



Payment for Ecosystem Services (PES)

Assessment of PES Potential in Kapuas Hulu

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Photo by Yves Laumonier/CIFOR.

Local residents who live within Danau Sentarum National Park, fish in a traditional way, Kapuas Hulu, West Kalimantan, Indonesia.

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Acronyms and abbreviation

ADD	<i>Alokasi Dana Desa</i> , a village allocation fund provided by the district government for village development including operational costs
APL	<i>Area Penggunaan Lain</i> , area for other use
CCB	Climate, Community and Biodiversity Standards
CDM	Clean Development Mechanism
FFI	Flora & Fauna International
FPIC	Free prior and informed consent, is the principle that a community has the right to give or withhold its consent to proposed projects
GIZ	<i>Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH</i> , German Federal Enterprise for International Cooperation
HL	<i>Hutan Lindung</i> , protected forest
HP	<i>Hutan Produksi</i> , production forest
HPH	<i>Hak Pengusahaan Hutan</i> , forest concession right
HPH-RE	<i>Hak Pengusahaan Hutan Restorasi Ekosistem</i> , forest concession right for ecosystem restoration
HPK	<i>Hutan Produksi Konversi</i> , production forest for conversion
HPT	<i>Hutan Produksi Terbatas</i> , limited production forest
KOMPAKH	<i>Komunitas Pariwisata Kapuas Hulu</i> , Kapuas Hulu ecotourism community
MRV	Measurement, Reporting and Verification
NP	National Park
NTFP	Non-Timber Forest Product/s
PES	Payment for Ecosystem Services
PDAM	<i>Perusahaan Daerah Air Minum</i> , public company operated by district government for providing access to clean water for community
PNPM	<i>Program Nasional Pemberdayaan Masyarakat</i> , national program for community empowerment, a project managed by BAPPENAS with support from the World Bank to improve access and poverty alleviation
REDD	Reducing Emissions from Deforestation and Forest Degradation
TNBK	<i>Taman Nasional Betung Kerihun</i> , Betung Kerihun National Park
TNDS	<i>Taman Nasional Danau Sentarum</i> , Danau Sentarum National Park
VCS	Verified Carbon Standard
WWF	World Wildlife Fund for Nature

1 Introduction

1.1 Aim of the assessment of PES potential in Kapuas Hulu

One component of the CoLUPSIA project is to explore the potential for establishing payment for ecosystem services (PES) projects within the pilot sites identified in each of the districts where the CoLUPSIA project is working, namely Seram (Central Maluku Province) and Kapuas Hulu (West Kalimantan Province).

As no PES projects are under development as part of CoLUPSIA, this assessment focused on the opportunities for PES, but did not assess the feasibility of any specific PES project(s). If a PES project is to be developed, then a full feasibility assessment should be conducted during the project design phase.

The aim of this assessment was to identify opportunities for PES and the feasibility of establishing PES projects in five villages/hamlets in Kapuas Hulu. During a field visit in November 2012, interviews were conducted in each village (usually with the village head) and also with the staff at the national park office and the Fauna & Flora International (FFI) and World Wide Fund for Nature (WWF) offices in Putussibau, the district capital. The questions and minutes from each meeting are included in Annex A.

The framework for this assessment followed the guideline to assessing the feasibility of PES which has been revised based on the results of this assessment (Fripp 2014). The guide outlines the basic steps required to identify and determine the feasibility of a PES project, thus providing a framework for preparing and implementing the project. Readers are advised to refer to the guide in conjunction with this report.

In summary, the objectives of this assessment were as follows:

- To assess whether there is potential for PES in Kapuas Hulu and, if so, identify the opportunities, constraints, risks, ways to mitigate risks and next steps.
- To review the practical applicability of the PES guide.

1.2 Approach

Following the format of the PES guide projects, the assessment applied each step in the guide in a practical context. For example, for any potential PES projects, the governance and administrative structures and benefit-sharing mechanisms — both existing and required — were assessed. The assessment focused predominantly on the socioeconomic conditions, processes and governance systems of the villages and hamlets with the aim of gaining greater understanding of how a PES project could be implemented and sustainably managed and, ultimately, whether a PES project would be feasible in the proposed pilot areas.

Information was elicited through interviews with key informants, rather than through focus group discussions. The aim of this approach was to gain an understanding of the administrative and governance approaches within the village, given the limited time available for the fieldwork. Information gained from detailed socioeconomic surveys conducted at household and village level during 2011 provided a baseline of information that could be used to reinforce the information gained through interviews. However, for any full feasibility study and/or development of a PES project, full consultation with and engagement of the local community are essential.

The concept of payment for ecosystem services, such as carbon sequestration, remains abstract in the absence of a defined project. To avoid raising expectations among respondents and creating confusion by discussing abstract scenarios, the interviews and discussions focused on the following:

- existing administrative and governance systems
- experience in managing resources
- experience dealing with conflict
- experience of working with external organizations such as private companies, NGOs and donor organizations.

These topics provided an understanding of the fundamental mechanisms of how villages function and the resulting implications for managing a PES project.

Technical requirements (biophysical requirements, measurement, reporting and verification — MRV) cannot be assessed until a PES project — and, in some cases, a buyer with stipulated buying requirements — has been identified. Once a project has been decided upon, the project design phase begins (see Figure 1 for the stages in identifying and then implementing PES). Project design must take place in full consultation with the local community, ensuring their full support and buy-in (a requirement for sustainability) and compliance with the requirements of Free, Prior Informed Consent (FPIC) included in most, if not all, verification standards (for carbon, REDD+, etc.).

The 10-step guide provides a starting point for designing a PES project. Other guides and technical support are also available, depending on the specific type of PES project planned (e.g. carbon project). Sources include Forest Trends' *Building Forest Carbon Projects: Step by Step Overview and Guide*.

2 The 10-step approach

The 10-Step Guide to PES is designed to take the user through the process of identifying the ecosystem service, the buyer, the seller and the market. It also aims to support the user in determining the feasibility of PES, including opportunities and risks. The 10 steps form the framework for this assessment of potential PES projects in the district of Kapuas Hulu.

Before presenting the feasibility results, it is worth reiterating a generally recognized definition for PES. According to Wunder (2005, 2008), PES can be defined as:

1. a **voluntary** transaction where
2. a well-defined **ecosystem service** or corresponding land use is
3. **bought** by an ecosystem service buyer from
4. an ecosystem service **provider**, but only if
5. the service provision is **secured** (conditionality).

For all PES programs, the buyer must be identified, the market conditions understood (including any

conditionalities) and the service provider legally and institutionally recognized. This last point in particular can be challenging for many small-scale producers such as hamlets and villagers.

Wunder (2007) states that designing PES schemes involves three main steps:

1. developing a baseline to assess **additionality**
2. estimating the provider's **opportunity cost** of conservation (or restoration)
3. establishing the **institutions** needed to monitor and enforce the terms of the contracts and distribute the benefits generated by the scheme.

Put simply, for a successful PES project, the demand, the supply and the appropriate transaction infrastructure (i.e. marketplace) must all be in place. All cases require a robust scientific baseline, supporting information and a project scenario (how the baseline situation will change (additionality) as a result of the PES project). In practice, this breaks down into a series of steps to establish a fully functioning PES scheme. All steps must be completed in order to design, establish and implement a fully functioning and sustainable PES program.

2.1 Practical steps to PES identification and feasibility assessment

The 10-step approach or decision process was developed to support the practical process of identifying and assessing the feasibility of PES. This forms part of the first step in developing and implementing a PES project (Figure 1), which is the focus of this field assessment. This preliminary analysis provides the information required for the subsequent steps of PES development and implementation. The 10 steps in identifying a potential PES project and assessing its feasibility are summarized in Figures 1 and 2.

The four-step approach (Figure 1) to the identification, design and implementation of a PES project is drawn from a report produced by the UK Department for Environment, Food and Rural Affairs (Defra) in 2013 (Smith et al. 2013). As seen, identifying the ecosystem services is the first step. Steps B, C and D involve, respectively, preparing for PES, negotiating agreements between buyers and sellers, and then actual implementation.

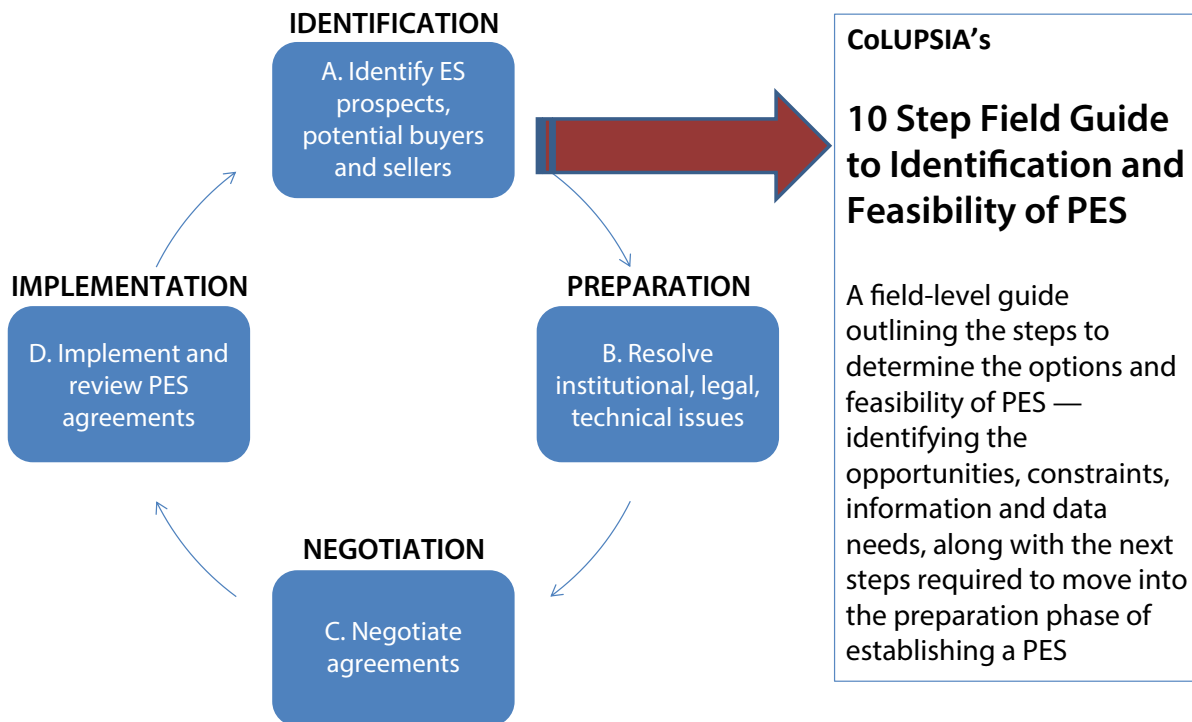


Figure 1. A guide to PES: From identification to implementation.

Source: Smith et al. (2013)

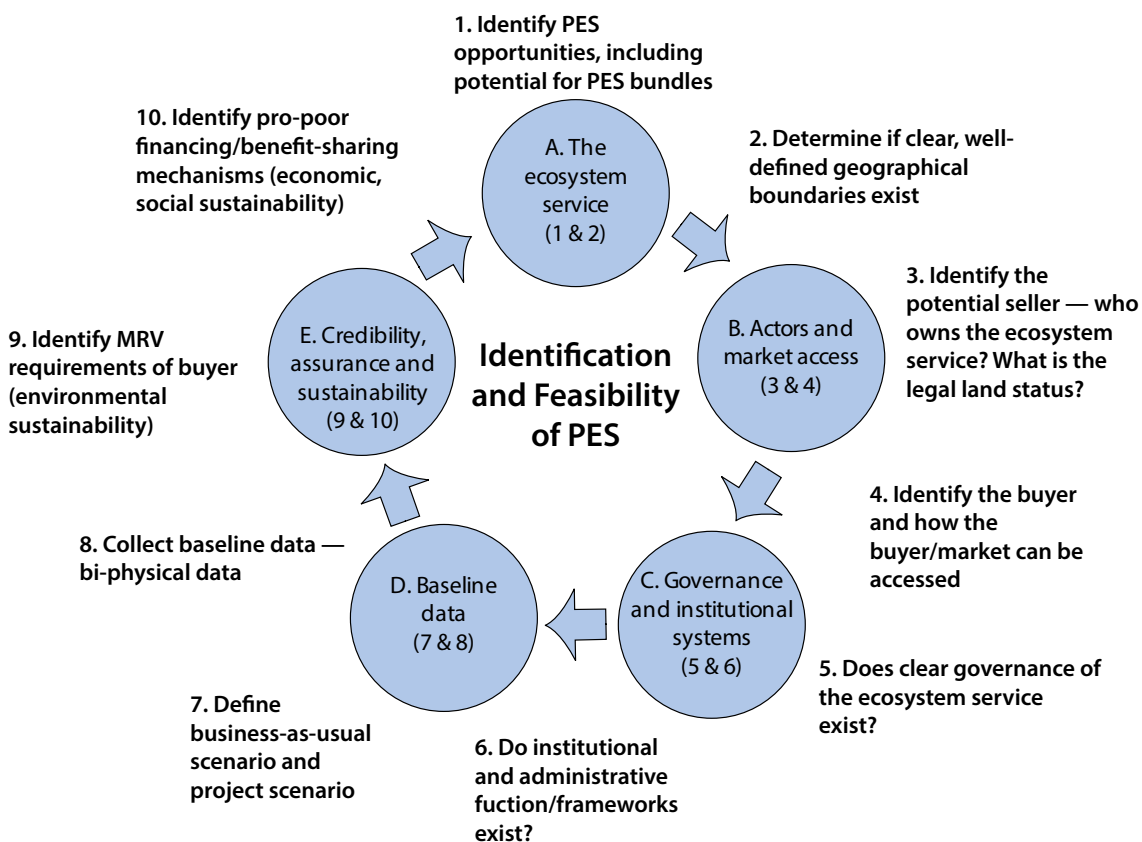


Figure 2. The 10 steps in assessing the feasibility of PES.

Source: Fripp (2014)

CoLUPSIA is working at Step A: Identification. Figure 2 depicts the steps involved in identification and in assessing the practical feasibility of establishing PES. These steps specifically take into account the fact that CoLUPSIA is working at the village and hamlet level, often in remote locations with very limited human, financial or technical resources available.

3 Case studies

WWF and FFI are running PES programs in Kapuas Hulu that may generate valuable information for CoLUPSIA. Information from the interviews is presented in Tables 1 and 2, organized against the PES 10-step criteria.

Table 1. FFI: Ecosystem Restoration Project.

10-step PES guide	Description
Identify PES opportunities and potential for PES bundles	In 2009, demonstration sites for potential carbon projects on land designated for 'ecosystem restoration' were identified through baseline studies (biodiversity, carbon, social and economic indicators, etc.). The main criterion was to be on deep swamp forest. The Siawan Belida area was selected for ecosystem restoration (a form of land allocation, such as a concession, that permits the sale of carbon). The PES identified was/is to be carbon sequestration.
Determine whether clear and well-defined geographic boundaries for the service(s) exist	The land was originally an HPH (forest concession) with clear boundaries. The concession includes some community land but needs further demarcation. Participatory mapping of community areas in the HPH is underway (and also mapping of the administrative boundaries) — this is part of the FFI project process (and also compliance with FPIC requirements of carbon certification standards). Area includes eight villages from four subdistricts.
Identify the potential seller — who owns the environmental service? What is the legal land status?	Former HPH as of 2009, managed by Bumi Raya. Current status is HPK (forest conversion land), the required land status for ecosystem restoration. Area is 49,000 ha. Memorandum of Understanding (MoU) signed between government, FFI, community and the private company that will manage the ecosystem restoration concession. Two institutions established: a joint institution for the eight villages involved. forest restoration company, PT Wana Hijau Nusantra (PT WHN). PT WHN was established as a private company, part of a collaboration between FFI and BioCarbon Group Pte. (a company has been established by IFC and Macquarie Bank to invest in Avoided Deforestation (AD) projects in emerging markets ³). To meet legal requirements for how FFI and BioCarbon can oversee PT WHN, a new foundation has been established, called Yayasan Hutan Hijau, which will oversee PT WHN. PT WHN will sell the carbon credits to voluntary markets based on carbon standard requirements. BioCarbon may assist with the marketing. The details of roles, responsibilities and procedures still need to be clarified, but the main principle is to ensure community rights and local governance are respected. Capacity and knowledge of communities are still being developed, through awareness-raising of REDD in villages, districts and hamlets, including information about carbon, climate change, etc., underway since 2007. <i>Issue:</i> Underestimation of the time and importance of ensuring the right land status and concession title are attained.

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Table 1. Continued

10-step PES guide	Description
Identify the buyer and how the buyer/market can be accessed	Will sell on the international voluntary carbon market. BioCarbon may provide some support in market access (knowledge, etc.).
Does clear governance of the Ecosystem Service exist?	<p>As an ecosystem restoration concession, a 30-year lease can be granted. Renewed three times up to a total of 90 years.</p> <p>However, current status is unclear because, according to the new land-use plan, this area's status will be changed to <i>Hutan Lindung</i> (protected area) and will not be eligible for an ecosystem restoration project) Communities are objecting to this proposed change in land status because, if it goes ahead, the communities will no longer have access to the forest for any use.</p> <p>Area of carbon not yet identified as waiting for a permit from the Ministry of Forestry permit.</p>
Do administrative and institutional functions/frameworks exist	Yes — see the section above 'The Seller'
Define business-as-usual scenario and project scenario	See above background — Steps 1 and 2.
Collect baseline data — bio-physical data	FFI baseline work — details not discussed.
Identify MRV requirements of buyers (environmental sustainability)	<p>Aim to comply with international voluntary and non-voluntary carbon markets.</p> <p>Standards — CCB and VCS will be used.</p>
Identify pro-poor financing/benefit-sharing mechanisms (economic, social sustainability)	<p>A government declaration states that all revenues (not profit) from the sale of carbon will be split as follows:</p> <p>20% to the communities (shared between the eight but exact details of who will get what and how that split is determined are not final)</p> <p>20% to the government</p> <p>60% to the private company (PT WHN), to cover all costs of production, including verification.</p> <p>A risk is that the market price in the voluntary market falls to a level that the 60% that goes to the private company is insufficient to cover the costs of production.</p>

* Responsible research 2010. Forestry in Asia. Issue for responsible investors, September 2010, Singapore

Note: Birdlife provided input into the definition of ecosystem restoration and associated regulation.

Table 2. WWF: Examples of Kapuas Hulu and the Lombok watershed.

10-step PES Guide	Description
Identify PES opportunities and potential for PES bundles	<p>2007 baseline study on water quality. In 2009, water monitoring and intervention activities were introduced. Water quality is an obvious issue, in particular sedimentation. The aim of the PES project is to remove the sedimentation in the river, providing cleaner water to a downstream water company, which then, as the beneficiary, makes payments to upstream farmers for this service.</p> <p>The project is working in the Mendalam River and not the Kapuas or Sibau Rivers as forest cover is relatively low and erosion is high compared to the other two rivers.</p> <p>Activities: Enrich gardens and agroforestry Monitor hydrology Capacity building (e.g. improve rubber management)</p> <p>The water company is interested and supportive but the lack of clear geographic boundaries for the project means that other rivers feed in and the impact of changing behavior has limited impact on sedimentation levels downstream. Limited direct cause and effect.</p> <p>The water company is mainly facing problems of distribution, which are exacerbated in the dry season when sedimentation is also very high.</p> <p>Gold mining in the Kapuas River results in high levels of sedimentation, which may compromise any results of this project.</p>
Determine if clear and well-defined geographical boundaries for the service(s) exist	<p>Area is the Mendalam River, which feeds into the Kapuas River and then the Sibau River joins. All three form one river just north of Putussibau and supply the water to the water company that supplies Putussibau.</p> <p><i>Issue:</i> Leakage is a problem. Activities to improve farming practices and thus reduce sedimentation in village areas upstream, have had very little, if any, impact on reducing sedimentation downstream where the water is extracted by the water company. There is no clear cause and effect between village activities and the quality of the water that is received by the water company. This does not meet PES requirements.</p>
Identify the potential seller. Who owns the environmental service? What is the legal land status?	<p>The sellers of the clean water/reduced sedimentation are the farmers upstream of the Mendalam River. They are supplying cleaner water to the water company. The farmers own the land on which the improved farming practices are being applied. However, there is leakage, where other factors influence the quality of the water, between the farmers and the water company.</p>
Identify the buyer and how the buyer/market can be accessed	<p>The buyer is the water company but, as yet, no payments have been made.</p> <p>Want to use the Lombok model but difficult because the direct benefit for the user/water company is uncertain: there is no direct link between the change in water quality and agricultural projects due to leakage from activities in the other two rivers.</p>

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Table 2. Continued

10-step PES Guide	Description
Does clear governance of the ecosystem service exist?	Yes — see sections above
Do administrative and institutional functions/frameworks exist?	Yes, will follow the Lombok model (?) with an institutional body acting as intermediary between villages and water company. Nothing has been set up yet. WWF works with the village providing training and seedlings, etc. No direct funds are transferred. Administrative requirements are relatively low.
Define business as usual scenario and project scenario	This will need to be determined. WWF are doing baseline monitoring on water levels, etc.
Collect baseline data — bio-physical data	There are signs that, in some places, sedimentation has decreased by 20–25% compared to the 2009 baseline in the dry season. A problem is persuading the company to pay for agricultural projects; could be other reasons behind the improvement. How can it be directly attributed? Could you use this result to encourage uptake of changes in agricultural practices in the other two rivers? Nine points of observation: six in Mendalam, one in Sibau, one in Kapuas, one at WWF office in Putussibau. In all points sedimentation but 20–25% improvement in Mendalam only.
Identify MRV requirements of buyers (environmental sustainability)	When a buyer, possibly the water company, is determined, then the MRV will be fully determined. In Lombok, the company pays for community projects and does not make individual payments to farmers. Payment is not based on a performance-based indicator (e.g. reduce sediment by X% and receive \$Y).
Identify pro-poor financing/benefit sharing mechanisms (economic, social sustainability)	Payments made by users to the company and then indirectly to the community; in the Lombok case, they are explicitly listed on the user bill. In Lombok, they are asking other buyers involved (e.g. hotels etc.). Water company is likely to move to the Sibau River and not source water from all three rivers because the volume is sufficient and quality is better.

Lombok: A successful PES watershed project

In Lombok, a water company charges users an additional fee per user (IDR 1000 to more than 2000), with the fee set by user type (e.g. business, individual household, etc.).

The income raised is given to an independent body with multi-stakeholder representation, which then oversees the disbursement of funds (approximately IDR 400 million – 500 million per month) to community projects in upstream areas. This body selects projects for funding based on proposals by communities.

3.1 The work of Taman Nasional Betung Kerihun (TNBK; Betung Kerihun National Park)

TNBK is engaged in and supports the promotion and development of PES projects for tourism, carbon sequestration and watershed management. These are all seen as supporting TNBK's overall goal of becoming a world-class national park for tourism and research, while providing a global economic service.

TNBK had a budget for carbon accounting and other carbon-related activities, but the work was cancelled because the requirements had not been clarified. REDD+ would make it possible to measure carbon inside the national park, but it is unclear whether a payment mechanism will be established or if this information will be used only by the national government, through the Ministry of Forestry, as part of compliance with REDD+ requirements.

A central function of TNBK is protection in the Kapuas catchment area, that is, to protect watercourses not only in the district but also downstream across the whole province. GIZ is undertaking micro-hydro activities. Laws allow for micro-hydro facilities to be built within the national park, but only in the zone for use by communities and as long as they are not used for commercial purposes. For TNBK, these activities help to raise awareness among communities of the benefits of the national park.

Disagreement over community boundaries remains an ongoing issue. In 2007, a conflict over *ladang* land (dry land agriculture) inside the national park was resolved through discussion but disputes between the park and two other villages are ongoing. One strategy for building relationships between communities and park authorities and agreeing on boundaries is to ensure that communities are aware of the benefits of national parks and the services they provide.

Ecotourism is potential for the park and the community. At present, the park receives 40 to 50 local, national and international visitors per year, including tourists, filmmakers and researchers, generating about IDR 11 million. TNBK works with local NGOs, communities and tour operators to generate demand and support tourism activities.

TNBK recognizes that sedimentation of the Mendalam River is a major problem, but preliminary assessments have not yet revealed the cause of the problem, which may be natural landslides upstream, near the Malaysian border. Landsat images and fieldwork have not identified any activities inside the national park causing sedimentation.

The border with Malaysia is seen as problematic, as oil palm plantations on the Malaysian side are encroaching on forest resources and some illegal logging activities are suspected. However, national park staff conduct only one or two patrols each year.

Major challenges for TNBK are the low staffing levels, lack of a strategic plan and low public awareness of the role and benefits of the national park. However, authorities maintain their vision of the national park as a major tourism destination, having a generally positive impact on local communities and serving as a hub for research on plants and animals, thus improving knowledge and awareness of the park's benefits.

3.2 Options for PES

The analysis in Section 4 focuses on the forest ecosystem services of carbon storage and sequestration, clean water provision and ecotourism, all of which may also encompass biodiversity protection.

CIFOR is examining the potential for identifying baselines and additionality of carbon sequestration from *ladang* land, thus possibly generating carbon credits that could in, theory, be sold on voluntary carbon markets. If potential is identified, it may generate further options for income in villages in Kapuas Hulu to be considered at a future stage.

However, this assessment does not consider the wider ecosystem services provided within Kapuas Hulu District to downstream users (e.g. communities, private companies, governments) in other districts and across the province. These benefits are considered separately in an economic valuation report produced by CoLUPSIA in 2013.

4 Assessment of potential for PES in Kapuas Hulu

The potential for PES in Kapuas Hulu was assessed using the 10-step guide to PES. For each step, the feasibility assessment considered the opportunities, constraints, risks and risk mitigation, assumptions and next steps.

Assessments were completed for five villages or hamlets in Kapuas Hulu, across the four pilot areas where socioeconomic survey work was undertaken. The assessment focused predominantly on socioeconomic, institutional and governance aspects, so that the findings of the assessment are applicable to any PES project, and not just those based on carbon. The main findings are summarized in Section 5, with issues relevant to all potential PES projects discussed here.

4.1 Baseline scenario and project scenario

For all PES projects (and REDD+ projects), a baseline or business-as-usual scenario must be defined. The baseline scenario provides the basis against which the performance of the PES or REDD+ project is measured, reported and verified. Payments for an ecosystem service will be conditional upon performance, where the PES project results in a desired change in the ecosystem service that would not have happened in the absence of the intervention. This change could be positive, such as an improvement in ecosystem service, or it could be the prevention of a negative change to the ecosystem service.

The baseline scenario may be complex and difficult to grasp. For example, the baseline scenario could be that population growth and economic development result in increased clearing of forest areas for agricultural expansion, whether for *ladang* or commercial enterprises such as oil palm plantations. These are both likely threats in the villages in Kapuas Hulu. Any changes to farming and livelihood practices, such as planting of rubber in *ladang*, could be as a valid alternative land use, providing additionality for carbon storage. CIFOR is investigating the potential for planting rubber on *ladang* as a means of storing carbon.

For PES to be credible, the current and predicted land uses and drivers of land-use change need to be thoroughly defined and understood, including the impact that the land use would have on carbon storage (or another ecosystem service) in the defined project area. This could be construed as the baseline scenario. In this case, it must be clear how the current land use is affecting forest carbon stocks and how changes in behavior will have a positive impact on carbon stocks (Olander and Ebeling 2011).

By introducing a PES project that involves payments for carbon sequestration, the forest or potential farmland becomes a source of income for communities, and may include other benefits such as prevention of landslides, soil erosion and water pollution. This income may serve to make up for the loss of income from converting the forest to farmland, while preserving the forest area. Some buyers of carbon credits may require that the carbon stock be increased, whereas others may require only that the baseline of carbon stock is maintained; this aspect must be ascertained when a potential buyer is identified.

In summary:

- A baseline scenario must be defined, along with its potential impact on carbon stocks or other ecosystem services.
- A “with-project” scenario should be developed to outline how the project is likely to affect the ecosystem service and what the additionality will be. This can be an increase or improvement in the service (e.g. enhanced carbon stocks) or a reduction in the possible decline of the service.
- A performance-based payment must be made for the change in service. Buyers and sellers must define and agree upon the means of measuring, reporting and verifying the change.

Setting the baseline is an important first step when developing a PES project.

4.2 Access to buyers, requirements for MRV and associated costs

Identifying a buyer for an ecosystem service is not always straightforward. In some cases, the buyer may identify the need for improved ecosystem services and lead the development of a project, including identifying service

providers to engage with; this is often the case for projects aimed at improving water quality, as in the case of a water utility company in Nanga Hovat (see Section 5.1). By contrast, in the case of carbon storage and other potential ecosystem services in Kapuas Hulu, the buyer may not be evident. A service provider (e.g. a community) may identify an opportunity, such as the sale of carbon credits, but will then need to find a suitable buyer. Finding the buyer may pose a major challenge and is likely to require support from the community's partners, such as government, NGOs or research institutions.

Establishing PES pilot projects in Kapuas Hulu requires that potential buyers and their requirements be identified at the outset or during the early phases of the PES project design. Project developers can draw on the experiences of WWF and FFI (see Section 3) in determining how to engage with buyers and what conditions need to be met, including the need to establish or work with a private company, in order to be legally able to sell carbon.

Ecosystem service buyers' requirements for MRV will differ. For carbon, buyers are likely to request verification under an internationally recognized standard such as Clean Development Mechanism (CDM), Verified Carbon Standard (VCS) or Plan Vivo (see the 10-step guide). Until a buyer for the ecosystem service is identified, MRV requirements — and hence requirements for data collection — cannot be determined.

MRV requirements also have implications for the costs of service provision. For example, independent verification of carbon stocks can be very expensive. These costs then have to be taken into account in the project design. Other costs to be considered are the startup costs, administrative costs and costs of technical skills and support that provided by a third party such as an NGO. Startup costs can be considerable, as costs are incurred not only in designing the project and gathering the baseline scientific data, but also in providing capacity building and training for institutions, identifying the buyer and building market access.

4.3 Bundling ecosystem services

One way to diversify risk and increase the potential income or financial returns of a PES project is to

identify more than one ecosystem service in an area that could be sold or marketed. This is known as bundling PES. For example, a project may be set up to accrue payments not only for carbon storage but also for biodiversity offsets and ecotourism. Project developers should consider this opportunity during the design phase, as bundling has the potential to increase income and mitigate the risks associated with dependence on a single service payment, such as international carbon prices.

One area that offers an opportunity for bundling of ecosystem services is in the hamlet of Keluin. A *tembawang* (old kampong site) area upstream of a potential site for micro-hydro may be suitable for regeneration through reforestation or some other form of improvement. Following land restoration through planting of forests, rubber or community, this area could then be developed for sale of carbon credits, if the land improvement is deemed to have sufficient additionality to comply with voluntary carbon standards. In addition, depending on the buyers, there may be potential to add biodiversity into the package of services sold. Increasing the number of services provided in an area to one or more buyers can boost economic returns and hence long-term sustainability. It may also help reduce encroachment for farming or conversion for oil palm plantations, especially if the benefits received are equitably distributed among all beneficiaries.

5 The potential for PES in Kapuas Hulu

This section summarizes the findings of the assessment of the potential for PES projects in Kapuas Hulu. Further details are given in interview notes are included in Annex A.

5.1 Nanga Hovat

Nanga Hovat, a hamlet in the village of Datah Dian, on the boundary of TNBK, has limited opportunity for PES, mainly because of land classifications and the presence of protected areas. Livelihood options also are limited. People are dependent on *ladang* areas (approximately 0.5 ha per household), which can be established up to 100 m inland from the river,

some forest products collected inside TNBK and gold mining. WWF is running projects here, but it is doubtful whether there is much opportunity to sell improvements to the water supply to a downstream water company (see the case study in Section 3). The community is engaged positively with TNBK and WWF to support ecotourism; although ecotourism could be expanded, it is unlikely to provide significant income. To determine the potential for a carbon project, it remains to be clarified whether land with the appropriate status and classification is available. A system selling biodiversity credits of some kind could be explored, perhaps involving efforts to limit community activities in protected forest, developed in conjunction with TNBK; however, this requires further research.

Potential PES: Landscape beauty/ecotourism, possibly carbon storage and sequestration

5.2 Benua Tengah

Benua Tengah is located on the main road between the towns of Putussibau and Lanjak. Community land is variously designated as conversion land (APL), production forest (HPT) or protected forest in the national park. Land classifications and boundaries are not clear. The community is eager to develop ecotourism based on their historical longhouse and have permission from the district government to build a new longhouse as a guesthouse and possibly a gallery or museum. There may be potential to develop carbon projects on land around the village, but this needs further exploration. For any carbon project, land boundaries and classifications will need to be determined. The community has a positive experience of working with a private company that extracts rocks from the village river for a fee, which gives them the experience of engaging and working with an outside third party. Administrative and customary procedures are in place and no apparent conflicts or issues were mentioned.

Potential PES: Landscape beauty/ecotourism, possibly carbon storage and sequestration

5.3 Keluin

Keluin offers a real opportunity for bundled PES. The area upstream of the micro-hydro is degraded

community forest land that could be rehabilitated, and could potentially meet requirements for carbon sequestration (additionality of improved land and forest condition). Improving this land could lead to improved biodiversity, adding an additional benefit that could be bundled with carbon stocks and micro-hydro. The potential for micro-hydro is being explored downstream of the *tembawang* area. The primary challenge will be identifying buyers for each service (or all services, if a bundle is offered). For hydroelectricity, the most likely buyer is the Keluin community itself, and it pays by covering operational and maintenance costs, rather than paying for the downstream benefit of improved water quality, which is necessary for the micro-hydro plants. However, coupling the provision of electricity with the provision of ecosystem services from the *tembawang* land, such as biodiversity or carbon credits, may provide an additional incentive for protecting this land and maintaining good water quality for the micro-hydro facility. The buyer of the biodiversity and/or carbon credits must be identified, but could operate at national or international level. The suitability of these PES options requires further investigation.

Potential PES: PES bundle (carbon, biodiversity and clean water for electricity generation creating downstream benefits for other users).

5.4 Tinting Seligi, Badau

The potential for PES in Tinting Seligi is limited. Located on the Malaysian border near Badau, a growing commercial town, and in the hub of a rapidly expanding palm oil sector, Tinting Seligi has benefited from the oil palm sector through the creation of employment for 20 people and thus increased income for the community and neighboring area. Oil palm was introduced 3 – 4 years ago. The area immediately surrounding Tinting Seligi has been converted to oil palm and *ladang*, and the community has set aside about 1000 ha for oil palm. Water is sourced from a nearby river and electricity from a Malaysian micro-hydro plant. The community is aware of the importance of protecting the water and has therefore avoided any oil palm development on the upstream land. An alternative source of water — a waterfall — 2 km away could be suitable for micro-hydro use; the community is interested in exploring the potential.

The most feasible option for PES would be to develop a carbon project on the community *ladang*. This will require investigation of land classifications and ownership to comply with standards for carbon credits. A second option is micro-hydro and electricity provision as a means of protecting upstream catchment areas from the effects of converting forest to oil palm.

Potential PES: Carbon stocks from ladang rubber production, clean water for electricity generation, creating downstream benefits for other users.

5.5 Nanga Dua

Nanga Dua presents a good opportunity for PES bundling. Nanga Dua is a traditional village located in the south of Kapuas Hulu, on the boundary of an ex-logging concession, bordering forest land (production forest and protected areas). According to the socioeconomic survey (Shantiko et al. 2013), the main income sources are gold mining (workers can earn IDR 100,000 per day) and followed by rubber (more than IDR 10,000 per day) and comparison – IDR 39,000 per day from palm oil. Mining also takes place in villages upstream. Mining causes sedimentation in the main river, so communities source drinking water from a smaller river. The key issue for the community is the lack of access to markets due to their remote location and poor road conditions.

The community, with the support of provincial-level politicians, has developed a proposal for a rubber plantation, which would be managed by a private company in close cooperation with the community; they based this model on their experience with the logging company. Community members see this as a good opportunity to improve roads, to secure paid employment, to develop alternative livelihoods as gold supplies and incomes fluctuate and slowly decline, and possibly to take a share of the plantation (an area set aside for community rubber gardens). However, concerns remain over the land status and boundaries.

The survey revealed potential to develop a carbon project either on the community forest land or on the new rubber plantation (if additionality sufficient to meet market standards can be proven). Land boundaries, particularly the land classification, need

clarification and people in local villages and hamlets must be informed of them. Ecotourism is another option, as the village is an area of considerable beauty, biodiversity and access to rivers and forests; reaching the site may be difficult, but that could be part of the appeal. The potential number of visitors needs to be assessed to determine the economic viability of ecotourism businesses or whether tourism will be a source of only occasional income.

Potential PES: PES bundle — carbon credits from community forest land or prospective rubber concession, biodiversity, ecotourism

6 Other issues and next steps

6.1 Administrative and governance issues

In all villages, official government administrative systems and customary processes operate in parallel. The degree of democracy, that is, election of representatives, varies across villages; in some places, where one particular longhouse or hamlet is larger than others in the village, an electoral system where whoever secures the most votes wins always results in the election of the representative from the biggest longhouse.

Governance over resources is reasonably equitable, according to conversations during the field visit, but land classification, boundaries and legal recognition of community land remain major issues.

6.2 Project baseline and additionality

In all cases, further research is required to fully define the baseline scenarios and the potential additionality of ecosystem service provision. Additionality must be assessed against the requirements of potential buyers.

6.3 Opportunities

In summary, the villages surveyed do show some potential for PES projects. Pressure on forest resources is increasing, largely through conversion of land for farming (*ladang*, rubber), because of demands associated with population growth and economic development. In addition, in Kapuas Hulu,

oil palm plantations are under rapid development, expanding from the west of the district. Oil palm offers an economically attractive alternative to traditional land uses and, realistically, PES is unlikely to be a sufficient economic alternative. However, PES can support sustainable development, by providing an additional revenue stream while simultaneously providing essential ecosystem services. These services should be considered as part of a development package. In some villages, experience with logging companies has left community members wary of oil palm companies; these communities are more inclined to negotiate and ensure that their community boundaries are well protected.

6.4 Risks

Some of the more pertinent risks are as follows:

- *Land classification and ownership.* This is an ongoing issue in Indonesia and is unlikely to be resolved in the near future. Clear land ownership is a key condition for PES.
- *Reallocation of land to alternative uses by the government.* This is linked to the first risk (unclear land ownership) and poses a major threat to current and future PES projects. Without clear legal recognition of community land, the land risks being allocated to an oil palm concession or other large company by the national or provincial government. Although communities in theory have the option to refuse the presence of an oil palm concession, this is not always a straightforward or amicable process.
- *Conflict between hamlets and villages.* Although conflicts were not observed during the field work, conflict may arise once additional income streams have been developed. This risk can be mitigated through appropriate consultation and Free, Prior and Informed Consent with hamlets and the village during the development of the PES project. It may be necessary to develop an MoU outlining roles, responsibilities and benefit-sharing mechanisms.
- *Technical knowledge and capacity.* Technical support and capacity building will be required for any PES initiative. Engagement with a third party, such as a local NGO, can overcome this challenge to build the community's capacity.
- *Identification of the seller.* This is linked to the issue of land ownership. Sellers must be clearly identified and recognized by all parties involved.
- *Identification of the buyer.* Identifying a buyer is fundamental. For FFI's project, the buyer was identified at the outset and was involved in the design not only of the PES scheme but also the institutional structure needed to meet legal requirements for selling carbon credits.
- *Risk of leakage or encroachment.* Avoiding leakage and encroachment requires that clear, widely recognized geographic boundaries be identified and applied to the PES project. As is evident in Nanga Hovat and the WWF project, there is leakage from other users of the river; this is limiting opportunities to reduce sedimentation for downstream users by changing agricultural practices upstream.
- *Risk that the project area is too small for the project to be economically feasible.* The proposed project area and volume of carbon stored may not be sufficient to meet buyer needs (at least 20,000–30,000 tons of carbon a year may be required, according to a report by Forest Trends). Even if a buyer is found, another risk is that the income generated will not be sufficient to cover all costs, including startup costs and MRV costs, which can be onerous for small-scale producers. Bundling PES can boost the potential economic viability of a PES project; opportunities for bundling services and selling bundles to a single or multiple buyers should be explored.

6.5 Next steps

To make progress in developing PES projects in Kapuas Hulu, issues related to land tenure and governance must be resolved, but this requires clarifying what ecosystem service is targeted and where the project will be located. Once governance issues are resolved, any project development must involve full consultation with local communities. An early step in the project design is to identify the baseline, that is, what would happen in the absence of the project. When the project is in development, a full feasibility study is needed to ensure, among other things, that the financial outlook of the project is robust.

CoLUPSIA has several opportunities and means to engage in the development of PES in Kapuas Hulu. The potential for PES could be further explored drawing on the experiences of NGOs such as WWF, FFI and Riak Bumi. Keluin would be a suitable starting point.

Box 1. Summary of lessons learned for REDD+ from PES and conservation incentive programs

Participation agreements

- Provide a clear institutional framework that facilitates inter-sectoral cooperation.
- Use simple contracts, backed up by clear, easy-to-reference program guidelines.
- Invest in legal capacity building and technical support.
- Explore options for overcoming tenure barriers to participation.
- Set contract duration based on the relative need for certainty in ecosystem service delivery versus flexibility in enrolled properties.
- Make payments directly or indirectly conditional on ecosystem service delivery.
- Design program activities to minimize the costs of participation while allowing for productive activities to occur alongside REDD+.
- Incorporate robust and transparent guidelines for monitoring and verification.
- Provide clear, transparent and enforceable sanctions for noncompliance, in combination with risk management mechanisms.

“Equity” or social objectives

- Strengthen the enabling legal, policy and governance framework.
- Support implementation with good governance and appropriate institutions at multiple levels.
- Adopt a rights-based approach that respects internationally agreed safeguards.
- Use targeted outreach and capacity building and control transaction costs to overcome obstacles to participation, particularly for poor or marginalized people.
- Incorporate credible monitoring of social outcomes and impacts.

Trade-offs and synergies between multiple benefits

- Account for multiple benefits in targeting payments or incentives.
- Use multiple criteria to minimize trade-offs and enhance synergies when selecting eligible participants and activities.
- Explicitly consider multiple or co-benefits in evaluating outcomes.
- Evaluate synergies and trade-offs with other environmental and economic development policies and programs.
- Use differentiated payments to recognize and reward actions that enhance synergies among multiple environmental services.

Measurement, reporting and verification (MRV)

- Understand the advantages and disadvantages of PES MRV systems, taking into consideration the key differences in scale, scope and objectives that distinguish the requirements for REDD+ MRV.
- Use effective MRV design to achieve and attribute additional emissions reductions.
- Design MRV systems to track leakage in order to improve efficiency of program performance against REDD+ objectives.
- In order to assess — and adaptively manage — performance on social and environmental safeguards, set clear targets and baselines, and regularly measure and evaluate relevant indicators.
- Identify opportunities for cost-efficiency in MRV while recognizing trade-offs between cost and accuracy or precision.
- Invest in human capital and capacity building at both “ends” of the payment.

Sustainable finance in PES and REDD+

- Diversify funding sources and duration to reduce risks and contribute to sustainability.
- Engage the private sector with public programs via an enabling legislative framework.
- Improve targeting by clearly defining objectives and baselines and using adaptive management techniques.
- Explore options to control administrative costs.

Source: FONAFIFO, CONAFOR and Ministry of Environment. 2012. *Lessons Learned for REDD+ from PES and Conservation Incentive Programs. Examples from Costa Rica, Mexico, and Ecuador.*

In addition, as with PES development in Seram, the following actions could be undertaken in the immediate future, to assist with the development of potential PES in Kapuas Hulu:

- Research international markets for carbon including the requirements for buying carbon credits (stock or annual growth?).
- Meet with Plan Vivo and other verification bodies, to understand the requirements for a carbon project.
- Incorporate the potential for PES into any future participatory prospective analysis (PPA) workshops.
- Explore the potential for rubber on *ladang* to be used to meet carbon market requirements, and any legal requirements for selling carbon credits from *ladang* in Indonesia.

For the development of a carbon project, useful references include Olander and Ebeling (2011). Box 1 presents lessons learned from PES projects in Costa Rica, Mexico and Ecuador. These lessons are useful points for consideration in the development of PES projects in Kapuas Hulu.

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Annex A. Interview results

Key findings from the following interviews are presented in this annex:

- Fauna & Flora International
- WWF
- Nanga Hovat
- Keluin
- Nanga Dua
- Tinting Seligi
- Benua Tengah

Meeting notes from CoLUPSIA field trip: Scoping assessment for PES options, November 2012

Interviewee	Sabinus Melano (Fauna & Flora International; FFI)
Date	14 Nov. 2012

- FFI has a program designed to establish an ecosystem restoration concession (HPH-RE) in Kapuas Hulu. It started the process in 2008 by identifying areas for demonstration activities (DA), identifying high conservation value forest (HCVF) and conducting a flora and fauna survey.
- This was followed in 2009 by identifying an area of deep swamp (peat) for DA-REDD. A baseline study on biodiversity, carbon and socioeconomic conditions was conducted in parallel. Among the sites identified, FFI selected Siawan Belida area (49,000 ha). FFI developed the following selection criteria with considered input from local government: deep peat, threatened ecosystem and degraded forest. To follow up, FFI and district government established an MoU.
- Activities related to the HPH-RE included awareness-raising at district, subdistrict and village levels. At the same time, a feasibility study for a carbon project was conducted, to produce a project design document (PDD) and use standards such as Climate, Community and Biodiversity (CCB) and VCS.
- FPIC is an important requirement to comply with these standard, so FFI has conducted a series of meetings for consultation, awareness raising and transfer of knowledge related to climate change and REDD+ since 2009.
- Eight villages from four subdistricts are involved.
- The status of the land: former HPH PT. Bumi Raya is in a degraded condition. Since 2009 it has been HPK (production forest to be converted). Under HPK status, the land is under state control and no community rights are recognized.
- Regarding the RE boundary, community already knows the boundaries because the community managed some areas inside RE. To strengthen this, FFI facilitated participatory mapping for community land inside the RE areas and mapping for administrative boundaries. FFI also conducted a rapid tenure assessment to identify potential conflict and how local institutional arrangements work for them.
- A scheme to develop for the HPH RE is collaborative management with the communities. Communities will set up Badan Kelola (BK) to work with the HPH RE company (PT Wana Hijau Nusantara; WHN). BK will work on the operational function such as area management and operation. A BK representative will be included and involved in decision making for PT WHN. The main role of PT WHN will be to sell carbon credits in the voluntary carbon market; BioCarbon will assist with marketing.
- The area for the carbon project within the concession has not been decided yet, because the Ministry of Forestry (MoF) has not issued a permit for the HPH RE. A selected area for the carbon project can be identified after the license is granted and carbon stocks assessed. To comply with certification standards, the project must be assessed every 5 years. Since the beginning of the process (2009), efforts have been made to establish the carbon project (according to CCB and VCS standards), including awareness raising, baseline study, etc. Therefore, it needs another 2 years to apply for certification. However, the permit for the HPH RE has still not been issued.
- In 2010, the company submitted documents to meet administrative requirement, but the recommendation from the governor of West Kalimantan was not granted. The central government passed a law on restoration ecosystems, but its implementation has been ineffective and the law is not enforced, especially at provincial and district level. The worst situation is the new spatial plan, which

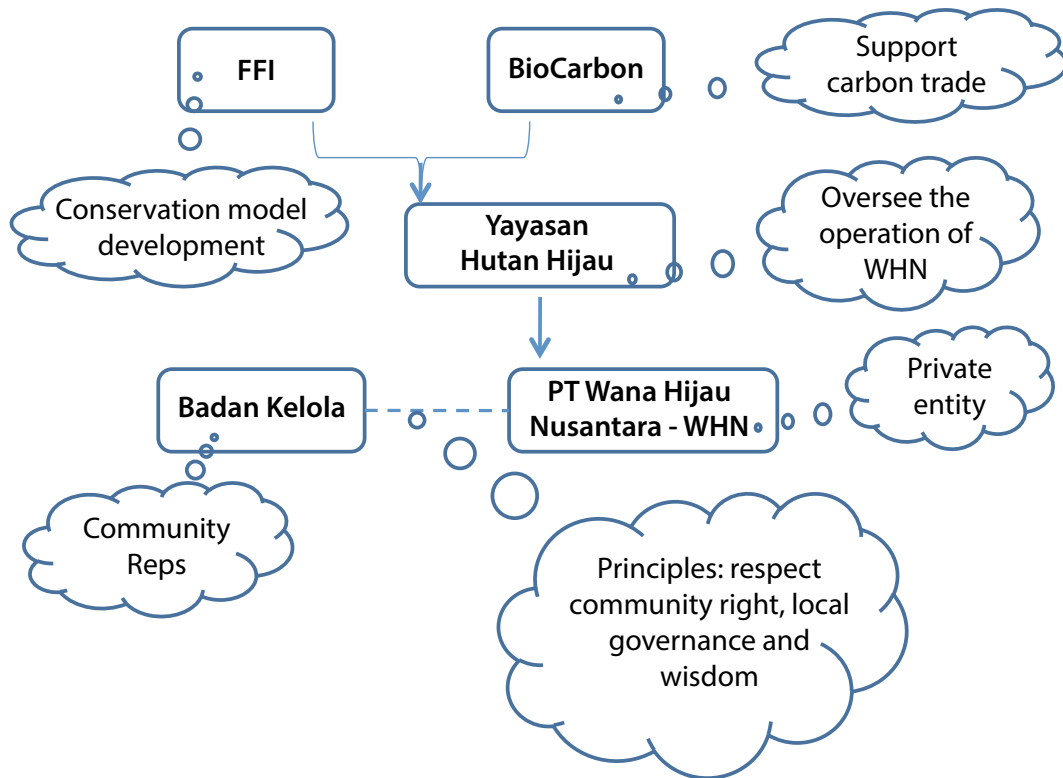


Figure A1. Organization and governance arrangement for FFI' ecosystem restoration plan.

proposes changing the status of the land from HPH RE from HPK to HL (protected forest); it is impossible for any company to manage land under HL status because the authority for HL is the state.

- If the project succeeds, the money will be distributed according to regulations established by the government (20% for community, 20% for government and 60% for project managers). The amount is calculated based on gross revenue. The regulation is undergoing revision, and even if changes related to the community share are made, PT WHN will receive at least 20%.
- Observation: The carbon project in HPH RE seems to have a much more complex division of roles and responsibilities and benefit sharing than described during the interview. It remains in the preparation stage since the permit has not been granted yet.

Interviewee	Hafiz (WWF Kapuas Hulu)
Date	14 Nov. 2012

- Successful PES initiated by WWF in Lombok, where PDAM (water utility) makes payments

- to a community in the upstream river area in exchange for maintaining the water quality for downstream users. PDAM levies an extra charge every month per user. Household users pay IDR 1000/month each and business users pay IDR 2000 per month. The fund is managed by Badan Kelola, which is an independent body made up of relevant stakeholders such as local government, PDAM and community members. Currently, it manages funds of around IDR 400 million–500 million per month. Communities are not paid directly but they are required to submit a proposal on livelihood improvement or conservation activities to be funded. A special committee assesses the proposal.
- In Kapuas Hulu, the EPWS project was developed in 2007. It covers part of the Mendalam watershed. The main criteria for selecting Mendalam are the high run-off level and low forest cover. During the project, WWF conducted several studies, i.e. hydrology, livelihood assessment, etc. WWF also assessed the nearest watersheds such as Kapuas and Sibau, but the condition across the above criteria above was better in Mendalam. Based on the study, a range of interventions were conducted such as enrichment of the riverbank,

enrichment of the *tembawang* (customary protected forest), capacity building and hydrology monitoring.

- It is expected that PDAM in Putussibau will benefit from the services provided by the improved ecosystem in upstream Mendalam. PDAM supports the idea but operationalizing the payment mechanism is a challenge, for several reasons. First, the water is taken from the Kapuas River at a point where three rivers join (see illustration).

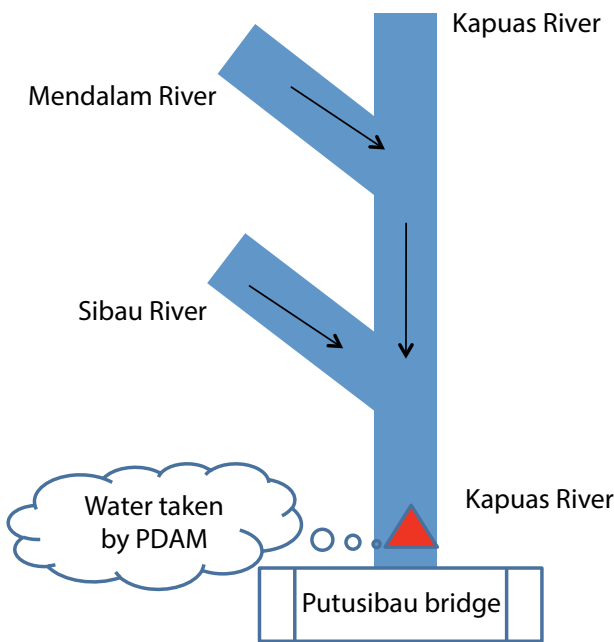


Figure A2. Relationship between water company (PDAM) in Putussibau and upstream communities of the Mendalam river.

Second, the service provided by PDAM for the water users/consumers is not satisfactory; for instance, there is a low water debit during the dry season and sediment in the water during the rainy season. Users have no incentive to pay more than is charged now. Third, the intervention by WWF focuses mainly on restoration in the Mendalam watershed only, which is not sufficient to have a significant impact on users' water. In the future, PDAM plans to find a new water source, probably in upstream Sibau River, where the quality and water debit are higher.

- WWF is focusing on monitoring activities, such as the following.
 - To measure sediment in the water, WWF conducted a baseline study in 2009, with similar measurements conducted during the dry season in 2012. The result shows that sedimentation in the Mendalam watershed decreased by about 20–25% from 2009. WWF also conducted observations in six locations in Mendalam, one location in Sibau and Kapuas, and in front of the Bupati's house. WWF plans to do something similar during rainy season (end of November). There are two hydrology stations, in Nanga Hovat (upstream) and Nanga Sambus (downstream), to measure water levels and rainfall.
 - Modeling of land use during 2008–2012 using satellite images showed an increase in run-off from open land but also a decrease in sedimentation in the restored area. Based on the findings, WWF advised the community to practice permanent agriculture because shifting cultivation makes a major contribution to sedimentation. Particularly in the rainy season, upstream Mendalam (inside TNBK) is suspected to contribute greatly to sedimentation. The national park authorities said they had used air-monitoring and found cleared areas inside the park, but they were difficult to access. WWF intended to do restoration in the area in collaboration with the park authorities, but the remoteness of the area meant it had not been done.
- Observation: PDAM's idea of finding a new water source in the upstream Sibau area will create ecosystem service boundaries and establish a clear relationship between restoration and the payments made by users.

Interviewee	Markus (hamlet head Nanga Hovat)
Date	15 Nov. 2012

- Nanga Hovat is a hamlet in the village of Datah Dian. It has a population of 310, comprising 46 households and 20 houses. People in Nanga Hovat are in the Dayak Bukat ethnic group. The village was established more than 60 years ago.

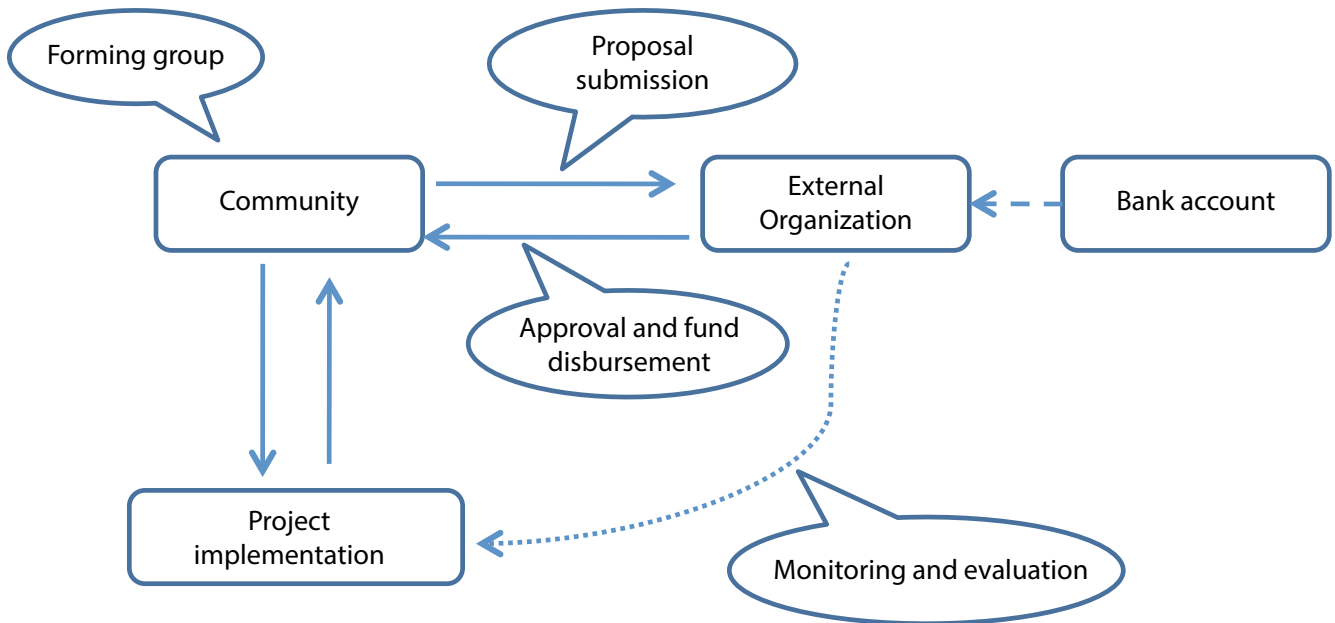


Figure A3. Village arrangement when managing external organization's fund.

The main ethnic group in Datah Dian is Dayak Kayan. The settlement is located on the Mendalam River. According to the community, the river was originally called the Bukat River but the Dutch changed the name during the colonial era.

- The main livelihood is shifting cultivation with average land use about 0.5 ha/household. People also grow rubber, which is a relatively new activity for them. Latex is sold in the market for around IDR 12,000/kg. Middlemen from a downstream village usually come to collect traded goods from the village. Currently, after planting paddy, people grow rubber.
- When people clear land, they mark the boundaries with poles, so all community members know where the boundaries are. The land was previously primary forest, and has become secondary forest through shifting agriculture. The cycle for shifting agriculture is around 5 years. According to the head of the hamlet, in the next 5 years, land will still be available for agriculture despite some rubber.
- According to the community, TNBK has advised that people can use the land for farming for up to 100 m back from the river. Beyond that, the area is protected forest, and the community has planted tree species such as *tengkawang*, *belian* and *ensurai*, with support from WWF and TNBK. There have been three planting activities

this year. The status of the land where the village is located is protected forest (HL), according to the district spatial plan (Hafiz, pers. comm). Although the settlement is located outside the NP, the NP authority works closely with the local people and provides grants and assistance. According to the community, the zoning of land for TNBK has not been finalized.

- Programs from outside are based on the community's proposal (see illustration).

TNBK and the community conducted a project in 2009 to plant rubber over 10 ha, and in 2012 TNBK gave 1000 seedlings to each household. The fund is managed by the groups and used to buy equipment, seedlings, etc. The fund is also used for maintenance, such as to replace damaged seedlings.

- Any program can be targeted for hamlet *dusun* is for *dusun* or stated otherwise, but the village should be informed and consulted. To date, people in the hamlet see the projects conducted by TNBK or WWF as useful for ensuring the future of their livelihoods and for preventing erosion. In the future, people will not need to extract timber anymore as they will have rubber. In a scenario with no intervention, people might do this themselves by planting seedlings for fruit trees. People still rely on support from external organizations.

• Community organization

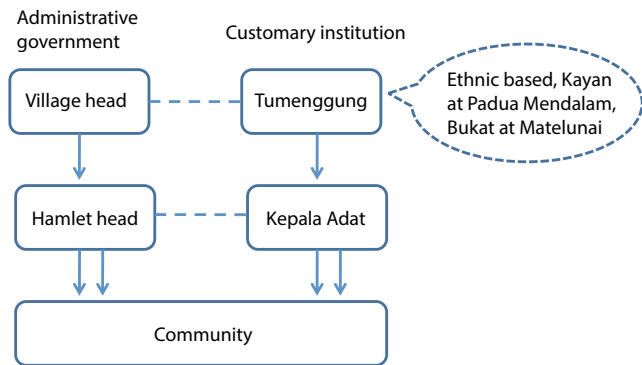


Figure A4. Community organization and institutions.

• Administrative structure

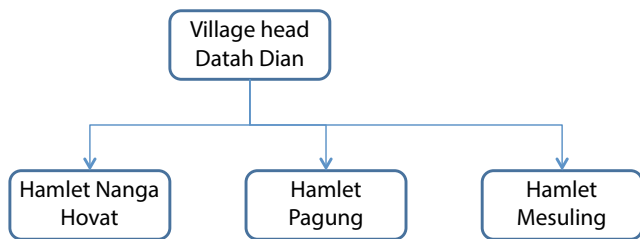


Figure A5. Village administrative structure.

- When the river in front of the village has a lot of sediment, especially in the rainy season, people take water from the river behind their village. There is enough water, but collected it is difficult because they must do it manually. The community has asked WWF and TNBK to provide equipment such as pumps, but have not received anything yet.

Interviewee	Benua Tengah
Date	16 Nov. 2012

- The longhouse was built in 1864. The *kepala dusun* head is a descendant of the king of the ethnic group. In 1940 and again in 2012 the longhouse was renovated. There used to be three hamlets but now are only two, as one hamlet was

large enough to be classed as a village and the village agreed to propose that this hamlet receive village status, using a district program in 2011 that supports expansion.

- The village head works in coordination with the customary head. The village head oversees all issues related to the village administration, while the customary head oversees ceremonies (weddings, etc.) and manages conflicts as a first step using customary law before going to the village and then finally the police.
- Through district funds and programs such as ADD, the village head leads a committee and is supported by a secretary and treasurer. This is part of a national program of community empowerment that provides support to communities.
- The community has a positive working relationship with a private company that extracts small rocks and sand from the river (the river is seen as a public good) that runs alongside the village/hamlet. The company pays the hamlet IDR 4000/truck and has supported community activities such as improvement of the road and redirection of the river away from the longhouse. Any cash received is shared equally between hamlets. The hamlets tend to use the funds for community-based activities, chosen by the head of the hamlet (*kepala dusun*).
- In 2009, the hamlet was recognized as a heritage site (for the longhouse) in Kapuas Hulu. In July 2012, the village celebrated this and the completion of renovations. In line with their desire to develop ecotourism, they plan to build a “museum/gallery” to showcase local art and history, and they also plan to build a new longhouse specifically for ecotourism use; they recently received a donation from the Bupati to build new toilets.
- The majority of the community land is thought to be in HPT (production forest) which is the main area for *ladang*, a bit in *hutan lindung* and APL and none in TNBK. However, there is very little understanding of the boundaries for these zones and of their own community boundaries. They are aware that they cannot extract products from the TNBK; they were once warned for taking sandalwood.

Interviewee	Hamlet head Keluin
Date	16 and 17 Nov. 2012

- Kelwin is a traditional longhouse located by two rivers. One river is used for drinking water and the other, bigger, one is the site of the forthcoming micro-hydro (on a side river). Both rivers are clean; sedimentation is rare, and only after heavy rains. It is the last hamlet before the national park, but the park is still one day's walk away.
- Historically, there was a logging HPH that intruded onto their lands and although it provided some employment and a pipe for water, it was not seen as a good relationship or beneficial overall. Now, the oil palm sector is approaching and they are cautious and wary. There has been no consultation and the palm oil company has already established boundaries in and around the community land. They refused this and through the use of customary (*adat*) law they fined the company IDR 40 million. The company negotiated and finally paid the community an "agreed" price of IDR 8 million. After costs incurred were deducted, the balance was shared out equally across the village/hamlets.
- PNPM (Program Nasional Pemberdayaan Masyarakat — national program for community empowerment): the village received funds and created groups. Each hamlet receives the same amount of cash. Kelwin hamlet made two groups: pig project and vegetable project. Everybody was involved.
- All programs and projects go through the village head. The hamlet meets to inform hamlet households. Village committee for PNPM.
- Village and hamlet governance and administration.
 - Village head is the main person responsible for allocation of budget (government) to the hamlets (via hamlet head). Hamlet does not feel that they are involved in village decisions.
 - Hamlets are similar in size, apart from one that is slightly larger so the village head, being elected, normally comes from the biggest hamlet.
 - Every Monday there is a meeting: the village head and staff (treasurer and secretary), hamlet heads (four, if include

the one that the village head represents). News, progress, issues, proposals, etc. are shared. Although collectively they have submitted some proposals to government, there has been no progress.

- Hamlet head is chosen by the hamlet people and serves two 5-year terms. The village head is elected. Hamlets can nominate as many candidates as they want. The first is the one with the most votes and the second becomes the secretary. The village head performs the administrative functions.
- CoLUPSIA is working with Riak Bumi to develop a micro-hydro project here; location and further information required.

Interviewee	Hamlet head, and head of <i>adat</i> Tinting Seligi, Badau
Date	17 Nov. 2012

- Missing information especially on administrative and institutional frameworks and processes.
- Water comes from behind the village. They are aware that if they open land upstream for *ladang* then this will have a negative impact on their water sources. This is why they have asked the palm oil companies not to do this. So far the palm oil companies have agreed to this. They feel that they have adequate land for *ladang* (mainly in front of village and a small part behind it), orchard and other uses, and can allocate 1000 ha from two hamlets for oil palm.
- Oil palm cultivation began locally about 3 years ago, and 4 years ago closer to Badau. (Note: Badau is developing quickly and with the opening in the near future of the border with Malaysia, it could be a new hub for oil palm cultivation, as it will be quicker to get the palm oil kernels to Malaysia for processing than elsewhere in West Kalimantan). The community is watching what happens elsewhere with the palm oil companies and communities before fully committing. The community can see the benefits of oil palm: jobs (income for motorbikes), an alternative opportunity to rubber. So far, 20 people have jobs, 8 of them permanent.
- The village and hamlet heads, staff and council are paid out of the village budget.

The group then discusses how to disburse the remaining funds.

- Water is perceived as being abundant. They built their own pipeline and this has now been improved by the government. Water comes from a waterfall about 2 km from the road. They would like to use this site for micro hydro.
- Electricity comes from Malaysia (hydro power).
- Road project using PNPM funds; used money effectively by employing own resources including labor, so extra funds could then be divided out between those who worked.

Interviewee	Village head Nanga Dua
Date	19 Nov. 2012

- This is a traditional village located in the south of Kapuas Hulu, on the boundary of a former logging company, bordering on forestland (production forest and protected areas). According to socio economic survey (Shantiko et al. 2013), the main sources of income are gold mining (earn 100,000 per day) and rubber (comparison — 39,000 per day from palm oil). There are other villages upstream that also do mining. Mining involves dredging in the river, which results in heavy sedimentation in the main river (water for the village is sourced from an alternative river and another river will be used from 2013). Gold mining on land takes in two forms: mining tunnels underground and surface clearing of soil, flooding and releasing dammed water through a carpet to catch the gold sands. All have negative environmental impacts on the land and water resources. The key issue facing the community is seen as a lack of access to markets because of the poor road conditions and distance from the main road and village.
- Village administration and institutional structures: one village, two hamlets (one is near the village and the other is upstream). Village head attends many meetings in the district and subdistrict and then hosts a monthly meeting with the hamlets to discuss news, information etc. The *kepala desa*, secretary and treasurer, *kepala dusun*, village representative and customary leaders attend the monthly meetings.

- Customary and village leaders work in close cooperation.
- Head *Tumenggung*: covers several villages.
- Customary village council: one person only
- Hamlet customary council also only has one person.
- Conflict resolution: within hamlet, then to the village, then to the *Tumenggung*. Customary or administrative leaders resolve the issues.
- Village head is elected by communities. There is an election committee, with rules and regulations. All individuals in all hamlets can put themselves up for nomination. Every 6 years there is an election.
- Customary: *Tumenggung* — elected position, again with a committee. The person elected serves until death or until a meeting when it is decided to replace him/her. Every village can propose candidates for the election: 1 person, 1 vote. When elected, the village head officially appoints the position.
- The fees paid to heads come out of the village budget. There is a bank account and payments are made by the district government twice a year. Budget is based on the number of people in the village and hamlets. Now, they receive IDR 127 million/year, which mainly covers salaries and allowances, etc., but not village projects.
- Private company experience: logging company (1980–1989). Employment for some but main benefit was the road access to market. Overall perceived as a negative experience. Unclear boundaries, HPH on community land, no opportunity to negotiate and accepted situation out of fear, as the HPH was owned by Suharto's wife. Roads were constructed all around community without discussion and some customary trees were cut. There was conflict and the communities “kidnapped” the machines. There were landslides and heavy erosion. The community still had some access to the forest but they were not using the forest resources very much at this time.
- Land status: unclear. The Forestry Department has made several visits. Although the community understands the classifications in principle, in practice it is still very unclear as to where the boundaries are; they are not defined. The community has its own boundaries, but situation is not clear and is thus unstable; there is a risk

that the government will reallocate the land for alternative uses.

- The community has developed a proposal (with the support of provincial MPs) for a rubber plantation, which would be managed by a private company but in close cooperation with the community, learning from their experience with the logging company. They see this as a positive opportunity, for improved roads and alternative income because gold supplies and incomes are fluctuating and slowly declining, possibly a share in a plantation (area for community rubber), jobs, etc. Negatives are concerns over the land status and boundaries.
- Vision of *kepala desa*: To be the capital of the subdistrict, with increased population but with this will need new livelihood options and desire to improve livelihoods. Cautious of palm oil as see that although things can be good at the beginning with roads, etc., in the long term the land is poisoned by pesticides and road condition deteriorates due to oil palm trucks. Rubber is a better option than oil palm. Rubber can be stockpiled (to avoid low prices in wet season), whereas oil palm kernels deteriorate and need quick processing.
- Village development projects (PNPN): Last one was 3–4 years ago and was the footpath construction.

Interviewee	Taman Nasional – BK
Date	19 Nov. 2012

Meeting with a representative of the Use and Service Dept. There are five sub-departments:

- Environmental services — water and carbon
- Tourism
- Community employment
- Environmental education
- Services — information, communications, etc.

Carbon:

- Had a budget for carbon counting but there is a lack of classification of requirements, so have cancelled program. This is under REDD+. It is possible to do carbon counting in national park, but it is not clear if there will be a payment mechanism applicable for working with national parks or how such a mechanism would work.

- REDD+ requires that they know baseline data for the amount of carbon in the national park; this has been initiated by Ministry of Forestry.
- Not clear who will pay/buy carbon credits or what MRV requirements will be.
- From the baseline data they are supposed to conduct carbon assessments but process not yet being applied.
- Need to clarify the regulations from the Ministry of Forestry for these activities and when all mechanisms are in place then they will take the process forward.

Water:

- Very important function of Kapuas Hulu — upstream of the rest of West Kalimantan — providing water to all.
- Both national parks (Danau Sentarun NP, TNDS, and Betung Kerihun NP, TNBK) play an important role as they are at the start of the water courses.
- Still struggle with how to improve awareness with the important role of the national park in regards to water provision — locally and across the province.
- Tanjung Pura University wants to build hydro stations to monitor water — still in discussion.

Micro-hydro

- GIZ has a micro hydro project (details unknown — not managed to meet GIZ).
- Main criteria: close proximity to community.
- Land status: can build within the national park only on land in the zone for use by communities, so long as it is not a commercial operation.
- Technical assistance is provided by GIZ. TNBK facilitates processes with the communities. This type of project helps to build community awareness of why the national park is good and how it can directly benefit them.

Community boundaries

- Boundaries remain an issue; continue to work with communities in an ongoing process.
- 2007 conflict between community *ladang* area and national park, but situation resolved through discussion. *Ladang* was located far from community.
- Another dispute with two villages is ongoing.
- Raising awareness of the benefits of the national park and its services to the community is one way

to build relationships and to get communities to accept the boundaries.

Eco-tourism:

- 40–50 people per year visit
 - Tourism, filmmaking, research
 - Australia, US, Asia, etc.
 - Indonesia: focus on research and filmmaking
 - Rp 11 million (PNPM): an increased amount of non-tax revenues, need to report this to the national government.
- NGOs (KOMPAKH - Komunitas Pariwisata Kapuas Hulu, Kapuas Hulu ecotourism community) working with tourists outside the national park.
- There are two groups facilitated by TNBK
 - Local tour operator – Katajak agency
 - Ecotourism groups KOMPAKH – transportation, homestay, guides etc.
- Communities are members/involved in both groups.
- Facilitator role of TNBK to build links and guide operations, however they aim to make this process independent of TNBK.

Sedimentation in Mendalam River:

- Landslides occur because of steep sides. Cannot find an alternative source of sedimentation, but do need to do further verification of this using Landsat maps, etc. There appears to be very little logging inside national park (minor community timber extraction). On Sibau River there is logging but it is outside the national park.

Border with Malaysia:

- National park staff and the army jointly patrol the border but there are only 1–2 patrols per year.
- On the Malaysian side, oil palm is fast approaching the border — not sure how close to the border. Forest is being cleared.

- There is some illegal logging but cooperation between Indonesia and Malaysia is not always as good as it could be.

Working with communities:

- Main activities are ecotourism activities
- Some work with NTFPs and fishing – rare and endangered species
 - New program with communities for Tor species (fish) that is endangered, community is very enthusiastic to be engaged, high-value fish, stock is very low.
 - TNBK, communities and other agents are working together.

Other issues:

- Internal issue
 - There is no specific strategic plan for the short and medium term for the national park.
 - Replacement of people/staff turnover makes it difficult to plan, especially for the staff left behind.
 - (Question — is there high turnover of staff? If so, why?)
- External issue
 - TNBK is expected to show that it can provide compensation to communities and the communities are not always happy with just projects, assistance, information, etc.
 - There is a lack of awareness of the role and benefits of the national park.

Vision for the future:

- For the national park to be an important tourism destination, with a positive impact on local communities.
- The national park becomes a research center for plants and animals, and through this they are able to improve the general level of education and awareness.

CIFOR Working Papers contain preliminary or advance research results on tropical forest issues that need to be published in a timely manner to inform and promote discussion. This content has been internally reviewed but has not undergone external peer review.

The CoLUPSIA project conducted an assessment of the potential of establishing payment for ecosystem services (PES) for two regencies in Indonesia. The objectives of the present study were to determine the feasibility of PES projects in the Kapuas Hulu regency, West Kalimantan, to assess whether there is potential for PES at our study sites and, if so, identify the opportunities, constraints, risks, risk mitigation and needed steps for future actions. The method used followed the CoLUPSIA's PES methodological guidelines (Fripp 2014).

Interviews were conducted with the national park office, regency forestry office, oil palm plantation company, water company, NGOs and local communities, exploring the wider potential for PES projects in Kapuas Hulu. The assessment focused predominantly on the socioeconomic, institutional and governance aspects, and so the findings can be applied to any PES project, beyond carbon sequestration alone.

The results show that potential for PES in Kapuas Hulu range from carbon projects to PES bundles in the five locations that were assessed. The hamlet of Keluin and village of Nanga Dua are examples of potential for PES bundles that improve biodiversity through land rehabilitation and could be bundled with carbon stock and micro hydro projects. In Tinting Seligi, where an oil palm plantation has been operated, a carbon project from rubber production could be one of the PES options. In addition, in the hamlets of Nanga Hovat and Benua Tengah, there is the potential for carbon storage and sequestration projects the beauty of the landscape could provide a basis ecotourism.

It is important to understand that this work focused on the opportunities for PES, but did not assess the feasibility of any identified specific PES projects. If a PES project is to be developed following our recommendations, then a full feasibility assessment should be conducted during the design phase.

This research was carried out as part of the European Union funded Collaborative Land Use Planning and Sustainable Institutional Arrangement project (CoLUPSIA). Run by CIRAD in partnership with CIFOR, TELAPAK and several local NGOs and Universities, the project aims to contribute to avoided environmental degradation and to strengthen land tenure and community right by collaboratively integrating all stakeholders' views in land use planning processes. The outputs revolve around the relationship between land use planning, land allocation and the provision and potential payment of ecosystem services. The project focuses on two regencies (kabupaten), Kapuas Hulu and Central Maluku in Indonesia.

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