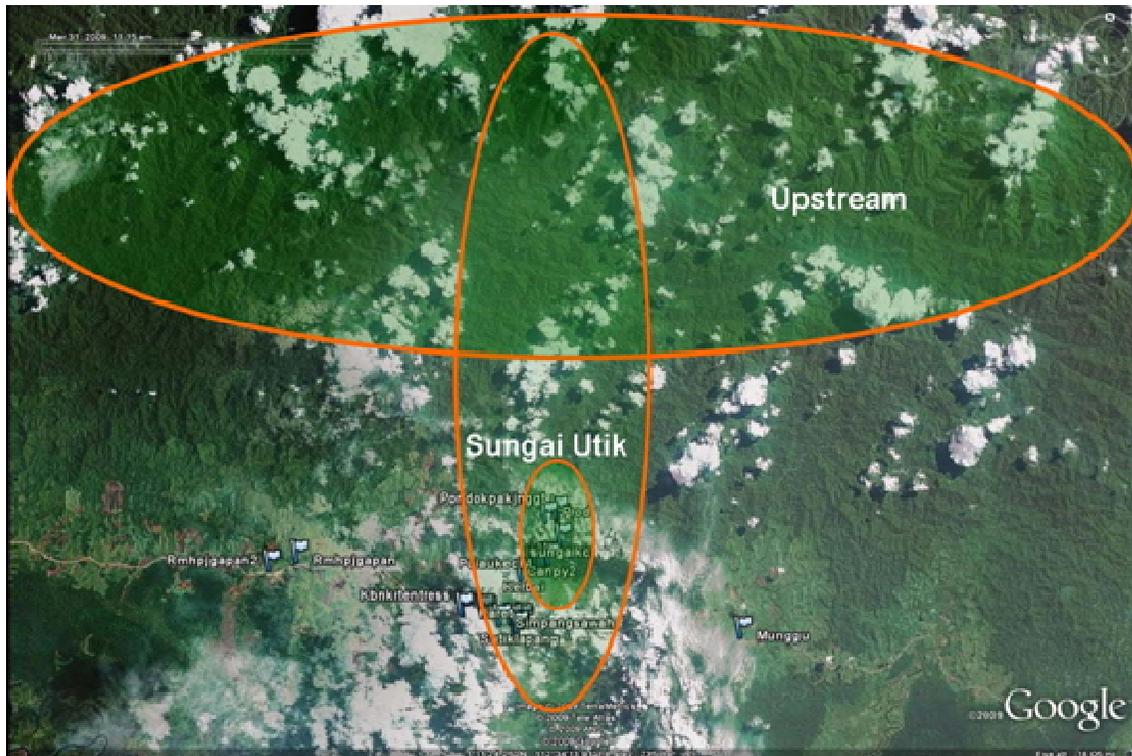
FIGURE 4.9: MAP OF MANAGED FOREST IN SUNGAI UTIK



Source: PPSDAK

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



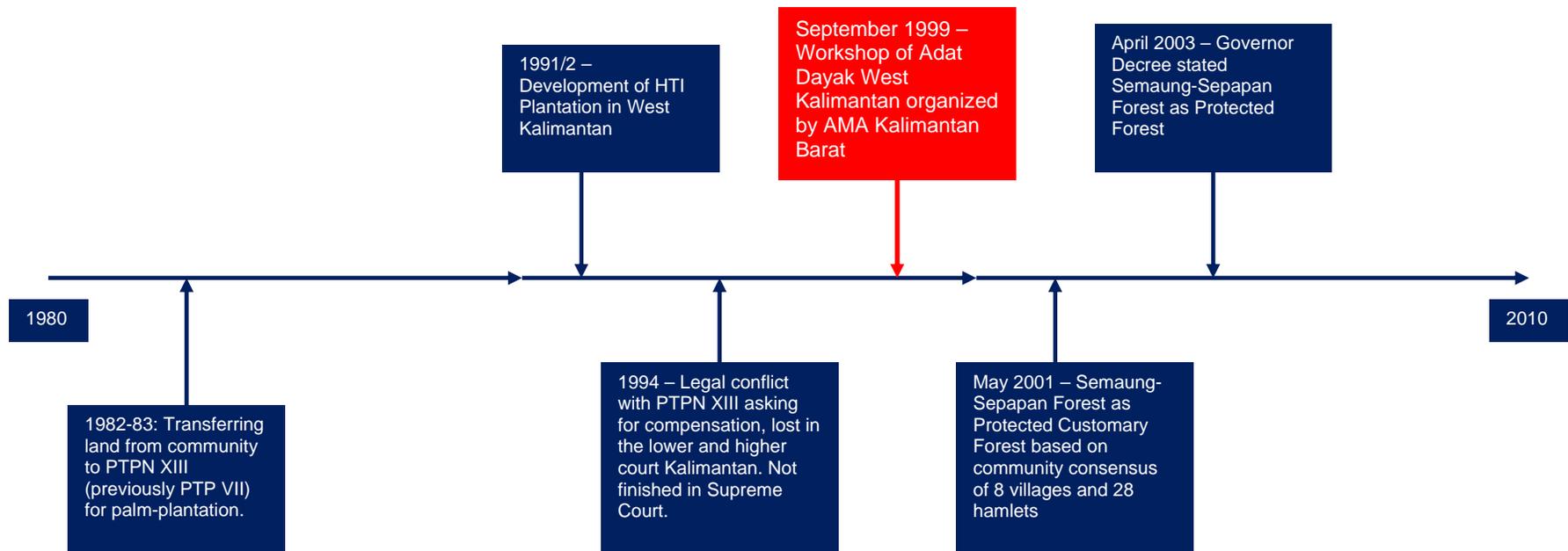
Modified from Google Earth, accessed April 2009

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RECENT TIME LINE ANALYSIS

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



PTPN	: PT. Perkebunan Nusantara
HTI	: Hutan Tanaman Industri
AMA	: Aliansi Masyarakat Adat

FIGURE 4.12: RECENT TIME LINE OF NRM IN SAMANGIT AND DANAU SENTARUM NATIONAL PARK

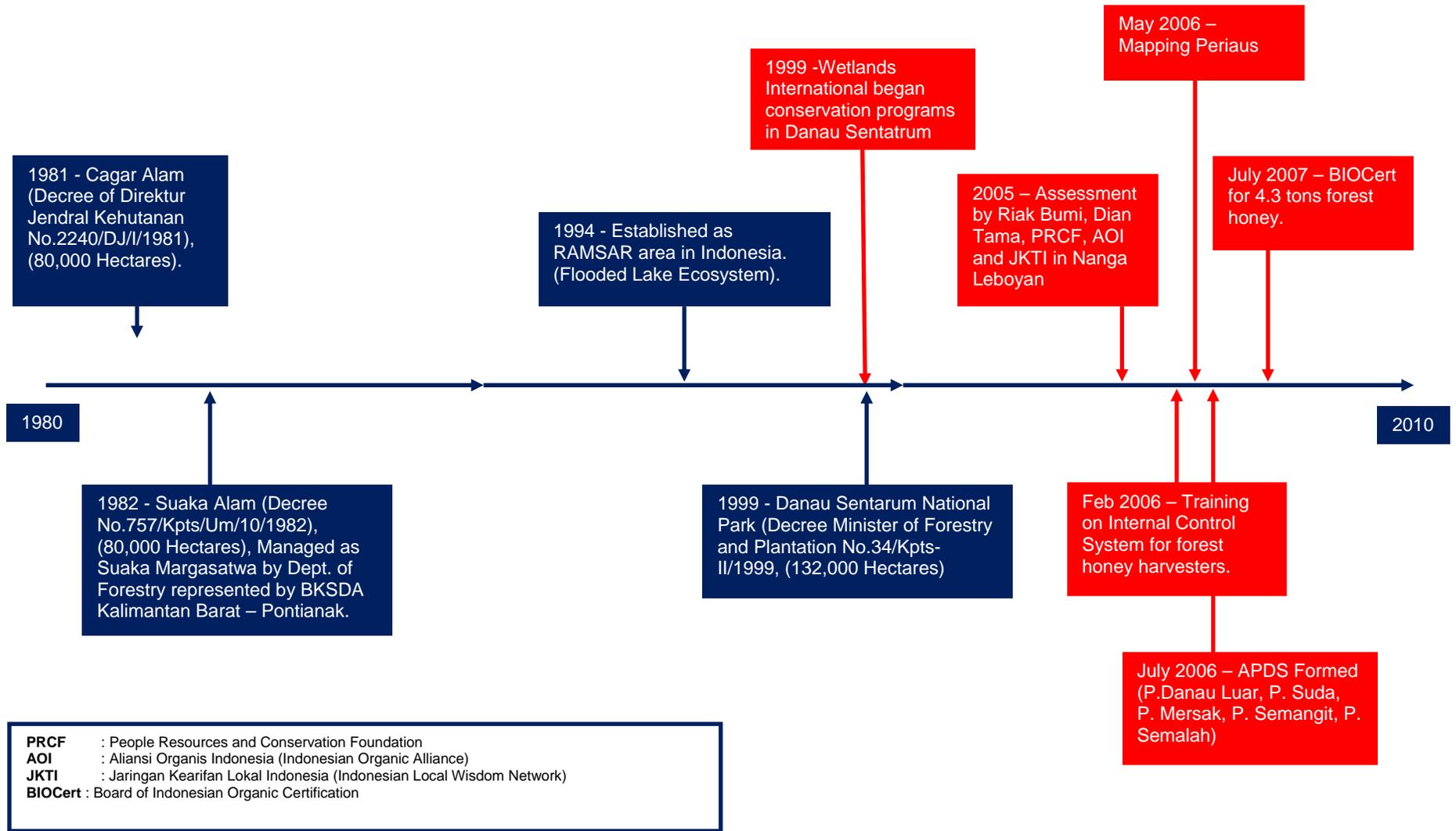
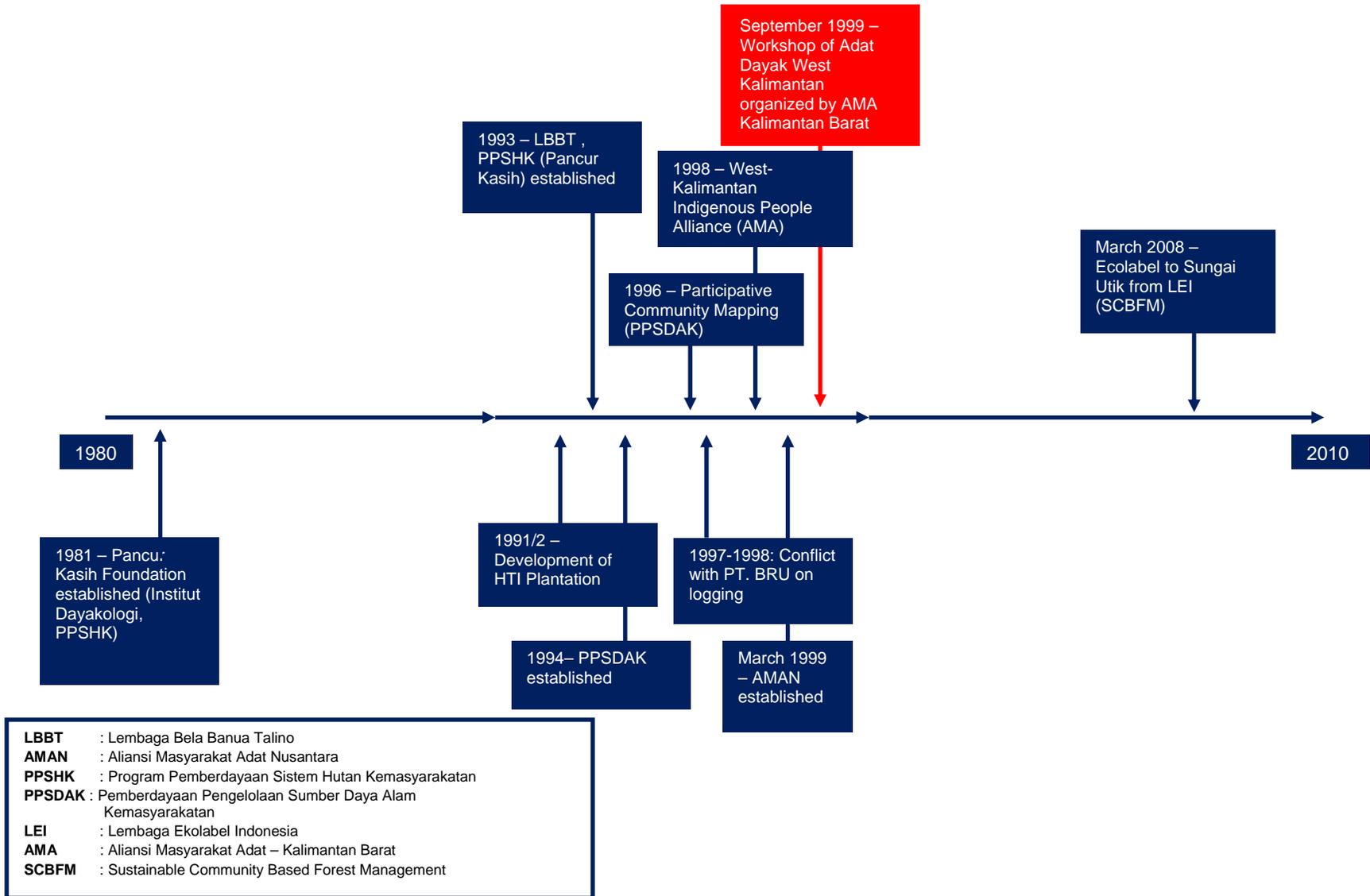


FIGURE 4.13: RECENT TIME OF SUNGAI UTIK PROTECTED FOREST RECOGNITION



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 Kemasyarakatan) an NGO whose task is promoting practices of CBFM. It was followed by the establishment of PPSDAK (Pemberdayaan Pengelolaan Sumber Daya Alam Kemasyarakatan) 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 stages 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.

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