



REWETTING OF TROPICAL PEAT SWAMP FOREST IN SEBANGAU NATIONAL PARK, CENTRAL KALIMANTAN, INDONESIA



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Prepared by: WWF-Indonesia Sebangau Project

With contributions from:

WWF-Germany

Sebangau National Park Office

Winrock International

Executive Summary

This Project Design Document was prepared for the project “Rewetting of Tropical Peat Swamp Forest in Sebangau National Park.” Sebangau National Park is a peat swamp forest located in Central Kalimantan, Indonesia that was previously a Production Forest logged under 13 concessions from 1970 to 1995. The project is included in the REDD+ Demonstration Activities implemented in conservation areas under Indonesia’s National Action Plan to Reduce GHG Emission.

After the ending of logging concessions in the area in 1995, an era of illegal logging began. During this time numerous canals were dug by illegal loggers to transport logs out of the peat swamp forest. These canals accelerate waterflow from the peatland, causing peat drainage and decomposition along with the release of associated greenhouse gases (GHG). The aim of the project activity is to reduce GHG emissions from peat decomposition by rewetting the drained peatland through technical means. The project will implement a canal blocking whereby dams are established in drainage canals. Studies have shown that GHG emissions produced by tropical peat land are controlled by the ground water level in relation to the peat surface, and therefore keeping the water level near the peat surface will reduce GHG emissions from peat decomposition.

In addition to reducing GHG emissions, restoration of natural hydrological conditions is expected to result in the recovery of the peat swamp forest ecosystem in Sebangau. Rewetting the peat will support vegetation regrowth, enabling the recovery and expansion of wildlife populations including the endangered Bornean orangutan. The project area is an important orangutan habitat. A survey conducted between 2006 and 2007 showed a population of around 5,400 individual orangutans in Sebangau National Park.

Construction of the dams began with pilot activities in 2004 with massive scaling-up of the activities starting in 2008. By 2010, with funding support from two German sponsors, Deutsche Post and Krombacher, the project had built 434 dams in the Bakung, Bangah, and Rasau River sub-catchments in the eastern part of Sebangau National Park.

Local communities have been involved in the project since its inception due to the importance of the project area for fishing and *jelutung* sap (wild rubber) collection. Three extended families in the nearby village of Kereng Bangkirai claim traditional management rights over the three Sub-catchments and for four generations families have depended on fishing in marshlands and tributaries of the Sebangau River for their livelihoods. Communities, especially the fishermen who fish intensively in the area, were consulted on the design of dams. In the canals which are frequently used for fishing and transporting *jelutung* sap the dam is made with a spillway, so that boats can still pass. Communities are also involved in the construction and maintenance of dams.

Restoration of natural hydrological conditions and peatland ecosystem recovery will ultimately benefit local communities that depend on the peatland resource for their livelihoods. Marshlands are important spawning grounds for fish populations, therefore rewetting of

marshlands that have been drained by the canals will result in more productive fishing for local fishermen. As well, the filling of canals with water will allow the gatherers of *jelutung* sap to increase activities and gain economic benefits.



Figure 1 Fishermen's shelters in a tributary of the Sebangau River in the project area

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GENERAL SECTION

G1. Original Conditions in the Project Area

G1.1. General Information

The goal of the project is to reduce peat drainage and raise the groundwater level in the project area through the construction of dams based on a thorough hydrological analysis of the area accompanied by ongoing measurements of hydrological parameters in the watersheds. As a result of hydrological restoration, significant emissions of CO₂ from peatlands in the project area will be prevented. As well, the raising of the groundwater level will increase the natural buffering capacity of peat forests minimizing the risk of both forest fires and floods.

The conservation of the peat swamp forest will also help to restore the peatland ecosystem and reduce poverty of several thousand families which depend directly and indirectly on the sustainable use of peatland resources in the project area. Additional activities implemented by WWF will further enhance livelihoods with income generating measures such as fish farming in the reservoir areas created by dams, afforestation with indigenous tropical species of commercial value, development of non-timber forest products such as rattan, handicraft materials, eco-tourism, other environmental services, fishery and sustainable farming.

G1.1.1. The location of the project and basic physical parameters

The project area is located in Sebangau National Park (SNP) in Central Kalimantan Province, Republic of Indonesia, on the island of Borneo (Figure 2). Sebangau National Park covers an area of 568,700 ha and was declared a protected area in 2004.



Figure 2 Location of Sebangau National Park, Central Kalimantan Province, Indonesia

The Park is part of a 734,700 ha large peat dome which contains the largest remaining continuous area of dense peat swamp forest in Borneo and stores a total of about 2.3 Gt of peat soil carbon¹. Before it became a National Park, the Sebangau forest area was zoned as Production Forest. It was managed and logged under 13 logging concessions until the mid-1990s, followed by an era of illegal logging until 2006. Logging activities entailed the construction of a network of almost 1,000 transportation canals which accelerates water flow from the peat dome and leads to peatland drainage. The drainage of the peat dome through these canals contributes to the lowering of the groundwater level, degradation and

¹ Jaenicke J, Rieley JO, Mott C, Kimman P, Siegert F. 2008. Determination of the amount of carbon stored in Indonesian peatlands. *Geoderma* 147: 151-158.

decomposition of the peat and ultimately the destruction of the entire Sebangau forest ecosystem.

As soon as oxygen penetrates the drained peat corpus, micro-organisms begin to decompose the peat and to release considerable quantities of the GHG carbon dioxide (CO₂). Reoccurring fires in drained peatlands accelerate this process. Drainage of tropical peatland areas in Indonesia for logging purposes or for conversion into rice and palm oil plantations continues to be a key source of greenhouse gas (GHG) emissions in the country. The drained peat forests of Central Kalimantan are considered a major risk for GHG emissions because of their tremendous carbon stores. In addition, the degradation of peat swamps in Central Kalimantan affects the socio-economic wellbeing of local populations that depend on the peatland resources for their livelihoods.

The general physical conditions of the project location are described below.

Climate

The climate of Central Kalimantan is characterised by a rather constant temperature throughout the year, high humidity and high rainfall with a marked wet and dry season. Annual rainfall varies between 2,000 and 4,000 mm and is influenced by periodic El Niño events which cause a prolonged dry season. The average evaporation is fairly constant, varying between 3.5 mm day⁻¹ and 4.8 mm day⁻¹ with a total of around 1500 mm per year.

Figure 3 shows a typical rainfall and evaporation pattern for Central Kalimantan with a clear wet and dry season.

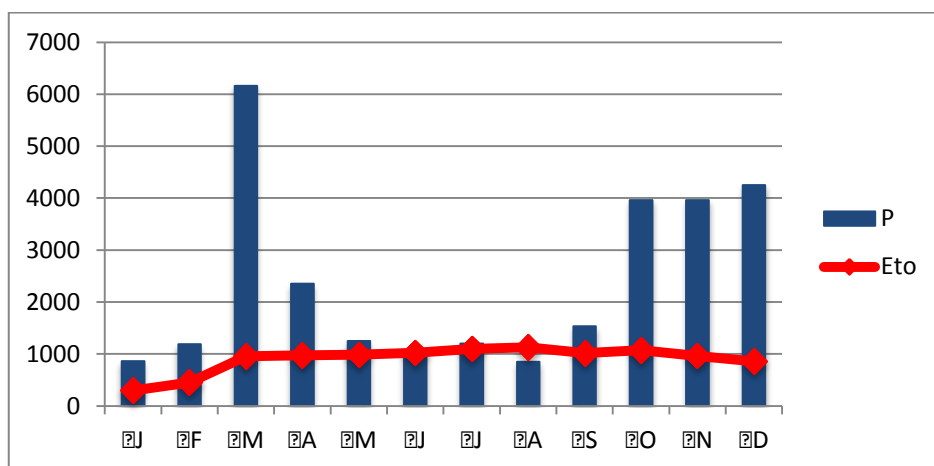


Figure 3 Mean monthly rainfall and evaporation (mm) in Sebangau NP, Central Kalimantan (Weatherhawk mini station data, SSI Field Station WWF-Indonesia Central Kalimantan, 2011); P = Precipitation; Eto = Evapotranspiration

The dry season usually begins in May and lasts until October and the wet season lasts from November until April. During the dry season the groundwater level in the peat drops as precipitation decreases.

Relief and Soils

100% of the project area is underlain by peat. The National Park area consists of a peat dome that arches between the Sebangau River to the east and the Katingan River to the west with a maximum elevation of 30 meters. It is approximately 70km wide and 120 km long. Like most Indonesian peatlands the Sebangau peat dome is ombrogenous, i.e. rainfall is the only source of water and nutrients. Peat consists of dead, partially decomposed plant remains (trunks, branches and roots of trees within a matrix of almost structureless organic material that also originates from rainforest plants, mostly trees) that have accumulated on the land surface for millennia under waterlogged conditions².

Radiocarbon dating suggests that some sub-coastal peatlands on Borneo started to accumulate around 26,000 years ago (late pleistocene) while coastal peatlands commenced their development only between 6000 and 2000 years BP (early holocene)³, when organic matter accumulation started.

Initially, these peat deposits were covered with pristine peat swamp forest but, as a result of economic development during the past two decades, they have been subjected to intensive logging and drainage.

The relief, peat depths and carbon storage of the Sebangau peat dome have been modelled by Jaenicke et al (2008)⁴. After calculating peat dome volumes, the carbon storage can be estimated. The amount of carbon sequestered in peat depends on the carbon content, measured in %, and bulk density. Both values vary for different peat types. A dry bulk density of 0.1 g/cm³ together with a carbon content of 58% can be regarded as an average for the tropical peat in Indonesia.

Hydrology

A natural peat swamp forest (Figure 4) functions as a reservoir of water, carbon and biodiversity. Generally groundwater levels are close to land surface, carbon is sequestered at a rate of approximately 1 mm peat accumulation per year, and the area is rich in flora and fauna including the rare Orangutan.

The water draining from this peatland is black owing to high levels of humic and fulvic acids, polyphenols and other products of organic matter decomposition.

² Page SE, Wüst RA, Weiss D, Rieley JO, Shotyk W, Limin SH. 2004. A record of Late Pleistocene and Holocene carbon accumulation and climate change from an equatorial peat bog (Kalimantan, Indonesia): implications for past, present and future carbon dynamics. *J Quaternary Sci* 19:625–635

³ Page, S, Hoscilo A, Wosten, H, Jauhiainen, J, Silvius, M, Rieley, J, Ritzema, H, Tansey, K, Graham, L, Vasander, H, Limin, S. 2009. Restoration ecology of lowland tropical peatlands in Southeast Asia: Current knowledge and future research directions. *Ecosystems* 12: 888-905.

⁴ Jaenicke J, Rieley JO, Mott c, Kimman P, Siegert F. 2008. Determination of the amount of carbon stored in Indonesian peatlands. *Geoderma* 147, 151-158.



Figure 4 Optimal hydrological conditions for the growth of peat swamp forest

Figure 5 shows the water balance in a tropical peatland and it indicates that a considerable portion of the rainfall is transported through the peat surface layer towards the drainage canals while only a small portion of the rainfall infiltrates the deeper peat layers. Groundwater levels fluctuate in the peat surface layer.

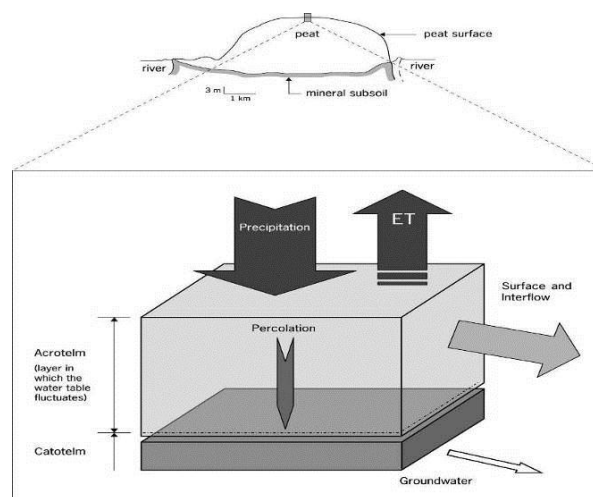


Figure 5 Schematic picture of the water balance of a tropical peatland. The size of the arrows gives a qualitative indication of the importance of each component

Figure 6 shows groundwater levels as measured in an intact peat swamp forest in the north of Sebangau. In most years groundwater levels stay within a range at land surface till 40 cm below land surface and they reflect the rainfall patterns with a wet and dry season. In dry El Niño years groundwater levels may drop to 100 cm below land surface.

As soon as groundwater levels fall below land surface, oxygen enters the soil profile and the process of peat oxidation starts. The deeper the groundwater level, the higher the oxidation rate. As shown in Figure 6 also groundwater levels in an intact peat swamp forest fluctuate with the result that during dry periods peat oxidizes while during wet periods peat accumulates.

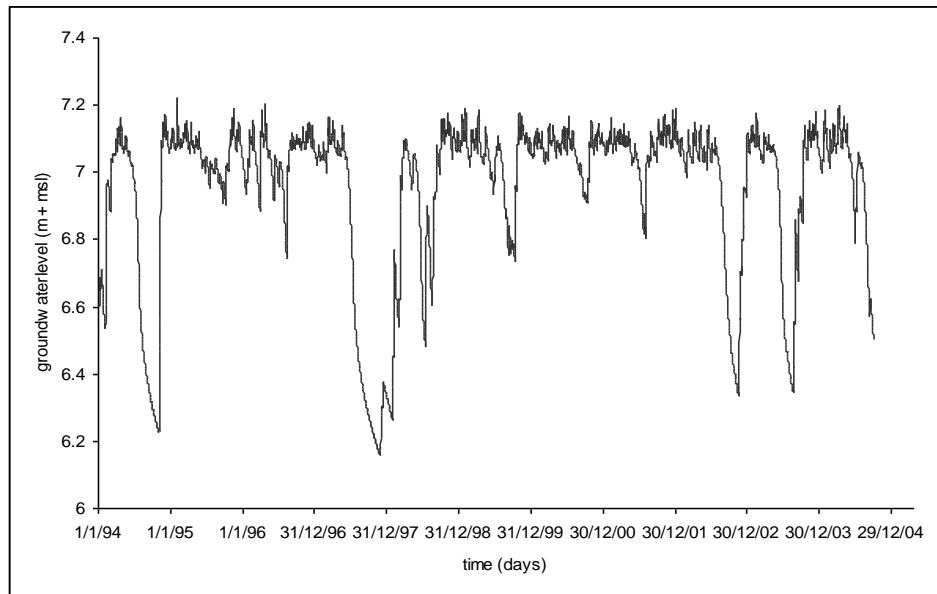


Figure 6 Long term record of measured groundwater levels in intact peat swamp forest in the Sebangau catchment as measured by Takahashi et al (2004)

Figure 7 shows the relationship between CO₂ emission and groundwater levels for the tropical, temperate and boreal area. As shown high temperatures cause high emissions while also emissions increase with lower groundwater levels.

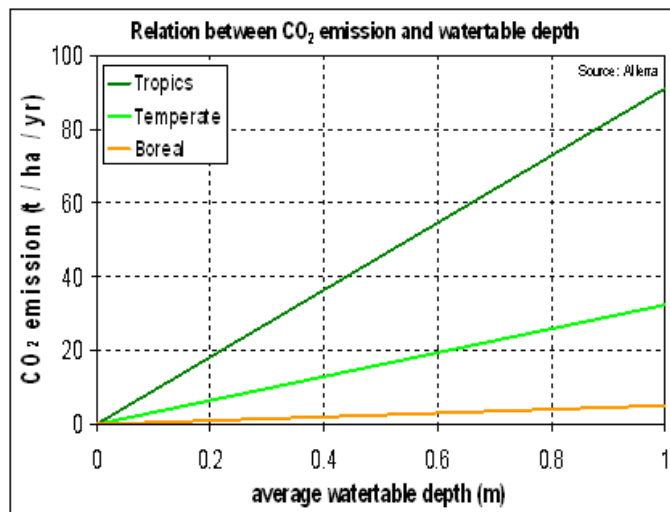


Figure 7 Relationship between CO₂ emission and groundwater levels for the tropical, temperate and boreal areas

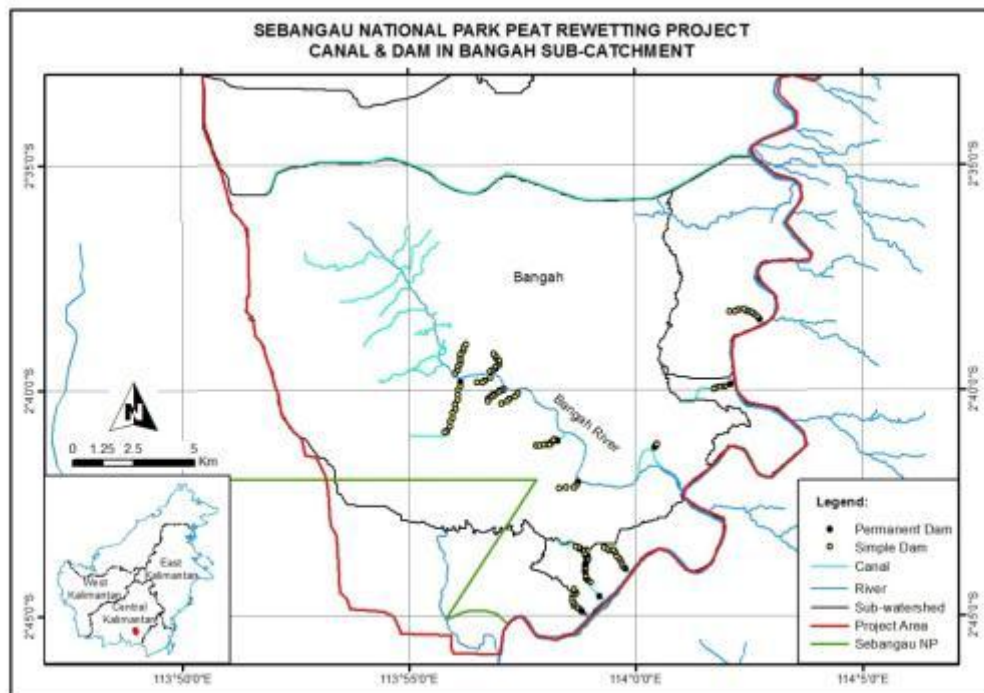
Interrelationships between peat and water were studied using a hydro-pedological modelling approach for adjacent relatively intact and degraded peatland in Central Kalimantan, Indonesia⁵. The easy to observe degree of peat humification provided good guidance for the assignment of more difficult to measure saturated hydraulic conductivities to the acrotelm-catotelm hydrological system. Ideally, to prevent subsidence and fire, groundwater levels should be maintained between 40 cm below and 100 cm above the peat surface. Calculated

⁵ Wösten JHM, Clymans E, Page SE, Rieley JO, Limin, SH. 2008. Peat-water interrelationships in a tropical peatland ecosystem in Southeast Asia. *Catena* 73: 212-224.

groundwater levels for different years and for different months within a single year showed that these levels can drop deeper than the critical threshold of 40 cm below the peat surface whilst flooding of more than 100 cm above the surface was also observed. In July 1997, a dry El Niño year, areas for which deep groundwater levels were calculated coincided with areas that were on fire as detected from radar images. The relatively intact peatland showed resilience towards disturbance of its hydrological integrity whereas the degraded peatland was susceptible to fire. Hydropedological modelling identified areas with good restoration potential based on predicted flooding depth and duration.

Owing to the low bulk density of most of the peat, tropical peatlands have a high porosity and, as a consequence, a high water-holding capacity that provides them with an important water regulation function with respect to downstream tropical lowlands. Under natural conditions tropical peatlands serve as reservoirs of fresh water, moderate water levels, reduce storm-flow and maintain river flows, even in the dry season, and they buffer against saltwater intrusion.

The waterways in and around the project area are shown in Figure 8. Several networks of canals drain into the Bangah, Bakung, Rassau Rivers, which drain into the Sebangau River. Some canals drain directly into the Sebangau River.



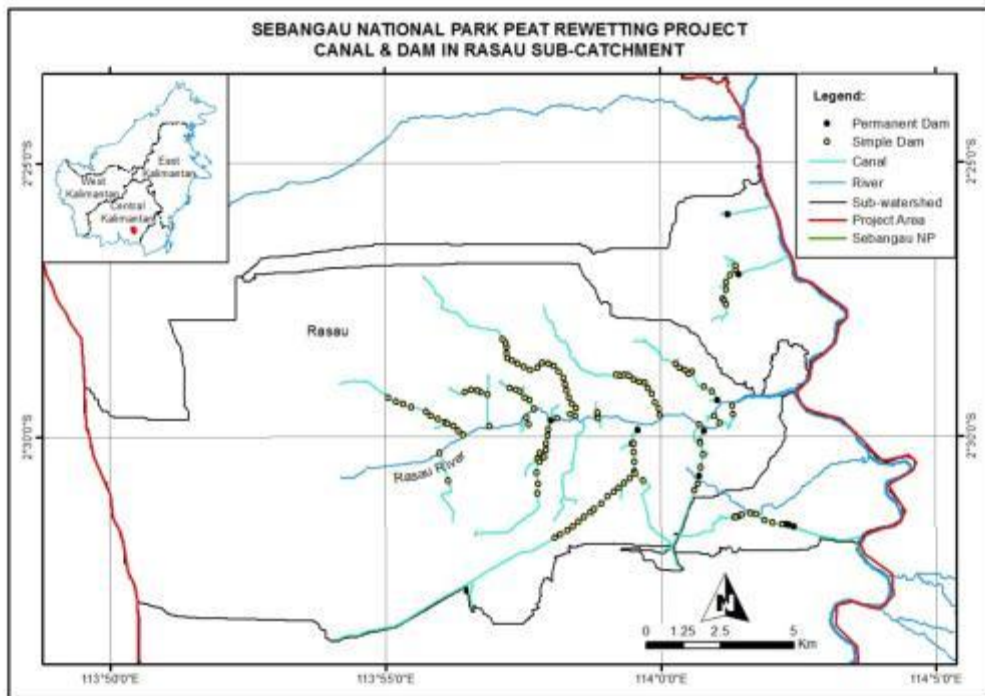
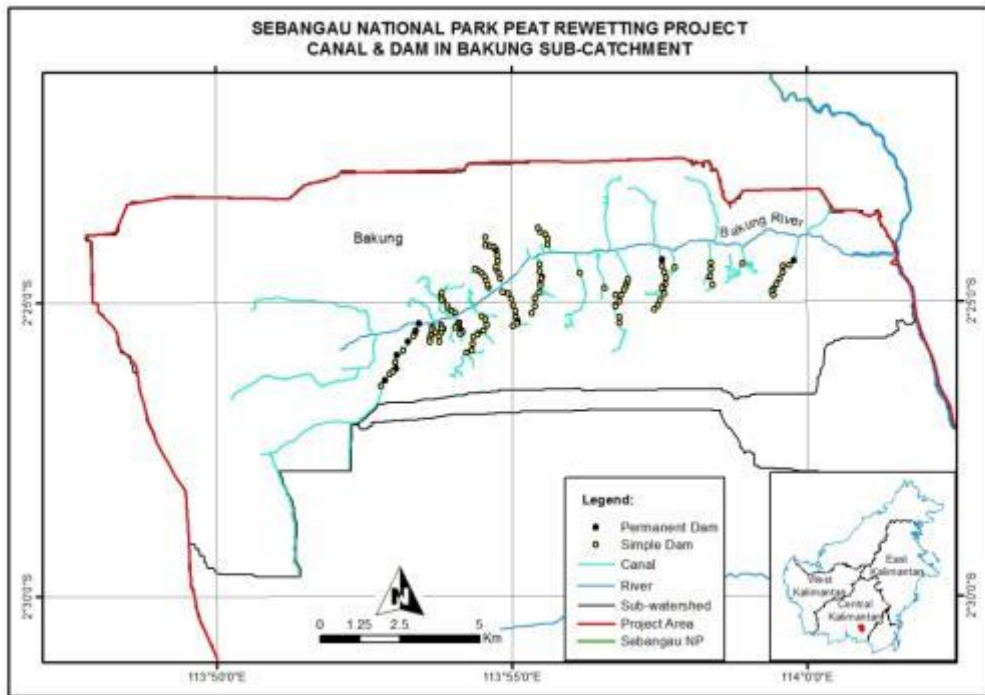


Figure 8 Waterways in the project area

The network of canals in the project area accelerates drainage of water from the peat dome towards the Sebangau River. Blocking the canals in the Sebangau National Park is of crucial

importance as it is the only way to restore the hydrological integrity of the peat swamp forest which is critical to fulfil its natural role as reservoir of water, carbon and biodiversity.

G1.1.2. The types and condition of vegetation within the Project Area

Since the project area is located in a National Park and land use conversion and timber extraction activities are consequently banned by law, most of the area is covered by natural forest and can be classified as lowland tropical peat swamp forest, though forest fires especially during the 1997 ENSO⁶ event have left burn scars scattered throughout the project area. As well, some exploitation of the Sebangau peat forests occurred before creation of the national park leaving patches of cleared areas.

The peat swamp forest ecosystem in Sebangau National Park, according to the Biology Research Center of Indonesian Institute of Sciences, contains a unique diversity of typical flora like *ramin* (*Gonystylus bancanus*), *jelutung* (*Dyera costulata*), *belangeran* (*Shorea belangeran*), *bintangur* (*Calophyllum sclerophyllum*), *meranti* (*Shorea spp.*), *nyatoh* (*Palaquium spp.*), *keruing* (*Dipterocarpus spp.*), *agathis* (*Aghatis spp.*), and *menjalin* (*Xanthophyllum spp.*)⁷.

Biodiversity and structure of the Sebangau peat swamp forest is dependent on peat dome structure and nutrient availability in soils. Changes in forest zones seem to follow the shape of the peat dome, suggesting a role for proximity to river flood levels and peat thickness on these forest growth-determining factors. Vegetation in the project area can be classified as follows⁸:

Riverine forest: This forest type is located between freshwater swamp forest with peat swamp forest. It is located close to the river (\pm up to one mile from the river) and always flooded during the rainy season. Generally the depth of peat in this area is very thin (\pm up into the 1.5 meter). The vegetation in this forest type is *Shorea balangeran*, where this species is the one that can reach a height of 35 meters. Other canopy layer generally can only reach a height of 25-35 meters with vegetation such as *Calophyllum spp.*, *Camptosperma coriaceum* and *Combretocarpus rotundus*, and then *Thorachostachyum bancanum* at the bottom layer.

Mixed swamp forest: This forest type usually can be found starting from the borders of the dome of peat up to 4 km. Peat depths generally range between 2-6 meters. Generally stands in this forest type is high and stratified, with the highest canopy layer can reach 35 meters, the middle layer ranges between 15-25 meters and the bottom are generally more open overgrown by plants with a high range between 7-12 meters. This forest type is characterized also by the many plants that have stilt or buttres roots; *pneumatophores* are also oftenly found. Plant species commonly found in mixed forest types are *Aglaiia rubuginosa*, *Calophyllum hosei*, *Calophyllum lowii*, *Calophyllum sclerophyllum*, *Combretocarpus rotundatus*, *Cratoxylum glaucum*, *Dactylocladus stenostachys*, *Dipterocarpus coriaceus*, *Dyera costulata*, *Ganua mottleyana*, *Gonystylus bancanus*, *Mezzetia leptopoda*, *Neoscortechinia kingii*,

⁶ El Niño Southern Oscillation

⁷ 2006. Lembaga Ilmu Pengetahuan Indonesia

⁸ Page SE, Rieley JO, Shotyk OW, Weiss D. 1999. Interdependence of peat and vegetation in a tropical peat swamp forest. Philosophical Transactions: Biological Sciences, 354 (1391): 1885-1897.

Palaquium coclearifolium, *Palaquium leiocarpum*, *Shorea balangeran*, *Shorea teysmanniana* and *Xylopiacusca*.

Low pole forest: This forest type is generally found in areas between 6-11 km from the river with a depth of peat ranges between 7-10 meters. Generally ground water level (water-table) are permanently high and forest floor is very uncertain. The trees grow in islands such as hummocks separated by the water which will generally disappear during the dry season. *Pneumatophores* abundant and growing tightly on the peat floor. This type is only found in two layers of the canopy with a height of 20 meters while the lower layer reaches 12-15 meters with a relatively more dense conditions. Plant species that are commonly found in this forest type is *Combretocarpus rotundus*, *Calophyllum fragrans*, *Calophyllum hosei*, and rarely found *Camptosperma coriaceum* and *Dactylocladus stenostachys*. *Pandanus* grows in a tightly formation and *Nepenthes spp.* is very abundant.

High stand forest (tall interior forest): This forest type is generally located on the slope of the peat dome, from 12 km (where there is a clear change in forest types towards low pole forest) to more than 24.5 km, with a depth of peat can reach more than 12 meters. Water level is always below the peat surface throughout the year. The highest canopy layer can reach 45 m and the bottom layer can be distinguished between the middle layer with a height between 15-25 meters and lower than 8-15 meters. Plant species that are commonly found in this community is *Agathis damara*, *Calophyllum hosei*, *Calophyllum Lowii*, *Cratoxylum glaucum*, *Dactylocladus stenostachys*, *Dipterocarpus coriaceus*, *Dyera costulata*, *Eugenia havelandii*, *Gonystylus bancanus*, *Gymnostoma sumatrana*, *Koompassia malaccensis*, *Mezzetia leptopoda*, *Palaquium coclearifolium*, *Palaquium leiocarpum*, *Shorea teysmanniana*, *Shorea platycarpa*, *Tristania grandifolia*, *Vatica mangachopai*, *Xanthophyllum spp.*, and *Xylopiacusca spp.*

Forest cover in Sebangau National Park in 2009 is shown in Figure 9. As a result of legal and illegal logging activities in the past much of the project area is covered by Secondary Swamp Forest (Figure9).

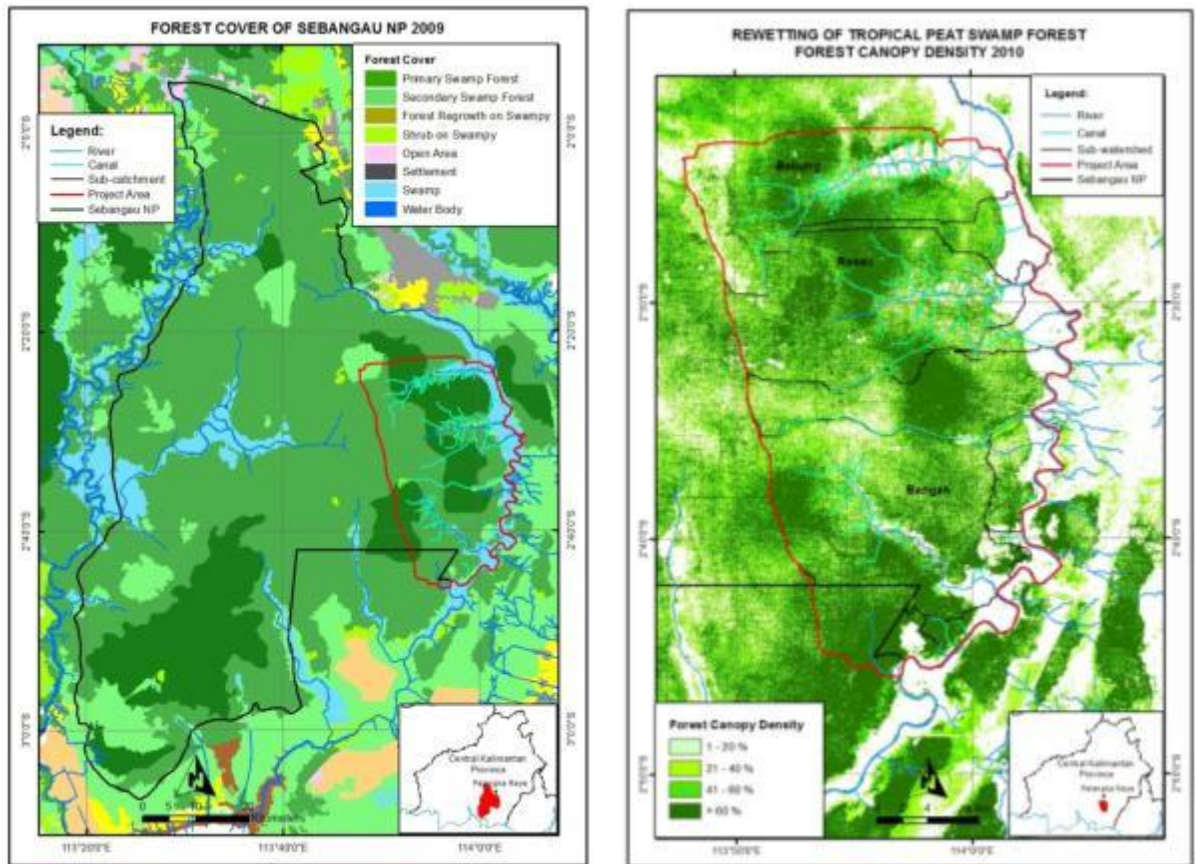


Figure 9 2009 forest cover and 2010 forest canopy density in the project area

G1.1.3. The boundaries of the Project Area and the Project Zone

The hydrological restoration project is carried out in a 90,882 ha area of the Sebangau National Park. The extent of the project area is defined by natural, hydrological borders, i.e. the Sebangau River to the east, tributary streams to the southwest and north and the highest elevation of the peat dome to the northwest (Figure 10).

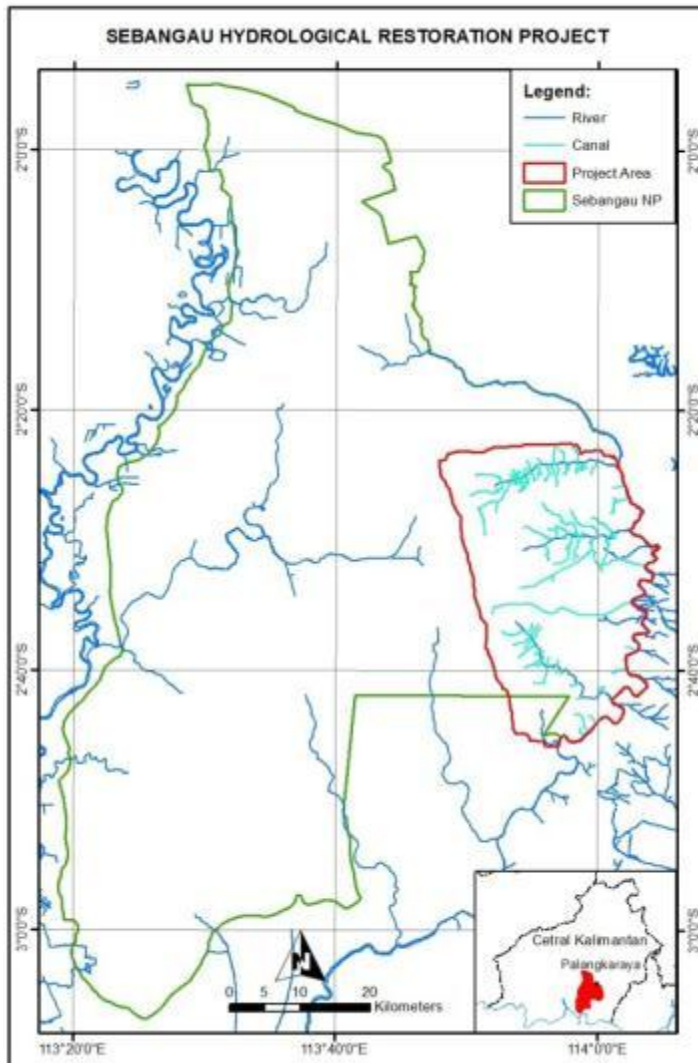


Figure 10 Sebangau hydrological restoration area

Two types of geographic boundaries are defined for the project in addition to the project area boundary following the selected methodology:

Watershed(s) of Interest: The one or more complete watersheds modeled to estimate the impact of project activities on water levels in the area of hydrological influence.

Excluded Area of Watershed(s): The area within the Watershed(s) of Interest that are outside the project area boundary.

The geographic boundaries of the Watershed of Interest encompass one complete watershed within the peat dome and are based on watershed mapping with the SIMGRO model and on-the-ground delineation of waterways using a GPS. The topographic conditions (elevation, slope) represented in the DTM generated for the peat dome were analyzed within the SIMGRO model to determine the direction of water flow in the region and thus the Watershed of Interest as described in the Project Boundary Report⁹. The Sebangau National Park Boundary

⁹ VCS PD Annex 12 Project boundary report: Sebangau National Park Peat Rewetting Project – Definition of Project Boundary Report

separates the Excluded Area of Watershed from the project area. The lands included in the project area are entirely inside the boundaries of Sebangau National Park. Maps of the Watershed of Interest, the Project Boundary, and the Sebangau National Park Boundary which segregates the Excluded Area of Watershed from the area inside the Project Boundary are provided in digital format in the supplementary documents to the VCS PD¹⁰¹¹.

The carbon project area boundary includes the subcatchments of Rasau, Bakung and Bangah Rivers within Sebangau National Park where the construction of dams takes place. The eastern part of the Sebangau catchment was selected for hydrological restoration due to its vicinity to the city of Palangka Raya and relatively easy access via the Sebangau River and its tributaries.

Stakeholders involved and/or impacted by the project include local community members who access the project area to fish and collect *jelutung* (wild rubber) sap. Mapping of the key stakeholders was initially completed in 2004 and has been continuously updated in the implementation of activities in the field. Traditional rights to the three tributary rivers and their associated subcatchments in the project area are claimed by three extended families living in Kereng Bangkirai, an old village on the north side of Sebangau National Park. Fishermen outside the families are also allowed to fish in the three subcatchments. All of the fishermen accessing the three subcatchments reside in Kereng Bangkirai, but they have temporary shelters built in 12 clusters along River Sebangau. Fishermen live in the temporary shelters roughly a little more than half of the year. While families claiming traditional rights to the rivers in the lands included within the project boundary are local to the area, most of the owners of the canals are outsiders from South Kalimantan, Java, Madura and Sumatera who came to the area for the illegal logging trade, and only a few are local people. After illegal logging was banned most of the outsiders returned to their place of origin or moved to other locations.

¹⁰ VCS PD Annex 7 GIS data: Project Boundary

¹¹ VCS PD Annex 7 GIS data: Sebangau National Park Boundary

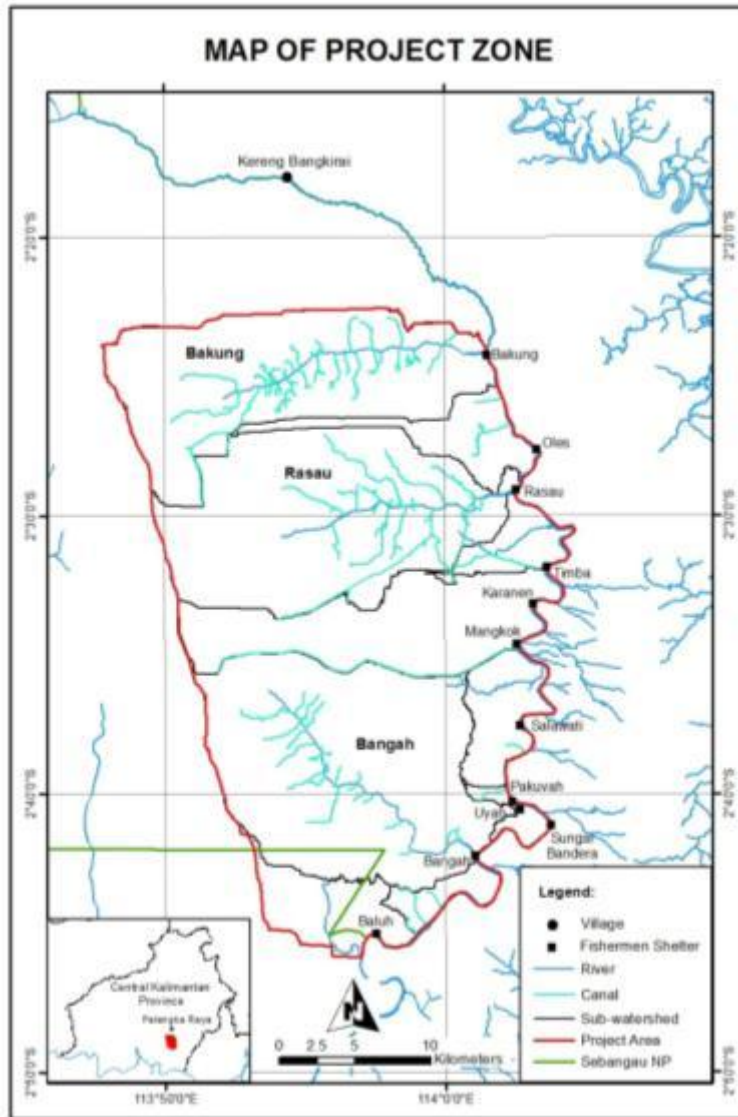


Figure 11 Sebangau project zone

The project zone is defined as the temporary fishing shelters adjacent to the project area along the Sebangau River and the village of Kereng Bangkirai (Figure 11).

G1.2. Climate Information

G1.2.4. Carbon stocks

Peat swamp forest carbon is primarily stored in the peat soil. LIDAR data analysis showed that the surface of the Sebangau peat dome towards the centre is elevated by a maximum of 13 m above its margins with an average gradient of 0.7 m per kilometre which appears flat when in the field. The result of thickness modelling reveals an average peat thickness of 5.4 ± 0.95 m within the study area¹². After calculating peat dome volumes, the carbon storage can be estimated. The amount of carbon sequestered in peat depends on the carbon content,

¹² Jaenicke, J, Wösten H, Siegert F, Budiman, A. 2010. Planning hydrological restoration of peatlands in Indonesia to mitigate carbon dioxide emissions. *Mitigation and Adaptation Strategies for Global Change*. DOI 10.1007/s11027-010-9214-5.

measured in %, and bulk density. Both values vary for different peat types. A dry bulk density of 0.1 g/cm³ together with a carbon content of 58% can be regarded as an average for the tropical peat in Indonesia.

However, pursuant to the carbon project methodology applied to estimate reductions in GHG emissions generated by the project activity, CO₂ emissions from peat oxidation are estimated considering the monthly mean average water levels relative to the peat surface in the project area and a CO₂ emission factor linking water levels to CO₂ emissions from oxidation. Therefore actual soil carbon stocks in the project area have not been estimated. Changes in aboveground tree biomass are included in accounting but are conservatively assumed to be zero in the baseline and project case therefore actual carbon stocks in aboveground tree biomass have not been estimated for the project area. Carbon stock changes in aboveground non-tree biomass, belowground biomass, litter, and deadwood are conservatively omitted from accounting as allowed by the methodology and thus actual carbon stocks in these pools have also not been estimated.

G1.3. Community Information

G1.3.5. Community in the Project Zone

WWF Indonesia has gathered information on the socio-economic conditions, traditional practices, and knowledge on utilization of natural resource in the project zone as part of its activities in the area since 2002. A detailed baseline study to update the existing information were carried out in two phases in 2010 and 2011.

During the first phase completed in 2010 WWF Indonesia identified the main resource user groups in the project zone. Identification of the main user groups was accomplished by: (i) direct observation of the fishing shelters in the area; (ii) interviews to get information on the kind of fish in the project zone and estimation of annual catch volume. Results of the first phase showed the existence of 12 clusters of fishermen's shelters in the area of intervention¹³.

In the second phase of the study in 2011, a questionnaire was used to gather information on the origin of the fishermen who use the fishing shelters, their family size, household assets including housing, transport equipment, fishing gear, and an estimation of incomes. The information from the questionnaire was complemented by in depth interviews with key informants to obtain additional information on the river holder system, livelihoods and the level of well-being in the project zone. Interviews were also conducted with the *Damang Kepala Adat* (Customary Chief) in Kereng Bangkirai, as well as the fishermen in Garung—a village in the East of area of intervention—who sometimes fishing along the Sebangau River¹⁴. However, Garung was not included in the Project Zone because fishermen from Garung only occasionally fish in Sebangau when fish resources became scarce in their own place in certain seasons.

¹³ Rosidi M, Ansori M. 2010. Study on the Relationship Between Forest Fire and Fishing on Sebangau River. WWF Indonesia.

¹⁴ Mahin M. 2011. Socio Economic Baseline Survey in Sebangau National Park. WWF Indonesia.

G1.3.6. Current land use in the Project Zone

Land within the Project Zone is not suitable for agricultural cultivation, and to date there is no claim to lands surrounding Sebangau National Park where the status of land is Production Forest under State control.

Information derived from a consultation workshop in 2003 shows that economic revenues of almost 80% of Kereng Bangkirai households are generated by the exploitation of natural resources in areas surrounding the community, such as Sebangau National Park and other natural areas. Most community members earn a living as traditional fishermen, as *gemor* bark collectors, as loggers and *jelutung* tappers, and a minority mine white clay (*kaolin*) and sand.

Other natural resources that are important in the region include turtles, snakes, shrimp, *barako* and *peraca* (types of frogs), birds, lizards and other animals. Daffodils, *purun* (wild grass used for weaving), *gaharu* (aloes or eaglewood) and *ujung hatap* leaf are also collected. In terms of income, the traditional freshwater fishing sector is the largest source of household revenues in the communities of the Sebangau area. In addition, the consultation workshop revealed that the use and extraction of natural resources around Kereng Bangkirai is also carried out by migrants who temporarily come to the village. For example *pantung* sap tapping was dominated by migrant workers with a ratio of 3.3:1 migrant to local workers.¹⁵

The prevailing perception has been that, in the context of utilization of natural resources, the timber business generates a lot more income for local communities compared to other activities. However, interviews with members of the Kereng Bangkirai community show that income from fishing is highest followed by *gemor* bark collection and *jelutung* tapping. For example, an average monthly income is IDR 912,500 for fishermen, and IDR 754,167 and IDR 750,000 respectively for *gemor* and *jelutung*. In contrast the illegal logging business guarantees around only IDR 375.000 per month for laborers.

Although areas utilized for fishing and NTFP collection are now included within the boundaries of Sebangau National Park, disputes over the rights to utilize the rivers have never occurred. The establishment of Sebangau National Park does not prevent stakeholders from accessing the park for fishing activities or to gather NTFPs. The families with rights to the rivers control activities that occur along the rivers, particularly fishing and activities such as transportation of NTFPs. Other fishermen outside of the families are allowed to fish in the rivers, as long as they do not use more sophisticated equipment than the families with customary claims to the rivers.

Minor conflicts have occurred occasionally when fishing equipment has been damaged, but the problems have so far been resolved by the *Damang*. The perpetrators are fined a sum of money which is paid to the owner of the damaged equipment. When problems occur, the families holding the rights to the Bakung and Rasau Rivers report to the *Damang* in Kereng Bangkirai. However, the family holding rights to the Bangah River reports to the *Damang* in

¹⁵ Municipality Government of Palangka Raya, WWF Indonesia - Central Kalimantan Sebangau Project. 2003. Report of Workshop on Understanding Sebangau Area Conditions and the Hope for the Future in District Pahandut, Kereng Bangkirai.

Paduran Sebangau (Sub-district Kuala Sebangau, District Pulang Pisau). The reporting system is a function of the proximity of the rivers to Kereng Bangkirai or Paduran.

The primary land use activities of fishing and NTFP collection are described in further detail below.

Fishing

Fishing is an important source of livelihood in Central Kalimantan, so utilization of fishery resources are highly regulated in the Project Zone. According to traditional customs people are free to fish in main rivers. However, for tributaries and lakes, management rights can be assigned to extended families. Families given the right to manage fisheries are the first who use the small river or lake intensively. To strengthen the right to rivers and lakes, the Village Head (called *Kepala Kampung* in the past) issued a letter to the family concerned. During the era of illegal logging before the establishment of Sebangau National Park, canal owners asked river holders for permission to build a canal and payed a fee for timber removed through the river to its holder.

As already described in Section G.1.1.3, three extended families from Kereng Bangkirai village claim traditional rights to access rivers and fish in the Bakung, Rasau and Bangah subcatchments included in the project area. According to *Damang Kepala Adat* in Kereng Bangkirai, the current holders of the rivers are the fourth generation after the generation that first gained fishing rights to the rivers. Currently each of the three extended families holds a letter signed by *Kepala Kampung* (Village Head) of Pahandut in 1958, when Kereng Bangkirai was just a hamlet under Pahandut administration. The letter was re-signed in 1961 by *Kepala Kampung* of Kereng Bengkirai, when the hamlet became an autonomous village.

Based on the survey of community members in the project zone, around two thirds of the respondents sold fresh fish, and the rest sold dried fish. The buyers come from their own neighbourhood, Kereng Bangkirai, Garung, Anjir Kalampangan, Pulang Pisau, Mandomai, as well as from Banjarmasin in South Kalimantan¹⁶.

¹⁶ Mahin. 2011



Figure 12 Dried fish from Kereng Bankirai sold near the road to Banjarmasin (© Kahlert, WWF)

The fishermen catch 11 kinds of fish with seven different tools. The most favored tool is *tampirai*, a box-shaped fishing trap made of wood and plastic mesh. A wealthy fisherman may have 500 *tampirais*. Around 16% of the respondents have no fishing gear, and they work for other fishermen. 76% of the respondents have permanent housing in Kereng Bangkirai, but they built their huts along Sebangau River with durable wood materials. Of the 35 fishermen shelters surveyed, 34% were aged over 10 years, 25% over 5 years, and 41% less than 5 years¹⁷.

In terms of sustainability of the business, the picture provided by the community indicates that fishing is practiced year round and is not affected by the change of season. However, peak fishing seasons occurred when there is rapid change (rising or receding) of water level in the river. Fish population is however dwindling in part because of the exploitation by migrant fishermen from Garung and South Kalimantan, who illegally use electrical shock to catch the fish along Sebangau River.

¹⁷ Mahin. 2011.



Figure 13 Temporary fishing shelter in the Sebangau river (© Kahlert, WWF)

NTFP Collection

Gemor is the bark of a tree (*Alseodaphne sp.*, *Coriaceae sp.*, *Lauraceae sp.*) which is abundant in the peatland forest of Sebangau. After the bark is cut from the tree, it is dried and sold to local traders at a price of about IDR 2,800 per kilo of dried *gemor*. Ships from Banjarmasin come to collect the sacks full of *gemor*. The material is used in the production of mosquito repellent but it is also used as a kind of glue in ship building.

The degradation of the peatland ecosystem caused by drainage has had a negative impact on the *gemor* industry in the region. In 2002 on average about 50 tons of *gemor* was collected monthly from the lower part of the Sebangau River¹⁸. However starting in 2007, the quantity of *gemor* harvested began to decrease due to the fact that collectors needed to travel greater distances to find trees that can be harvested. The harvesting of *gemor* has been unsustainable because tree cutting has not taken into account the rate of natural regeneration of the species and their relatively slow growth in conditions of habitat disturbance¹⁹.

Jelutung sap is an important non-timber forest product from the Sebangau catchment area. The trees (*Dyera costulata*, *D. Lowii*) produce a milky sap comparable to rubber trees. Sap is

¹⁸ Persoon GA, Aliyub A. 2002. A Socio-Economic Profile of the Sebangau Watershed Area, Central Kalimantan. WWF Indonesia.

¹⁹ Kissinger H, Kristiadi M, Muhayah HR. 2007. Studies on Market and Its Potential for NTFP (Gemor, Rubber and Rattan) at Locations Around Sebangau National Park. WWF-Indonesia, University of Lambung Mangkurat.

collected by making an incision on the trees. Once mixed with a chemical product, the sap turns into a relatively solid kind of substance and is sold to local traders. Traders regularly sell the product to a wholesale dealer in Palangka Raya, P.T. Sampit. This large firm, which also deals in rubber and various kinds of rattan, exports the *jelutung* mainly to Japan²⁰. The collectors receive a price of IDR 250,000 per 100 kilograms (*kuintal*). As a result of the recent forest fires and illegal logging in the past, many *jelutung* trees have been destroyed or cut down to be sold as timber for quick returns. Illegal loggers are mostly responsible to this kind of use of *jelutung* trees (which is regarded as low-value timber)²¹.

Another no-timber forest product from the area is *damar* resin derived from a number of trees (*Shorea sp.*, *Vatica sp.*, *Dryobalanops sp.*). The product is used as adhesive in ship building activities. Local people get about IDR 500 per kilogram of resin. Most of the people engage in resin collection as a side activity, as it is not very profitable²².

Particularly during the dry season, catching of flying foxes or *kalong* is popular. Nets are put in the canopy of blooming and fruiting trees which are visited by the large bats during night time. They are caught in large numbers and sold by piece at various places along the road side where town people buy them for food. An adult *kalong*, which might weigh up to 700-800 grams, only costs IDR 4,000 (IDR 3,000 for smaller ones) which is about a third of the price for a chicken. In addition to the selling of the live animals, cut and cleaned animals are also sold. The gall (*empedu*) is sold separately from cleaned animals at a price of IDR 500 a piece. It is said to be a good medicine for numerous complaints but for asthma in particular.

Beside hunting in order to obtain bush meat (such as *kalong* and deer) or controlling agricultural pests (pig and pigtail macaques in particular, and deer), local people like to catch animals to keep them as pets or to sell them to others, especially birds (such as *beos*, small pigeons and others). There is a vibrant bird market in Palangka Raya, with a wide variety of birds sold from IDR 50.000 to more than two million rupiah.²³

G1.4. Biodiversity Information

G1.4.7. Current biodiversity

Morrogh-Bernard et al. (2003)²⁴, reported that the forests of Sebangau have high biodiversity and contain many protected species and several species that are threatened or near threatened with extinction. Research has indicated the presence of many species previously not thought to be found in this part of Borneo.

²⁰ In the past there was also a market in Europe but this is lost due to unknown reasons.

²¹ Peerson et al. 2002 p. 29.

²² Persoon et al. 2002.

²³ Peerson et al. (2002) p. 28-30.

²⁴ Morrogh-Bernard H, Husson S, Page SE, Rieley JO. (2003). Population status of the Bornean orang-utan (*Pongo pygmaeus*) in the Sabangau peat swamp forest, Central Kalimantan, Indonesia. *Biological Conservation* 110: 141-52. Cited in Harrison ME, Cheyne SM, Morrogh-Bernard H, Husson SJ. 2007. What can apes tell us about the health of their environment? A review of the use of orang-utans and gibbons as indicators of changes in habitat quality in tropical peat swamp forests.

There are 808 flora species within 128 plants families in Sebangau National Park. Among these taxa, 9 families were found to be dominant, which were Rubiaceae, Myrtaceae, Euphorbiaceae, Moraceae, Fabaceae, Cluciaceae, Cyperaceae, Annonaceae and Lauraceae²⁵. A total of 16 out of 808 species were unidentified, since their morphological characteristic was not present during study periods.

A total of 65 species of mammals have been identified in the Sebangau peat ecosystem (Morrogh-Bernard. 2009)²⁶. These include 9 species of primates, including the orangutan (*Pongo pygmaeus*), agile gibbon (*Hylobates albibarbis*) and proboscis monkey (*Nasalis larvatus*). Morrogh-Bernard (2009) also reported a total number of 154 species of birds have been identified in the Sebangau, on which are endemic to this habitat, e.g. storms stork (*Ciconia stormi*) and grey-breasted babbler (*Malacocincla albogulare*). Over 43 species of reptiles have been identified, including 22 snake species, 2 crocodilians, 3 turtles, 11 lizards and 3 frog species²⁷.



Figure 14 Bornean Orangutan (*Pongo pygmaeus*) (© Kahlert, WWF)

Aside from the orangutan; agile gibbons (*Hylobates agilis*²⁸) and red leaf monkeys (*Presbytis rubicunda*) appear to be common in the mixed swamp forest (MSF) and tall interior forest (TIF)

²⁵ LIPI and WWF. 2007. Flora of Sebangau National Park. Research report. LIPI – WWF Indonesia. Not Published.

²⁶ Morrogh-Bernard CH. 2009. Orangutan behavior ecology in the Sabangau peat-swamp forest Borneo. Ph.D. Dissertation. University of Cambridge, UK.

²⁷ Morrogh-Bernard CH. 2009.

²⁸ The agile gibbon occurs on Borneo and Sumatra as two sub-species. Recent studies suggest that these should be classed as separate species, in which case the Sumatran form would retain the name *agilis*. The Bornean species would become *Hylobates albobaris*.

habitat types. Pig-tailed macaques (*Macaca nemestrina*) are often seen in large groups in MSF within 2km from the forest-edge. Long-tailed macaques (*Macaca fascicularis*) are extremely common on all forested waterways (and also kept as pets in villages along the river). Silver leaf monkeys (*Presbytis cristata*) are also recorded. A population of proboscis monkeys (*Nasalis larvatus*) occurs on the lower reaches of the Katingan River (and possibly also on the Bulan River) although their preferred habitats of riverine and mangrove forest have been largely cleared. Local people report that proboscis monkeys also occur on the lower Sebangau and Bantanan Rivers. One sighting each of the nocturnal slow loris (*Nyctibus coucang*) and western tarsier (*Tarsius bancanus*) has been made.



Figure 15 Proboscis monkey (*Nasalis larvatus*). Endangered species. (© Martin Harvey / WWF-Canon)

Amongst the larger mammals, sun-bears (*Helarctos malayanus*) and bearded pigs (*Sus barbatus*) seem common, although pigs are hunted for meat. A brief assessment of signs indicating the ears presence of sun-by a sun-bear expert suggested they were common, although at roughly half the densities seen elsewhere. The large sambar deer (*Cervus unicolor*) is also hunted but still present. It naturally occurs at low densities and evidence is seen sporadically, including a record of one dead animal near the mouth of the Bangah River in 2001. Muntjac (*Muntiacus atheroides*) and mouse deer (*Tragulus javanicus*) prints (and vocalisations in the case of the muntjac) are also recorded from time to time. Prints of the leopard cat (*Prionailurus bengalensis*) are regularly seen, but the other felines, including the endangered clouded leopard (*Neofelis nebulosa*) and marbled cat (*Pardofelis marmorata*), have not been recorded since 1994. Civets were formerly sighted frequently but are rarely seen now due to habitat degradation; the animal cannot find enough fruit which is a major part of their diet. Several trapping studies indicate a large and varied small mammal population, notably rats, treeshrews and squirrels. There is some evidence that a feral domestic cat (*Felis felis*) population is established on the forest fringes. Furthermore, Hussons

and Morrogh-Bernard also recorded 182 bird species²⁹ using the various habitats of the Sebangau River catchment.



Figure 16 Bornean clouded leopard (*neofelis diardi*), Kalimantan, Indonesia (© Alain Compost./ WWF-Canon)

Peat swamp forests support a specialized subset of the lowland forest bird-fauna and some important wetland birds. There are 37 endemic species in Borneo, many of which are known to range in the tropical peat swamp forest. In addition, many of the species which have been sighted in the Sebangau River catchment are listed as near threatened, vulnerable, endangered or critically endangered by the World Conservation Union (IUCN), the Convention on International Trade of Endangered Species (CITES), and the US Endangered Species Act (ESA).

²⁹ The Island of Borneo has 358 recorded bird species.



Figure 17 Rhinoceros hornbill (*Buceros rhinoceros*) (© Alain Compost / WWF-Canon)

G1.4.8. High Conservation Values in the Project Zone

The entire project area is located in a National Park and according to the Indonesian HCV Toolkit³⁰, conservation areas (National Park, Wildlife Sanctuary, Nature Reserve, etc.) are HCV 1.1. Therefore, the entire project area has High Conservation Value. The remaining area in the Project Zone includes only the fishing shelters themselves and the Village of Kereng Bangkirai.

Based on relevant reports on biodiversity, socioeconomic conditions, biophysical parameters and the Sebangau National Park Management Plan, from the total of 13 sub-values, at least six other values (HCV 1.2, HCV 1.3, HCV 2.1, HCV 3, HCV 4.1, HCV 4.3) are present in the project area.

In the Indonesian HCV Toolkit, the phrase “globally, regionally or nationally significant” has been removed, but the definitions and criteria of the revised values, remain broadly consistent with the definitions of globally, regionally or nationally significant, as outlined in the Global HCV Toolkit. The value of HCV 2 becomes “Natural Landscapes and Dynamics”, where one of the related sub-values within the project area is HCV 2.1: Large Natural Landscapes with Capacity to Maintain Natural Ecological Processes and Dynamics. The identification of HCV 2.1 in the project area is based on the definition of a landscape where the core area is a forest block (or other natural landscape mosaic) with an internal core >20,000 ha surrounded by a natural vegetation buffer of at least 3 km from the forest edge. The map of the project area indicates that the area and natural forest inside is more than 20,000 ha. Hence HCV 2.1 is present in the project area.

³⁰ Consortium to Revise the HCV Toolkit for Indonesia. 2008. Toolkit for Identification of High Conservation Values in Indonesia.

The Indonesian HCV toolkit mentions that to determine if an ecosystem is rare or endangered, an evaluation is made comparing the historical, current and expected future extent of the ecosystem within the physiographic region where it occurs. If within a single physiographic region an ecosystem has declined in extent by 50% or more, or if it is expected to decline by >75% under future scenarios of forest conversion, then the ecosystem is considered endangered under HCV 3. If, as a result of natural factors or human intervention, an ecosystem constitutes less than 5% of a physiographic region, then the ecosystem is considered rare under HCV 3. Although a large proportion of natural land ecosystems in Indonesia are forest ecosystems, other aquatic ecosystems such as lakes and open swamps or marshlands are also being considered.

Another method to determine whether the area is endangered or not, is to use a decision tree table from the toolkit (see page 78-79 of the toolkit). The project area lays on the peat swamp ecosystem which has been degraded for years, with surface layers of organic matter (peat) > 25 cm or more on average. Peat land where some elements of natural vegetation remain and on which a large system of drainage canals has not been established. And amount of wooden vegetation biomass is more than 5 m³ per ha; the formerly Production Forests have not been totally clear cut or burned. The ecosystem is degraded, but (i) exists on fertile soil (in this case “still natural”), (ii) occurs close to natural forests with protected areas, and (iii) occurs in areas of low human population density with no large scale development plans. Based on the Precautionary Approach table for Kalimantan (HVC Indonesia Toolkit), peat swamp is considered an Endangered Ecosystem.

The area is a peatland ecosystem which has been proven important as a hydrology ecosystem. Based on the toolkit some wetland Ecosystems are considered HCV 4.1. Several studies on small watershed areas (less than 25 km²) have shown that forest can only prevent floods where rainfall is <100 mm/day. However, much of Indonesia experiences extreme rainfall with intensities exceeding this limit, which leads to floods. Because of this situation, wetland ecosystems, including swamp forest, peat swamps, mangroves, other swamps and lakes must be protected to maintain their function as a retarding basin. All wetland ecosystems that function as a retarding basin are considered HCV 4.1.

Forest or wetland areas can keep fires from spreading, and this confers very high value in fire prone areas. Densely forested regions and wetlands, when in good condition, have physical characteristics that make them resistant to fire, even during the dry season or during droughts related to the El-Nino phenomenon (like those in 1982/1983 and 1997). All such areas are potential HCV 4.3.

Other areas that function as fire break or buffer zone must also be protected, including e.g. intact peat swamp forest, other swamp forest types, open wetland/marshes other wetland ecosystem types, as well as green belts with various species of fire-resistant plants. Some areas inside the project are intact peat swamp forest. The restoration project has the objective to restore the ecosystem and hydrology function to be “natural” which will then be again an intact peat land forest ecosystem.

G2. Baseline Projections

G2.1. Land use scenario

The project area is currently affected by drainage waterways. Drainage canals are evident in the project area in 2004 SPOT imagery³¹ demonstrating that drainage by these canals occurred prior to 1 January 2008. A 2008 study showed that these annual and monthly water levels in the project area can drop deeper than the critical threshold of 40 cm below the peat surface as a result of drainage caused by the network of existing canals in the project area³².

The project area is located in a National Park where deforestation, logging, land use conversion, crop production, and grazing of animals are banned by law³³. The ban on these prohibited activities is successfully enforced by the National Park through regular monitoring as demonstrated by monitoring reports³⁴ and therefore baseline land use activities in the project area do not include deforestation, planned forest degradation, land use conversion, crop production, or grazing of animals.

No policies or regulations in Indonesia or Central Kalimantan require or imply the restoration of peatlands in the project area at the project start date. Sebangau National Park, the authority responsible for managing the park, does not have available funding for peatland restoration³⁵, therefore no restoration activities are planned in the absence of the project activity.

Modeling of hydrological conditions in the project area with SIMGRO software demonstrate that without the proposed project activity the average annual water levels during the crediting period will result in peat degradation and associated emissions as detailed in the Baseline Report³⁶.

This evidence demonstrates that the hydrology of the project area is affected by existing drainage waterways and will remain similarly affected in the absence of the project.

G2.2. Additionality

As per the selected VCS methodology, the VCS Tool: “Tool for the Demonstration and Assessment of Additionality in VCS Agriculture, Forestry and Other Land Use (AFOLU) Project Activities” is used to demonstrate project additionality as described below.

Step 1. Identification of alternative land use scenarios to the proposed VCS AFOLU project activity

³¹ VCS PD Annex 15 Scientific literature referenced: Siegert, F, Jaenicke, J, Wosten, H. 2009. Final Report: Planning hydrological restoration measures by canal blocking in the Sebangau water catchment, Central Kalimantan. Remote Sensing Solutions GmbH.

³² VCS PD Annex 15 Scientific literature referenced: Wösten, JHM, Clymans, E, Page, SE, Rieley, JO, Limin, SH. 2008. Peat-water interrelationships in a tropical peatland ecosystem in Southeast Asia. *Catena* 73: 212-224.

³³ VCS PD Annex 9 Legislation referenced: Law No. 5 of 1990

³⁴ VCS PD Annex 8 Leakage analysis: Sebangau National Park Monitoring Reports

³⁵ VCS PD Annex 13 Additionality: Sebangau National Park Annual Budget 2007-2011.pdf

³⁶ VCS PD Annex 2 Baseline report: Sebangau National Park Peat Rewetting Project: Baseline Report

Sub-step 1a. Identify credible alternative land use scenarios to the proposed VCS AFOLU project activity

Scenario 1. Continuation as protected area containing multiple canals throughout the proposed project area

Under this scenario the proposed project area is managed as a protected area under the authority of Sebangau National Park Office but no action is taken to block existing canals. Although the excavation of new canals is not expected due to enforcement of Law No. 5 of 1990³⁷ within the Park Boundaries, existing canals remain open, accelerating drainage of the peatland resulting in continuing peat degradation and associated greenhouse gas emissions.

Scenario 2. Continuation as protected area with canals dammed, reducing peat emissions in the proposed project area without being registered as a VCS AFOLU project

Under this scenario the proposed project area is managed as a protected area under the authority of Sebangau National Park Office. Actions to block existing canals are undertaken, increasing annual average water levels within the project boundary, thereby resulting in the reestablishment of ecological processes, functions, and biotic and/or abiotic linkages that lead to persistent, resilient systems integrated within the landscape.

Sub-step 1b. Consistency of credible land use scenarios with enforced mandatory applicable laws and regulations

The proposed project area lies within the boundaries of Sebangau National Park per Ministry of Forestry Decision Menhut-II/2004³⁸. According to Law No. 5 of 1990 on Natural Resource Conservation³⁹, parks are organized by a zoning system, in which parks may be demarcated into core zones (strictly protected; nonhuman-induced change permitted), utilization zones (for tourism and recreation), and “other” zones, including wilderness, traditional use, and rehabilitation (Articles 32-33 and elucidation). All land use scenarios identified in sub-step 1a are compatible with the proposed project area’s National Park status and therefore in compliance with all mandatory applicable legal and regulatory requirements. Extractive landuse scenarios, although common in the region (e.g. oil palm, timber plantation) would not be consistent with mandatory applicable laws and regulations.

Sub-step 1c. Selection of the baseline scenario

The selection and determination of the most plausible baseline scenario is detailed in Section 2.4 following the stepwise approach specified by the selected methodology.

The outcome of the stepwise approach to determining the most plausible baseline scenario in the project area demonstrates that the peatland within the project area is drained and will remain drained in the absence of the project.

STEP 2: Investment analysis

³⁷ VCS PD Annex 15 Legislation referenced: Law No. 5 of 1990

³⁸ VCS PD Annex 6 Legislation referenced: Ministry of Forestry Decree No. 423 Menhut-II/2004

³⁹ VCS PD Annex 15 Legislation referenced: Law No. 5 of 1990

Project additionality is demonstrated by investment analysis.

Sub-step 2a. Determine appropriate analysis method

The VCS AFOLU project generates no financial or economic benefits other than VCS related income. Therefore simple cost analysis is applied to demonstrate project additionality.

Sub-step 2b. – Option 1. Apply simple cost analysis

The costs and revenues associated with the VCS AFOLU activity and project revenues are described below.

Project costs

The first pilot dam was built in the National Park with assistance from WWF Indonesia in 2005⁴⁰. However, it soon became clear that the National Park budget allocated to the National Park by the Ministry of Forestry would by far not be sufficient to implement all the activities necessary for the rewetting activity.

The estimated costs for implementation of the project activities are detailed in the project financial analysis⁴¹. As evidenced by this document there are substantial costs associated with implementation of the project activity, and the Sebangau National Park budget does not contain funds to cover this activity⁴² even though rewetting activities are included in the National Park's management plan⁴³.

Funding sources and revenue

Together with WWF Germany, a plan was made to look for alternative financing options, possibly by attracting foreign sponsors. WWF Germany and WWF Indonesia have a long history of working together, Borneo being one of the focal regions for WWF Germany involvement. This led to the formulation of a proposal for a forest carbon project to a potential German sponsor⁴⁴. At the end of 2007, the proposal was successfully accepted by the German Sponsor, Deutsche Post⁴⁵. With sponsoring from Deutsche Post, the "Sebangau Biocarbon Project" was started as WWF's first REDD pilot project. The project area at that time encompassed the Bangah and Bakung watersheds. In 2009, the Deutsche Post sponsoring was complemented by the contribution of another sponsor, the Krombacher Brewery. Krombacher financed the rewetting activities in the Rasau watershed.

Project development activities have been funded by Deutsche Post and Krombacher through WWF Germany, in anticipation of generating a return on investment from sale of carbon

⁴⁰ VCS PD Annex 1 Additionality: Canal Blocking on Sebangau Peatland Ecosystem.pdf

⁴¹ VCS PD Annex 1 Additionality: Sebangau Peat Rewetting Project Financial Analysis.xls

⁴² VCS PD Annex 1 Additionality: Sebangau National Park Budget 2007-2011.pdf

⁴³ VCS PD Annex 13 Project management: Sebangau National Park Management Plan

⁴⁴ VCS PD Annex 1 Additionality: Sebangau Forest Carbon Project Proposal.pdf

⁴⁵ Deutsche Post, Germany's only universal provider of postal services is part of Deutsche Post DHL, the world's leading mail and logistics Group.

credits⁴⁶. Revenue to fund project implementation activities will be generated from the sale of carbon credits for the entire duration of the crediting period, as detailed in the project financial analysis⁴⁷. Sustainability of the project activities is further ensured by a fund set aside by the German sponsor that puts aside a specific amount of money for dam maintenance and monitoring for the next 30 years⁴⁸.

As the project activity produces no financial benefits other than VCS related income, the demonstration of additionality is concluded with an analysis of common practice in the geographical area of the proposed project activity.

Step 4. Common practice analysis

Activities similar to the one proposed as the VCS AFOLU project activity have been implemented in the project area, but on a pilot scale. A total of five demonstration dams were built to test the effectiveness of the proposed project activity⁴⁹. No other similar activities have been implemented previously or are currently underway in the region. Therefore similar activities have been observed but there are essential distinctions between the proposed VCS AFOLU project activity and the similar activities. Therefore, the proposed VCS AFOLU project activity is not the baseline scenario and is additional.

G2.3. Carbon stock changes

The only carbon pools that are accounted for within the baseline case are the aboveground tree biomass and soil carbon pools. Under the applicability conditions of the selected methodology, it is assumed that in the baseline scenario the carbon stocks in the aboveground tree biomass will be decreasing or stable due to increased chance of burning or tree death due to low water table levels. Therefore it is conservatively assumed that the change in aboveground tree biomass in the baseline is equal to zero.

Soil carbon stocks are expected to decrease in the baseline as a result of the decomposition of drained peat. CO₂ emissions from peat oxidation in the baseline were estimated considering the monthly mean average water levels relative to the peat surface in the project area and a CO₂ emission factor linking water levels to CO₂ emissions from oxidation specified in the selected methodology.

G2.4. Community without project

The Sebangau National Park would continue to exist as a National Park in the absence of the project. Community members in the project zone would continue to be able to access the National Park and conduct activities such as fishing and collection of NTFPs as described in section G1.3. However, the canals would continue to be undammed, thus resulting in peat decomposition and lowering of the peat surface over time. In addition, fire would likely be more prevalent as the peat layer would be drier, fostering conditions allowing for fires to take place. This increase in fire may reduce tree and vegetation biomass and reduce the ability to

⁴⁶ Funding agreements will be presented to the validator upon request

⁴⁷ VCS PD Annex 1 Additionality: Sebangau Peat Rewetting Project Financial Analysis.xls

⁴⁸ Funding agreements will be presented to the validator upon request

⁴⁹ VCS PD Annex 1 Additionality: Canal Blocking on Sebangau Peatland Ecosystem.pdf

produce jelutung sap, honey, and other NTFP such as rattan. The combination of a lowered groundwater level, peat decomposition and heavy fires will ultimately lead to the peat swamp forest ceasing to exist as a forest and the elimination of associated resources upon which communities depend for their livelihoods.

This type of scenario has been witnessed in the former mega rice project area, located on the east side of the Sebangau River. In this area, logging and drainage resulted in low water tables, tree death, and increased fires⁵⁰. Tree death and fires have reduced fish populations and NTFP production. The smoke from these fires also can impact community members' health. Respiratory disease caused by excessive smoke from fires is common in areas where fires are frequent⁵¹. Floods may also occur more frequently when peatland hydrological functions are degraded⁵².



Figure 18 Google Satellite view showing the Sebangau forest (left) next to the degraded area of the ex-megarice project (right)

⁵⁰ Boehm HDV, Siegert F. 2001. Ecological Impact of the One Million Hectare Rice Project in Central Kalimantan, Indonesia, Using Remote Sensing and GIS.

⁵¹ Heil A. 2007. Indonesian Forest and Peat Fires: Emissions, Air Quality, and Human Health. PhD thesis, Max Planck Institute for Meteorology, Hamburg. Cited in Harrison ME, Page SE, Limin SH. 2009. The global impact of Indonesian forest fires. *Biologist* Vol 56, August 2009, pp 156-163.

⁵² Siegert F, Boehm HDV, Rieley JO, Page SE, Jauhainen J, Vasander H, Jaya A. 2001. Peat fires in Central Kalimantan, Indonesia: Fire impacts and carbon release.

G2.5. Biodiversity without project

The construction of canals and associated drainage will have a negative impact on biodiversity in the baseline. According to Chambers (1979)⁵³ and Care (2005)⁵⁴, the reduction in ground water levels relative to the peat surface will cause peat drying and subsidence. As the depth of dry peat increases, the elevation of the peat surface decreases through subsidence and decomposition, exposing the roots of trees and making them more susceptible to damage. In addition, the dry peat is inferior to wet peat in securing the roots. This then results in trees falling over during wind or storms, resulting in lower tree biomass over time.

The continued dry state of the peat will impact the integrity of the habitat and environment in the surrounding project zone. Peatland contains a pyrite compound (FeS_2) and under wet conditions, this compound is stable but when the peat is dry the compound is oxidized (Mohammad Noor, 2000)⁵⁵ producing sulphate acid. This increased water acidity reduces water quality and impacts the species living in the water (Jonotono, 2005)⁵⁶. Additionally, the alteration from anaerobic to aerobic conditions allows for the increase in the activity of *Thiobacillus thiooxidans* and *T. ferrooxidans*, and it will accelerate oxidation of FeS_2 .

Peat has a very high water holding capacity, being able to hold as much as 300-800% of its weight in water, but it also is able to release this water as the water table lowers (Wahyunto, 2005)⁵⁷. However, this characteristic will disappear if the peat land becomes dry as a consequence of the vegetation loss or the decline in water table (Ng Tian Peng & Ibrahim, 2001)**Error! Bookmark not defined.** In the National Management Policy of Peatland of 2005⁵⁸, the peat swamp is considered to as have both direct and indirect impacts on humans. The peat swamp is important for biodiversity as well as for control of flooding, absorbing excess water during the rainy season and distributes it during the dry season.

The location is also an important habitat for orangutan. Degradation of the natural ecosystem in the location means a loss of orangutan habitat, and in the end would lead to the elimination of the species in this location. Study of orangutan habitat and distribution in Sebangau has been done by many researchers, including Suryadiputra (2004)⁵⁹, Nelleman (2007)⁶⁰, Suhud (2009)⁶¹, Kreveld (2009)⁶², Panda (2010)⁶³ and Wich (2011)⁶⁴. The baseline data provided by

⁵³ Chambers MJ. 1979. Rate of Peat loss on the Upang transmigration project South Sumatra. Paper A17. Proceedings of National Symposium III on Development of Inundate Areas, Palembang, 5-10 Februari 1979.

⁵⁴ CARE International – Indonesia. 2005. Peat Land Management through Sustainable Agriculture. Paper presented at the Peat Land Sustainable Management Workshop, Palangka Raya, 10-13 May 2005.

⁵⁵ Noor M. 2000. Peat land Agriculture, Potentials and Constraints. Kanisius, Yogyakarta.

⁵⁶ Jonotono, Budiman A. 2005. A Review of Natural Forest in Kampar Peninsular Proposed as A Conservation Area, WWF Indonesia – Riau.

⁵⁷ Wahyunto et al. 2005.

⁵⁸ Directorate General of Forest Protection and Nature Conservation/PHKA

⁵⁹ Suryadiputra INN, Dohong A, Waspodo RSB, Muslihat L, Lubis IR, Hasudungan F, Wibisono ITC. 2004. A guide to canal Blocking; In a conjunction with community. Wetlands International-Indonesia Programme and Wildlife Habitat Canada.

⁶⁰ Nellemann C, Miles L, Kaltenborn BP, Virtue M, Ahlenius H. 2007. The last stand of the orangutan – State of emergency: Illegal logging, fire and palm oil in Indonesia's national parks. UNEP, GRID-Arendal.

⁶¹ Suhud M, Saleh C. 2007. Climate Change Impact on Orangutan Habitat, WWF-Indonesia.

2006-2007 surveys, using more conservative values for the nest decay rate, estimated that about 5,400 orangutans are still found in Sebangau National Park.⁶⁵

G3. Project Design and Goals

G3.1. Major climate, community and biodiversity objectives

Project activities achieve net GHG emission reductions by raising ground level waters in the project area through a canal blocking system whereby dams are established in drainage canals. Raising water levels in the peatland results in lower CO₂ emissions from peat oxidation. The rewetting of the peat is also expected to result in positive impacts on communities and the biodiversity inside the project boundary and its surrounding areas. Expected positive impacts include improved fish and wildlife habitat that has been degraded. The project creates safeguards to ensure that project activities do not have a negative impact on communities and biodiversity.

The overall canal blocking system was designed considering the unique characteristics of peatland which include low bearing capacity and high permeability of the peat, irregular rainfall, and the use of canals for fishing and transportation of *jelutung* sap by the local people. The dams will hold the water and cause the ground water table to rise, as well as water in the canals. This increased water level in the canals allows community members to be able to travel by boat farther into the project area than previously, thus increasing access to fishing and other NTFPs. Fishermen have also found that the blocking of the canals has allowed small lakes to be re-filled with water, creating highly suitable fish spawning habitats, thus increasing fish stocks in the area.

In a longer term, rewetting the area will recover the local ecosystem, which is the natural habitat of the orangutan. Ecosystem recovery will enable the regrowth of local tree species, including trees that are important sources of food for orangutan.

⁶² Kreveld A, Roerhorst I. 2009. Great Apes and Logging. WWF.

⁶³ Panda A, Pamungkas B, Ancrenaz M. 2010. The Population Status Of Bornean Orang-Utans (*Pongo pygmaeus Wurmii*) In Sebangau National Park Central Kalimantan Indonesia. Paper Presented on International Workshop on Orangutan Conservation, Bali 15-16 July 2010.

⁶⁴ Wich SA, Vogel ER, Larsen MD, Fredriksson G, Leighton M, Yeager CP, Brearley FQ, Schaik CP, Marshall AJ. 2011. Forest Fruit Production Is Higher on Sumatra Than on Borneo. PloS ONE Vol. 6, Issue 6, e21278, 2011.

⁶⁵ Panda et al. 2010.



Figure 19 Local woman collecting *jelutung* sap in the forest (© Kahlert, WWF)

G3.2. Project activities

Project activities achieve net GHG emission reductions by raising ground level waters in the project area through a canal blocking system whereby dams are established in drainage canals. The overall canal blocking system was designed considering the unique characteristics of peatlands: low bearing capacity and high permeability of the peat, irregular rainfall, and use of canals for transportation by the local people. A cascade of dams, more appropriately called “water retarders”, with relatively small distances between the dams (for instance 500 m) is used to avoid too much head difference over the dam. Experience and computer simulations with an unsteady-state simulation model show that head differences in the relatively small canals or “parits” with an average width of 2 m and an average depth of 1 m should be 25 cm maximum. Ignoring this principle can result in dam failure during periods of high water discharge during the wet season.

The construction of a cascade of relatively simple dams reduces water velocity in the canals. In turn this limited water velocity stimulates sedimentation of mineral and organic particles in the part of the canal upstream of the dam while also reducing erosion of the canal walls as well as the dam. The blocking is best started at the upstream part of the canal to avoid too much discharge and thereby gradually decreasing the pressure on the dams constructed further downstream in the canals. Locally available materials, i.e. gelam poles and peat (gambut) etc., are used to avoid too much load/weight. The principle is that the on-going consolidation of the peat layer under these structures should be approximately equal to the total, unavoidable subsidence of the surrounding area. The practical consequence of this principle is that the overburden pressure should be very low (e.g. for a water table of 0.25 m

the overburden pressure should not exceed about 1 kPa or 100 kg/m². Use of locally available material also has the clear advantage that it is practical and inexpensive as no new construction material needs to be transported to the dam building site.

Construction of a simple dam in the Timba canal in Rasau watershed is shown in Figure 20.



Figure 20 Construction of a simple dam in the Timba canal of Rasau watershed

The ultimate aim of the canal blocking system is to accelerate the process of canal filling to restore natural peat forming conditions with average water flow of 30m/day. As indigenous materials, i.e. peat, above the groundwater level will oxidize and even gelam poles have a limited lifetime when they are not permanently water saturated, vegetation growth on the dam and in the blocked canal sections should be stimulated to ensure more permanent clogging of the canal system. Dams are designed in such a way that vegetation can easily re-grow thereby restoring natural conditions. Natural clogging up of the canal system with original peat forming vegetation requires a long period of time. The canal blocking system accelerates this process and reduces peat subsidence compared to the baseline condition.

The project activity is implemented according to the following steps outlined below:

STEP 1: Selection of locations for dam establishment

Following mapping of waterways, canals were prioritized for damming based on their physical characteristics and economic uses. The selection of locations for dam establishment is summarized here and described in further detail in Section 4.2.1.1 of the VCS PD. The number and location of dams for blocking was determined based on an analysis of the surface slope along each waterway chosen for closure together with an average hydraulic head difference, i.e. difference between upstream and downstream waterway water level across a dam. It is recommended that long waterways in the larger waterway classes be assigned a higher

priority for blocking than smaller waterway classes. The optimal location of large permanent dams was determined by the practical use of the waterway and the condition of the canal. After building permanent dams, cascades of simple small dams were installed. Simple small dams were installed according to optimal waterway locations and canal conditions. For small dams the measured or DTM-derived slopes for each identified waterway were used to calculate optimal spacing of dams within a cascade.

STEP 2: Dam construction

Prior to dam construction, the objectives of the dam building activity and benefits to local communities were discussed with communities living around the selected dam location. The steps in dam construction and the concept behind canal blocking and peat rewetting were also explained to the community.

The main steps in construction of both permanent and simple dams are summarized here.

Permanent dams consist of frames of dimensional lumber and two panels of wooden planks. The space between the two panels is filled with sacks of mineral soil. Standard bulkhead dimensions are 1.6 m width, 1 m height, and 1.5 m length but may be adjusted to the dimensions of the canal. Construction lumber is local material such as belangeran or gelam and obtained from local sawmills.



Figure 21 Dam in Rasau

Simple dam frames are built with local materials such as gelam poles. The dam frame is filled with additional gelam poles, guaze, canvas, and bags filled with peat material. Natural materials (e.g. litter and sediment) accumulate around the dam, accelerating the process of canal blocking.

A total of 434 dams have been constructed.

STEP 3: Monitoring

Following construction dams are periodically monitored to ensure that no damage has occurred. Damaged dams are repaired. In addition, ground water levels are monitored to

evaluate the effect of canal blocking on ground water levels in the peatlands. Blocking of canals with multiple dams can be considered successful if the blocked canal sections also hold water during the dry season.

G3.3. Project location

Location of project activities, i.e. dam construction and ground water level monitoring, is shown in Figure 22. The map includes the Project Area, as well as the Project Zone where the affected communities live and do their economic activities.

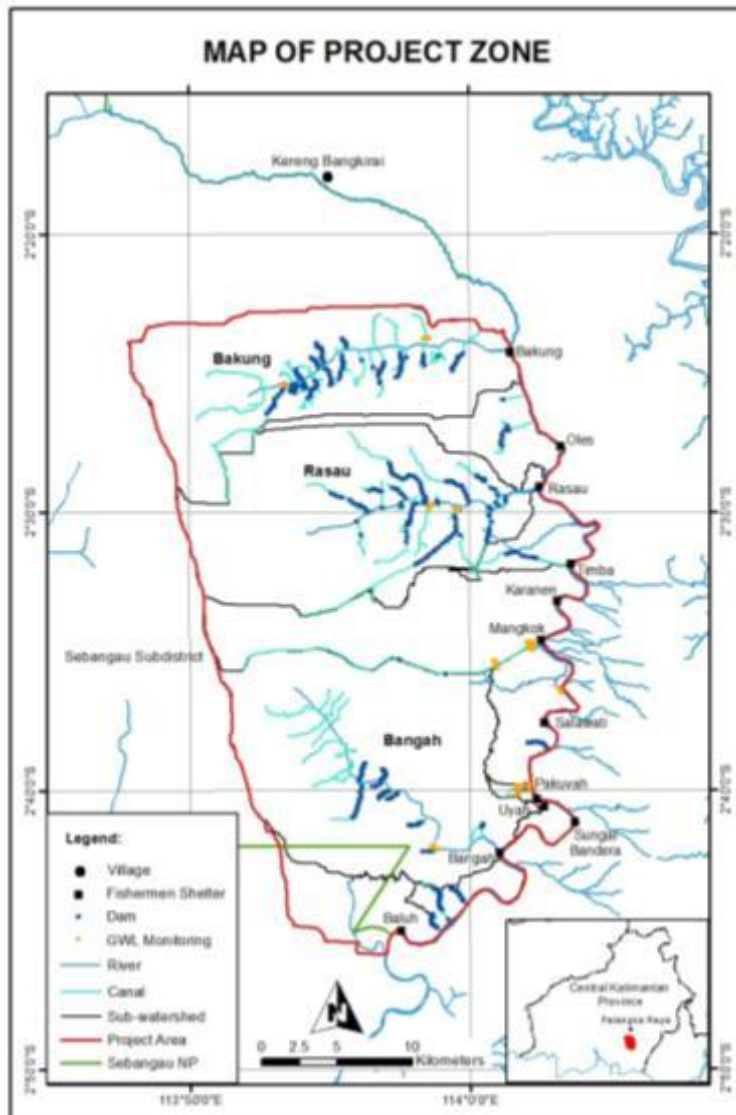


Figure 22 Location of project activities and its surrounding

G3.4. Project period

The project start date is December 22, 2008 which is the date dam construction commenced leading to the generation of GHG emission reductions. The project crediting period is 30 years, ending on December 22, 2038.

G3.5. Risks and mitigation measures

The project is located in Sebangau National Park where, due to the protected status of the Park, activities that may cause reversal of GHG emission reductions following the construction of dams, such as destruction of dams and creation of new drainage canals for illegal logging activities are prohibited by law. Dams construction was conducted with the fishermen in the area, who mainly rely on fishing for their livelihoods. Design of the dams was based on consultation with the fishermen. Dams are built with a spillway in canals that are used by the communities for fishing or entering the park for harvesting NTFP. Solid dams are only built in the areas where the fishermen have no interest for fishing. Dams with a spillway also serve community members who collect *jelutung* sap. However, it is possible that dams could be damaged either by people who are illegally trapping commercial birds or by people accidentally crashing into the dams when transporting *jelutung* sap. Also, dams are being flooded and/or scoured in some wet seasons with high water levels. Therefore dam monitoring and maintenance is a part of the Project Management Plan.

The monitoring plan includes patrols by the National Park authority along with joint patrols by the fisherman. According to the Sebangau National Park Office annual workplan, there are 12 regular patrols per year. Each patrolling activity lasts for 5 days, involving 3 National Park personnel⁶⁶. Apart from the patrols described in their yearly operational plan, there will be additional supervision of any activity involving external visitors as well as WWF's regular activity in the project area, so that the frequency and extent of patrols will be sufficient to demonstrate that control is maintained over the land on which the project is taking place. In addition to monitoring the condition of the dam, this patrol also is expected to reduce other illegal activities. From the sponsoring of this project, a special account has been set up that puts aside the financial means for 30 years of dam maintenance – with a pre-determined amount to be annually made available to the National Park authorities through WWF.

The river holders and fishermen, as well as collectors of non-timber forest products maintain their use rights, for under the Sebangau National Park zoning system they are still allowed to do limited activities such as sustainable harvesting of NTFPs. As well, the local *Damang Kepala Adat* (Customary Chief) has agreed to the strengthening of customary laws on natural resource utilization and environmental management to prevent unsustainable practices implemented by outsiders such as electro-fishing. The enforcement of customary laws will complement the formal regulation of the National Park management. Customary laws will provide a local mechanism to prevent misuse of natural resources in the area, as well as applying sanctions on those who cause fires and who destroy fishing gear.

G3.6. Maintenance of High Conservation Values

Historically the area within the project boundary had been selectively logged prior to the establishment of Sebangau National Park. With the continued protection of the project area and the rewetting of the peat, it is expected that tree biomass will increase, the number of trees and other flora species will increase, and the natural peat swamp forest habitat will be

⁶⁶ Demonstrated in Sebangau National Park Annual Budget of 2011.

improved over time. It is expected that this improved habitat will allow for an not only the maintenance but also the enhancement of the High Conservation Values defined in Section G1.

G3.7. Benefits beyond project lifetime

Sebangau National Park Office, as the project proponent, is the official government body with authority and management responsibility for the Park which includes the project area. The Sebangau National Park Office has a long term 20-year National Park Management Plan (2007-2026) which is reviewed every five years. The hydrological restoration of the peat swamp forest is accomplished with carbon finance. Biophysical monitoring is included in the Project Management Plan to support the restoration and its impact.

As described in section G3.2, the construction of the dams accelerates the process of canal filling. Based on previous experience, it is expected that the canals will be filled prior to the project end date. The benefits in terms of increased biodiversity and improved livelihoods for communities in the Project Zone are expected to continue beyond the project lifetime.

G3.8. Stakeholders consultation

In 2004 the project proponents began consultation on dam construction with former “owners” of canals that still live in the project zone and families holding customary rights to the tributaries of the Sebangau River in the project area. After the holders of rights to the tributaries agreed to the plan, the appropriate dam design was negotiated with the community members who utilize the canals. In the canals that are used by community members for fishing or to access NTFPs, the dams were built with a spillway that allows access for the types of boats used in this area (called permanent dam). In areas where the community was not interested in using the canals for any activity, the dam was blocked across the entire channel width (called simple dam). Figure 23 shows simple and permanent dam design.



Figure 23 Simple dam (on the left) and permanent dam (on the right)

Figure 24 show the locations of simple and permanent dams in the three subcatchments.

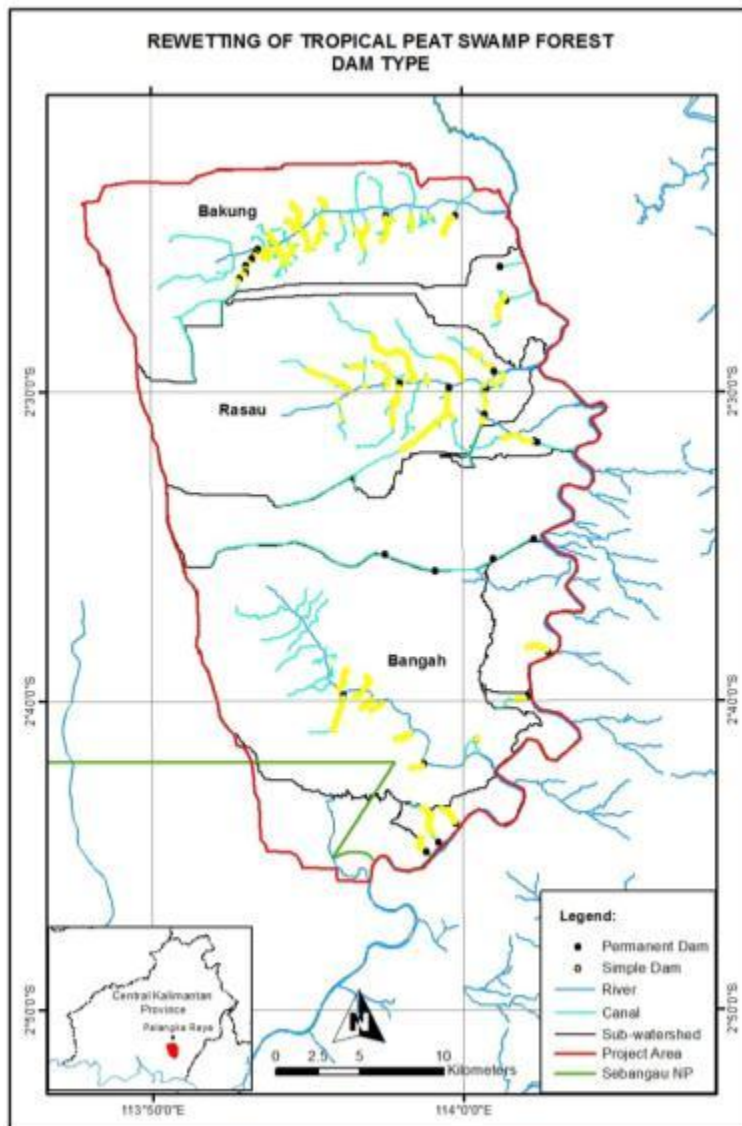


Figure 24 Location and type of dams in Bakung, Rasau, and Bangah Subcatchments

After an agreement was made with the river holders, a meeting with the broader stakeholder group was held to develop an understanding among parties in April 2012. The parties involved included Customary Chiefs, Village Governments, Village Consultative Bodies and Community Forums in the area. A memorandum of understanding was signed by 12 representatives of the parties⁶⁷. The agreement contained the following:

1. Endorsement for registration of the project with the Ministry of Forestry as a REDD+ Demonstration Activity.
2. Requirement of the project proponent to update the parties involved on the progress of the REDD+ activity.
3. Further discussion on the distribution and utilization of compensation for any carbon offsets generated by the activity.

⁶⁷ See supplementary document: MoU Among Primary Stakeholders of Sebangau DA REDD.pdf

4. In order to ensure the sustainable benefits of the project, the parties in their respective capacity will control the activities that could thwart efforts to reduce greenhouse gas emissions and restore the natural peatland ecosystem which is important for local livelihoods.

A communication and grievance mechanism has been developed and will be implemented during the project period⁶⁸. The mechanism was developed with the following goals:

- Provide an effective means to convey information about the project to the relevant stakeholders.
- Provide a clear means for the community to express their concerns to the project proponent.
- Provide clear and definite procedures for handling complaints.
- Provide effective procedures to resolve disputes between the community and project proponent if any problems occur in the preparation and implementation of the project.

G3.9. CCBA comment period

The final Project Document will be translated into Indonesian and distributed to the primary stakeholders including river holders and fishermen in the area, Village Community Institution and Village Representative Board, Village Governments, Community Forums at Sub-district level, Customary Chiefs and Sub-district Governments.

During a three months period stakeholders are allowed to give their comments and inputs.

Plan to get public comments:

- Project Design Document posted on the CCBA website during the public comment period, starting at the end of October 2012, with announcement through WWF website and notification via mailing lists
- Local stakeholders meeting

G3.10. Conflict resolution and grievance mechanism

If possible, any complaints and disputes will first be solved at the lowest level of coordination which are the Post Units. Customary elders will help in solving matters involving local customs. There are *Mantirs* at village level and *Damangs* at Sub-district level that serve as the customary authorities. If resolving the matter requires a higher level of authority, it will be addressed in Section Units and if necessary with the National Park Management Unit. Disputes that cannot be resolved at the National Park Management Unit level will be brought to the State Court. The conflict resolution and grievance mechanism is illustrated in Figure 25.

⁶⁸ See supplementary document: Sebangau DA REDD Communication and Grievance Mechanism.pdf

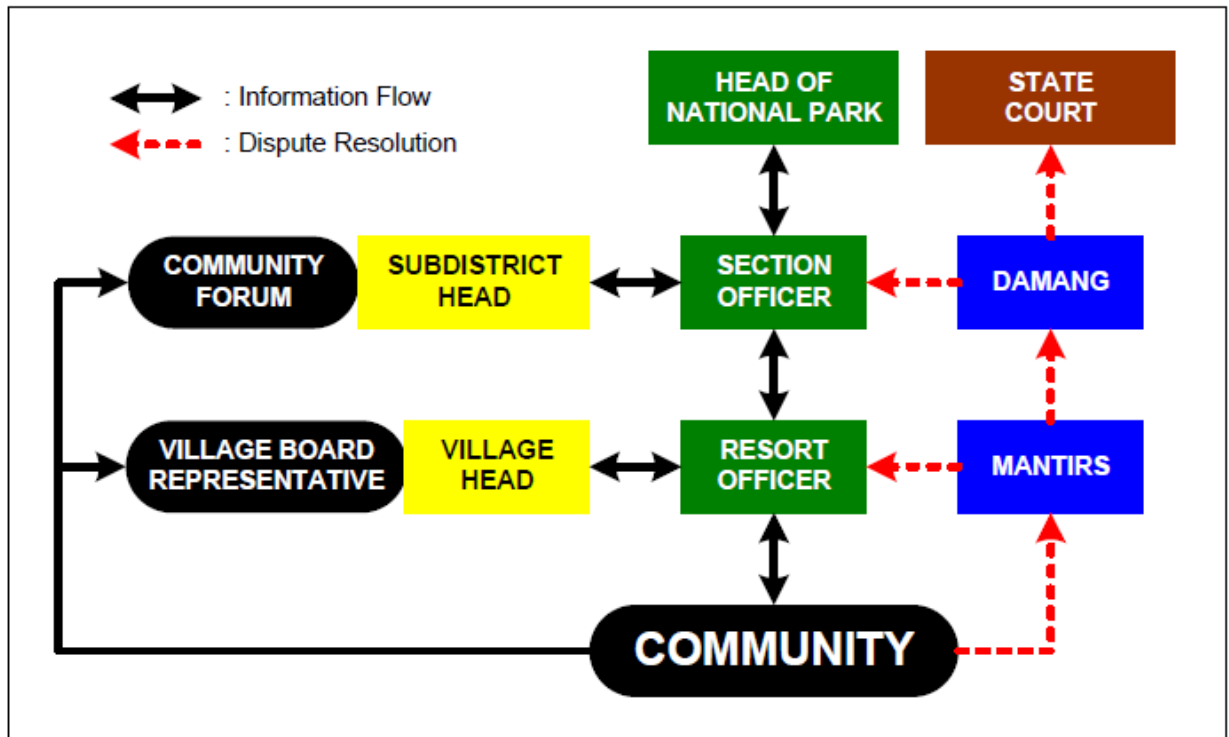


Figure 25 Sebangau National Park Peat Rewetting Project Communication and Grievance Mechanism

Adjustments to project activities will be made as needed based on issues raised by stakeholder through the conflict resolution and grievance mechanism.

G3.11. Project financial support

The seed money for the carbon project, i.e for project design, methodology development, and scientific background analyses, as well as for the field activities has been provided by two German Sponsors. Contracts are considered confidential, but can be provided to the certifier at request.

It is expected that the project will generate carbon credits after December 2012. Income from compensation for carbon offsets is needed for maintenance of the dams, restoration of the peat forest, fire prevention, capacity building, community development, hydrological monitoring, and social and biodiversity monitoring.

WWF Indonesia, which has assisted in the preparation stage will immediately hand over the management of the project to the National Park authority in 2013. However, WWF Indonesia will continue to provide technical assistance in the implementation phase of the project. Sustainability of the project activities is further ensured by a fund set aside by the German sponsor that puts aside a specific amount of money for dam maintenance and monitoring for the next 30 years.

G4. Management Capacity and Best Practice

G4.1. Project proponent

Sebangau National Park Office is a government authority with responsibility for management and protection of the National Park where the project is located. The Office will coordinate the registration of the project at the national level with the Ministry of Forestry and with voluntary market standards (VCS and CCBS). The office will also conduct project monitoring. In its implementation the National Park Office will coordinate closely with the Directorate of Conservation Areas and Protected Forests Environmental Services, as the Project Coordinator at national level. WWF Indonesia as partner of the project proponent also provides support to project facilitation, technical assistance for project design and implementation. WWF Germany provides the expertise and technical backstopping of the carbon project management.

G4.2. Technical skills

Management of the project is under the coordination of Sebangau National Park Office, which is fully supported by WWF Indonesia in both technical support and capacity building. WWF Indonesia has been working on conservation programs in Indonesia since 1961, and has developed a program management capacity in 26 provinces. WWF Indonesia in turn is being supported by WWF Germany in terms of design, implementation and management of the carbon project. WWF Germany has developed forest carbon pilot projects since 2007.

Key capacities of the project management team include:

General Project Management

Key technical skills: Peat hydrology, tropical peat ecosystem, REDD policy, project management, leadership, English literate, budgeting, report writing, team building, analytical thinking, presentation skill, achievement oriented, organizational awareness.

Community Engagement

Key technical skills: Communication and facilitation skill, community development, participatory approaches, conflict management, bridging leadership. For social studies local expertise i.e. from Christian University of Palangka Raya and Palangka Raya University were engaged.

Biodiversity Assessment

Key technical skills: Ecosystem mapping, biodiversity survey (particularly on key species e.g. orangutan), forest cover mapping. For forest cover mapping, remote sensing experts from Palangka Raya University were engaged.

Project Activities

Key technical skills: Communication, community organization, project management (including budgeting, scheduling activities, monitoring and progress report writing).

G4.3. Capacity building

The project opens job opportunities for local communities. Kinds of jobs available include: (i) regular compilation of ground water level data; (ii) monitoring dams condition; (iii) maintenance of the dams; (iv) planting and replanting; (v) monitoring of tree survival rate and growth. Maintenance of the dams and planting and monitoring of growth and survival rate are usually done by hired group(s) of local workers. They are only hired for a certain job, and not permanently. In most cases the workers already have the technical skills needed for this type of work. A technical briefing is provided before the fieldwork so as to ensure the quality and accuracy of the work expected.

Regular compilation of ground water level data and monitoring of the dams would be available as regular or permanent jobs. It requires simple skill to do, and it is expected that a graduate from Lower Secondary School (SLTP) or Higher Secondary School (SLTA) can do it well. Government statistical data in 2010 shows that 50% of job seekers in Palangka Raya Municipality (the nearest settlement to the project zone) have graduated from Higher Secondary School, and 15% from Lower Secondary School. The same statistical data also reveals that the highest percentage of education level in Palangka Raya is Higher Secondary School (29%), followed by Lower Secondary School (22%) and Primary School (19%); while only 12% graduated from university.⁶⁹

Technical training for the permanent workers will be carried out by their respective supervisor. A simple visual guide book will be produced as to provide hands on guidance in the fieldwork. If there is turnover, the new worker will be trained individually by the supervisor, and equipped with the guide book.



Figure 26 WWF/NP Field station at SSI canal is used for workshops with the local communities, school classes and other training and capacity buliding purposes. A model of a canal with dam is shown. (© Kahlert, WWF)

⁶⁹ Regional Planning Agency and Central Bureau of Statistics of Palangka Raya City. 2010. Palangka Raya City in Figures.

G4.4. Community employment opportunities

Vacancy of available jobs is announced in the nearby villages. Aligned with local social character, there is a principle to prioritize local recruits as far as possible. The mode of publication is be consulted with the Village Government and community leaders, in order to most effectively reach the whole community. Selection is be made by project staff of Sebangau National Park Office and the staff of Village Governments, as they know the personal quality of the applicants. A test would be held on technical skills. The selected applicants are communicated to the Village Government, for they help in fostering the workers to develop their capacity on their respective jobs.

G4.5. Workers' rights

Regulations applicable to workers' rights are listed below:

- Law No. 13/2003 on Employment: Basic regulations of employment in Indonesia.
- Law No. 80/1957 on Ratification of ILO Convention 100 on Equal Remuneration: Endorsement to follow international convention on the principle of equal remuneration for male workers and women for work of equal value.
- Law No. 1/1970 on Safety at Work: Every worker on the job and any other person in the workplace are entitled for protection and safety.
- Law. No. 7/1984 on Ratification of Convention on the Elimination of All Forms of Discrimination Against Women: Guarantee that all citizens shall be equal before the law and government, so that all forms of discrimination against women should be abolished because it is not in accordance with Pancasila (ideology of the nation and the source of all law in Indonesia) and the 1945 Constitution, and thus endorse the related international convention.
- Law No. 20/1999 on Minimum Age of Employment: Endorsement of ILO Convention No. 138 on the same subject.
- Law No. 21/1999 on Discrimination in the Employment and Occupation: : Endorsement of ILO Convention No. 111 on the same subject.
- Law No. 11/2005 on Ratification of International Covenant on Economic, Social and Cultural Rights: According to the nature of the Republic as a country that upholds human dignity and ensuring equality of all citizens within the law, and the desire of the nation to continuously promote and protect human rights, the government endorse the related international covenant.
- Government Regulation No. 8/1981 on Protection of Wages: Regulates the fairness of wages, including prohibition to discrimination of wage between male and female worker.
- Government Regulation No. 15/2007 on Procedures of Employment Information and Manpower Planning: Regulates the compilation of information on employment and the plan to provide demanded manpower up to District/Municipality level.

- Governor Regulation No. 26/2011 on Provincial Minimum Wage And Provincial Sectoral Minimum Wages in 2012: Set sectoral minimum wage in the Province of Central Kalimantan, which is updated every year.

Workers are being informed of their rights on the first day of their employment, and a staff with legal expertise will ensure compliance with existing regulations.

G4.6. Worker safety

During the construction of the dams the workers face the risk of injuries from the use of the equipments. Wildlife in the project area also adds the risk of the worker. Bees are abundant in the location, while snakes are also sometimes encountered. Crocodiles, though rare, can be encountered in the main river.

Except for the risk of injuries at dam construction, the risks to the workers do not differ from the risks they encounter in their usual work as fisherman or gatherers of NTFP.

Information on the risks are provided to the workers on the first day of their employment. First aid kit are always available at the fieldwork site, and for serious injuries the workers would be transported to the hospital (2 hours by speed boat at the farthest workplace). Annual life insurance is also provided to the permanent workers.

G4.7. Financial health of implementation organization

Almost all of project preparations were funded under agreements between WWF Germany and German project investors. Technical design of the project, methodology and PDD development, as well as validation and verification processes are being coordinated by WWF Germany, while data collection and dam construction are being implemented by WWF Indonesia.

G5. Legal Status and Property Rights

G5.1. Compliance with national and local laws

The Government of Indonesia is using a phased approach for REDD+ implementation. The key steps in this process are preparation, transformation and full implementation. Five key activities are currently being conducted in the preparation phase: development of REDD+ institutions, development of a National Strategy on REDD+, development of an entity and system to manage MRV, development of a financial mechanism for distribution of benefits, and development of criteria to choose two pilot provinces. The transformation phase started at the beginning of 2011 and will run through to 2014. Full implementation is planned to start in 2015. The national policy and program on REDD+, once implemented, will have many implications for voluntary REDD+ projects in Indonesia and adjustments to the Project to reflect these new policies might be required in the future.

Below we provide a summary of the laws and regulations relevant to voluntary REDD+ projects which are currently in effect and operational in Indonesia.⁷⁰

Legislation	Brief description	Implications and compliance
Law n° 5 of 1990 on Natural Resource Conservation	This law addresses management of ecosystem and biodiversity protection areas, including national parks. Management of national parks is under the authority of the central government. National parks are organized by a zoning system, in which parks may be demarcated into core zones (strictly protected; nonhuman-induced change permitted), utilization zones (for tourism and recreation), and “other” zones, including wilderness, traditional use, rehabilitation, and other uses (cf. articles 32 and 33). Buffer zones outside the protected areas may be privately held, but they are still subject to government dictated management practices (cf. elucidation to Article 16.2).	The Sebangau National Park is overseen by the DG PHKA within the Ministry of Forestry. While zoning of the Sebangau National Park has not been determined yet, the close coordination and involvement of the Ministry of Forestry secures that final zoning attribution will be coherent with the development of the Project.
Act n° 41 of 1999 on Forestry	This is the basic forestry law in Indonesia. According to this Law the state exercises <i>a priori</i> full rights over forest land (cf. preamble and article 1). Conservation areas such as national parks are overseen by DG PHKA, whereas the national park offices are responsible for directly managing the parks.	The Sebangau National Park Office is the entity with direct responsibility for the National Park and reports directly to the DG PHKA.
Ministerial Decision Letter n° 56/2006 on Zoning within National Parks	This Decision determines how different zones can be developed in national parks and what can/cannot be done in each zone (core, sanctuary, wilderness, etc.) within the park. No activities other than	The zoning of Sebangau National Park has not been determined yet. However, the activities allowed within the core zone of a national park include protection and

⁷⁰ We note that some regulations related to forest carbon and REDD have been enacted in Indonesia but have never been made operational. These regulations lack the necessary implementing legislation to be made effective.

	<p>research are allowed in the core zone. Limited activity is allowed in the wilderness zone, including environmental services and activity that supports the functions of the core zone. Activities in other zones vary depending on local conditions (article 7).</p>	<p>security, inventory of biodiversity and ecosystem, R&D, science and education. We would argue this project falls under the protection and security of the ecosystem of the park and therefore it is in compliance.</p>
<p>Ministry of Forestry Regulation n° 68/2008 on the Implementation of Demonstration Activities on REDD</p>	<p>This Regulation deals with the implementation of demonstration REDD activities. It foresees the implementation of pilot projects “to test and develop methodologies, technologies and institutions” for a maximum period of 5 years (cf. articles 2 and 5.6). Recognized project proponents are the government, timber licensees, and other right holders, including indigenous right holders and “forest management units” (cf. article 1.6). Proponents are allowed to cooperate with partners such as international agencies and the private sector (cf. article 1.7). All demonstration activities need to be authorized by the Ministry of Forestry.</p>	<p>WWF has an agreement with the Ministry of Forestry, from April 2011, on REDD demonstration projects in Sebangau National Park, in implementation of Regulation no° 68/2008.</p>
<p>Ministerial Decree n° 30/2009 Implementation Procedures for REDD</p>	<p>This Decree specifically authorizes REDD activities in conservation forest areas (cf. article 3). The decree contains guidelines for location selection (cf. appendix 2), plan submission (cf. appendix 3), setting reference emission levels and measuring forest cover/carbon stock (cf. appendix 5), and guidelines for verification and certification (cf. appendix 6) and elaborates on data requirements and procedures to register a REDD project with the Ministry of Forestry (see decree</p>	<p>Sebangau, being a national park, is deemed a conservation forest area by article 29 of Law n° 5/1990 and Ministerial Decree n° 423/2004. The REDD Commission established by this Ministerial Decree is not, in fact, operational. Therefore the Agreement WWF has with the Ministry of Forest for the implementation of REDD activities in</p>

	generally). Implementation of REDD, including assessment of REDD proposals, review of monitoring and verification results, and issuance of Carbon Emission Reduction Certificates is the responsibility of a REDD Commission established by the Minister (cf. articles 1, 12, 18-19). The future of this Decree is uncertain because currently the government is developing an MRV institution to manage a carbon accounting and reporting system.	Sebangau from April 2011 should be sufficient.
Presidential Decree n° 61 of 2011 on the National Action Plan for Greenhouse Gas Emission Reduction	This Decree stipulates core and supporting activities designed to reduce natural and anthropogenic greenhouse gas emissions as part of Indonesia's larger development strategy and in light of Indonesia's international commitments to reduce GHG emissions. One of the strategies is to reduce GHG emissions from deforestation and forest degradation, including through peat land management (Article 2). Sebangau is one of the projects authorized by this Decree (see Attachment 1, Core Activities, authorizing two REDD demonstration activities in peat forest conservation areas in Central Kalimantan and Jambi provinces).	No provisions explicitly dealing with carbon credits.
Ministry of Forestry Regulation n° 20/2012 on Implementation Forest Carbon	This Regulation applies to forest carbon management demonstration activities for the readiness phase. These activities can be conducted in state conservation forests. The initiator of the activity must submit a written request of the project to the Minister of Forestry for registration.	In June 2012, Sebangau National Park Management sent a letter to the DG PHKA requesting registration of this project.

The project activity, rewetting drained peatlands in Sebangau National Park through technical means (establishment of dams) is in full compliance with all relevant laws described here. Due to uncertainty surrounding regulation of the voluntary REDD market in Indonesia, WWF and the Ministry of Forestry Director General of Forest Protection and Nature have developed an agreement for a transition period with WWF to facilitate project management and implementation and development of a financial mechanism for benefit distribution by Sebangau National Park.

G5.2. Approval from appropriate authorities

According to article 1 of Regulation n° 3/2007 of the Ministry of Forestry, national park offices are the authorities endowed with responsibility for the management and protection of the respective national parks. Article 3 of this Regulation also establishes that the national park office is responsible for, among others, the promotion of environmental services within the national park area. National park offices report directly to the Director General Forest Protection and Nature Conservation (DG PHKA) within the Ministry of Forestry.

Forests within the Sebangau National Park are classified as state conservation forests (Forestry Act n°41/1999) whose aim is to preserve the forest's main ecological functions. No concessions or use permits have been or are expected to be issued by the Ministry of Forestry or any other authority within the Project area.

The Sebangau National Park Office is hence the sole entity legally authorized to carry-out management, protection, and conservation activities within the National Park and the authority which has direct control over the entire Project area. The right of use of the Sebangau National Park Office is further confirmed by the agreement entered between WWF Indonesia (supporting partner and project participant) and the DG PHKA, of 11 April 2011, appointing the Sebangau National Park as the Project initiator (pursuant to Regulation n° 68/2008 and Regulation n° 20/2012).

The implementation of this project must also meet REDD safeguards. Currently national REDD safeguards (Indonesia Safeguards Principle Criteria Indicators—PRISAI) are still in the drafting process. However, the hydrology restoration project in Sebangau National Park has attempted to meet the basic principles of the draft version of the national safeguards, especially those relating to the rights of local communities. The construction of dams is always agreed upon with the holder of rivers and the customary owner of the canals (whenever they were still living in the area). While entering the REDD scheme, approval of the holders of the rights to the river in the project area was specifically requested, which is confirmed by the Sub-district Government⁷¹. A meeting was held with the primary stakeholders, i.e. the stakeholders at village level up to Customary Chief at sub-district level, which produced a memorandum of understanding on the implementation of REDD in Sebangau National Park⁷².

⁷¹ See supplementary document: Agreement from River Holders.pdf.

⁷² See supplementary document: MoU Among Primary Stakeholders of Sebangau DA REDD.pdf.

G5.3. Compliance with property rights

The project is considered as a REDD+ demonstration activity (DA) by the Government of Indonesia. It has been included in the National Action Plan of GHG Emission Reduction since 2011 as a DA in a conservation area. For its implementation a Program Referral and Operational Plan was jointly created by the Ministry of Forestry and WWF-Indonesia. All forest areas in Indonesia are controlled and managed by the State for public purposes, so there is no individual ownership of lands within the project boundary. However, traditional rights over the river tributaries remain and are discussed here.

As mentioned in section G3.8. the existing customary tenurial rights in the project are first consulted with Customary Chiefs and checked with the respective holders. Traditional rights over the river tributaries and the utilization of *jelutung* sap still exist in the project area. On 20 September 2011, Sebangau National Park authority invited the river holders and fishermen for a socialisation and consultation session, where WWF Indonesia helped in presenting the project and facilitating the discussion. All of the river holders attended the meeting, along with 58 fishermen who temporarily stay in 10 clusters of fishermen shelters surrounding the area of intervention. The Heads of the two Sub-districts, two Sub-district Customary Chiefs, two Village Heads, the board members of two Community Forums and the Head of Sub-district Police Station also attended the meeting.

Prior to the consultation in 2011, the river holders had already agreed on the construction of the dams in its pilot phase in 2004. Now that they have been presented with the possibility of the registration of the project to become one of REDD demonstration activity in Indonesia, they have no objection. All of the caretakers of the rivers signed an agreement letter, which was prepared after the meeting.

G5.4. Involuntary relocation

There is no permanent settlement in the project area, only clusters of temporary fishermen shelters along River Sebangau on the east perimeter of the project area. The fishermen shelters will not be relocated, for fishing activities do not negatively affecting the project.

G5.5. Illegal activities

Illegal activities that could affect the project's climate, community or biodiversity impacts include fire, dam destruction, wildlife poaching (e.g. commercial birds, bush meats), and the use of poison and electricity to catch fish. In order to prevent and address illegal activities at the local level, key stakeholders agreed to strengthening customary laws on natural resource utilization and environmental care. The agreement is mentioned in the MoU among the primary stakeholders⁷³. At the formal level National Park regulations specifically protect the ecosystem and its biodiversity. Legal basis for the protection is provided by Law No. 5/1990 on Natural Resources and Ecosystems Conservation. Coordination with local Police Station is required in the completion process under national laws.

⁷³ See supplementary document: MoU Among Primary Stakeholders of Sebangau DA REDD.pdf

G5.6. Carbon rights

Following Regulation n° 20/2012 on implementation of forest carbon activities (articles 3 and 4), the Sebangau National Park Office officially submitted a letter to the DG PHKA of the Ministry of Forestry requesting registration of the Project. The DG PHKA of the Ministry of Forestry has acknowledged receipt of the request and is expected to proceed with Project registration by submitting a letter to the Minister of Forestry as required by Regulation n° 20/2012.

The project proponent is Sebangau National Park pursuant to Ministry of Forestry Regulation No. 68 of Year 2008 Article 1 Point 6 which states that the carbon project proponent is the government, permit holder for timber utilization, permit holder or manager of forest rights holder, manager of customary forest, or the head of the forest management unit with responsibility for demonstration activities. This was also agreed to by the Director of Environmental Services under the Director General of the Forest Protection and Nature Conservation Ministry during consultation between July and December 2011. Sebangau National Park is the entity mandated with authority over the park under the Ministry of Forestry based on Ministry of Forestry Regulation No. 40 of Year 2010 addressing organization and governance of the Ministry of Forestry. Therefore, Sebangau National Park has 'right of use' of carbon credits generated by the activities in the proposed project area.

Considering the Law of Forestry No. 41 of Year 1999, Sebangau National Park will not be eligible to conduct business transactions since its function is technical implementation of the carbon project under the Ministry of Forestry. Sebangau National Park through the Ministry of Forestry Director of Environment Service has developed a business entity "Government Body for Services" (BLU) that is eligible to conduct business transactions under the park authority.

CLIMATE SECTION

CL1. Net Climate Impacts

Under the applicability conditions in the selected methodology, it is assumed that in the baseline scenario the carbon stocks in the aboveground tree biomass will be decreasing or stable due to increased chance of burning or tree death due to low water table levels. Therefore it is conservatively assumed that no changes occur in the aboveground biomass as a result of project activities, and the only carbon pool that is accounted for within the project boundary in the project scenario is the soil carbon pool.

Baseline CO₂ emissions are estimated based on the water level with respect to the peat surface. These water levels are modeled based on the layout of relevant drainage systems historically and at the project start date (including any potential “natural damming” expected to occur in the project area) and the long-term average weather prior to the project start. The dynamic integrated model SIMGRO calibrated for ombrogenous tropical peatlands in Southeast Asia is used to model water levels and stratify the project area by drainage depth to estimate baseline emissions. It is conservatively assumed that no CH₄ or N₂O GHG emissions take place in the baseline scenario.

Project CO₂ emissions were calculated according to the method used for the baseline scenario.

Uncertainty in emissions from change in pools due to uncertainty in modeled water table levels are assessed and quantified as follows.

The uncertainty in water table levels calculated for the SIMGRO model is used to calculate the uncertainty in the change in pools due using the equation:

$$Uncertainty_{Total} = U_{WT}$$

Where:

Uncertainty_{Total} Total Uncertainty for entire project; %

U_{WT} Percent uncertainty in water table levels; %

The total uncertainty for the entire project is 31%.

The allowable uncertainty is +/- 30% of C_{PRC,t} at the 95% confidence level. Where uncertainty exceeds 30% of C_{PRC,t} at the 95% confidence level then the deduction must be equal to the amount that the uncertainty exceeds the allowable level. At 31% *Uncertainty_{Total}* exceeds the maximum allowable uncertainty by 1%. Therefore the adjusted value for C_{PRC,t} to account for uncertainty is be calculated with the equation:

$$Adjusted_C_{PRC,t} = C_{PRC,t} * (100\% - Uncertainty_{Total} + 30\%)$$

Where:

- Adjusted_ C_{PRC, t}* Cumulative total net GHG emission reductions at time *t* adjusted to account for uncertainty; t CO₂-e
- C_{PRC, t}* Cumulative total net GHG emission reductions at time *t*; t CO₂-e
- Uncertainty_{Total}* Total uncertainty for WRC project activity; %

Baseline, project, and leakage emissions are summarized in Table 1. Total net GHG emission reductions generated by the project over the 30 year crediting period adjusted for uncertainty in modeled water levels are 99,833 t CO₂-e. The 100 year net benefit adjusted for uncertainty is 99,873,882 t CO₂-e and is thus not insignificant.

Table 1 Summary of baseline, project, and leakage emissions and net GHG emission reductions

Year	Baseline Emissions		Project Emissions			Leakage	Net GHG Emission Reductions	Adjusted Net GHG Emission Reductions
	CO ₂ (t CO ₂ -e)	CO ₂ (t CO ₂ -e)	CH ₄ (t CO ₂ -e)	N ₂ O (t CO ₂ -e)	CO ₂ (t CO ₂ -e)	t CO ₂ -e	t CO ₂ -e	
1	168,318	153,328	0	0	0	14,990	14,840	
2	105,472	94,354	0	0	0	11,118	11,007	
3	1,013,810	980,863	0	0	0	32,947	32,618	
4	77,517	68,400	0	0	0	9,117	9,026	
5	10,131	9,053	0	0	0	1,078	1,067	
6	80,320	71,521	0	0	0	8,799	8,711	
7	37,403	33,782	0	0	0	3,621	3,585	
8	60,094	52,052	0	0	0	8,043	7,962	
9	1,315	1,252	0	0	0	63	62	
10	4,590	4,261	0	0	0	329	326	
11	36,972	33,030	0	0	0	3,942	3,902	
12	30,384	27,926	0	0	0	2,458	2,434	
13	1,735	1,630	0	0	0	105	104	
14	2,847	2,616	0	0	0	231	229	
15	8,779	8,136	0	0	0	643	637	
16	634	590	0	0	0	44	43	
17	3,447	3,216	0	0	0	231	229	
18	30,910	29,052	0	0	0	1,858	1,840	
19	1,420	1,314	0	0	0	106	105	
20	333	301	0	0	0	33	32	
21	609	558	0	0	0	51	50	
22	861	775	0	0	0	86	85	
23	7,701	7,077	0	0	0	623	617	
24	831	736	0	0	0	95	94	
25	168	143	0	0	0	25	25	
26	21	13	0	0	0	8	8	
27	1,994	1,837	0	0	0	157	156	

28	81	55	0	0	0	25	25
29	30	19	0	0	0	12	12
30	2	0	0	0	0	2	2
TOTAL	1,688,729	1,587,888	0	0	0	100,841	99,833

Details of calculations of net GHG emission reductions are included in the supplementary documents to the VCS PD⁷⁴.

CL2. Offsite Climate Impacts (Leakage)

As a result of the project activity, any illegal selective logging activities in the baseline may be temporarily or permanently displaced from within the Project Area Boundary to areas outside the project boundary. Under the applicability conditions of this methodology, no leakage is assumed to occur as a result of the displacement of economic activities from the Excluded Area of Watershed(s) to other areas. However since rewetting activities taking place within the project boundary may result in an increase in water levels within the Excluded Area of Watershed(s), emissions from methane are conservatively estimated.

Emissions from potential leakage are estimated as the sum of emissions due to market effects and activity displacement. However, as allowed by the selected methodology under VCS AFOLU V3.2 Section 4.6.16, GHG emissions due to market effects leakage are not considered. Therefore, emissions from potential leakage are calculated as follows:

$$LK = \sum_{t=1}^{t_{crediting_period}} LK_t$$

$$LK_t = LK_{MarketEffects} + LK_{ActivityDisplacement,t}$$

$$LK_{MarketEffects} = 0$$

$$LK_{ActivityDisplacement,t} = LK_{Deg,t} + LK_{CH4,t}$$

Where:

LK Net greenhouse gas emissions due to leakage; t CO₂-e

LK_t Net greenhouse gas emissions due to leakage at time t ; t CO₂-e

$LK_{MarketEffects}$ Total GHG emissions due to market effects leakage; t CO₂-e

$LK_{ActivityDisplacement,t}$ Total GHG emissions due to activity shifting leakage at time t ; t CO₂-e

$LK_{Deg,t}$ Total GHG emissions due potential degradation at time t ; t CO₂-e

$LK_{CH4,t}$ Net emissions from methane the Excluded Area of Watershed(s) at time t ; t CO₂-e

⁷⁴ Annex 2 Baseline report: Net GHG Emission Reduction Summary.xls

t 1, 2, 3, ... $t_{crediting_period}$ years elapsed since the projected start of the project activity

As required by the selected methodology, an assessment was carried out to determine if degradation activities would have taken place in the absence of the project. A participatory rural appraisal (PRA) of the communities surrounding the project area was conducted to determine if there is the potential for degradation to occur within the project boundary or in the surrounding areas under either the baseline or project scenario.

The primary users of the peatland resource in the project area and surrounding areas reside permanently in Kereng Bangkirai village. Information derived from a consultation workshop in 2003 shows that economic revenues of almost 80% of the village of Kereng Bangkirai are from the exploitation of natural resources surrounding the community, such as the Sebangau National Park and other natural areas⁷⁵. Most households earn a living from traditional fishing activities, *gemor* bark collection, and *pantung/jelutung* tapping. A minority of households engage in mining of white clay (*kaolin*) and sand.

In terms of household incomes, the traditional freshwater fisheries sector was found to provide the highest revenues for the communities surrounding the project area compared to other activities. Interviews with members of the Kereng Bangkirai's community showed that income as a fisherman is highest, followed by *gemor*, and *pantung (jelutung)*. An average monthly income is IDR 912,500 for fishermen, and IDR 754,167 and IDR 750,000 respectively for *gemor* and *jelutung* tappers. On the contrary, the illegal logging business guarantees only around IDR 375,000 per month. Therefore, there is no economic incentive to engage in illegal logging activities. Furthermore, regular patrolling by the Sebangau National Park Office has been effective in preventing illegal logging within the Park boundaries where the project area is located as evidenced by Park monitoring reports⁷⁶. Based on this information obtained from the consultation workshop and the enforcement of the legal status of the lands within the project boundary, it is concluded that no degradation activities would potentially take place, and as allowed by the methodology, activity shifting leakage is assumed to be zero until the next PRA occurs. The likelihood of degradation activities being shifted to other locations will be monitored by repeating the PRA activity every five years.

CL3. Climate Impact Monitoring

Monitoring is carried out periodically to ensure that project activities are implemented as planned and to evaluate the impact of project activities on water levels in the project area. Monitoring is carried out by WWF under the supervision of a field hydrological coordinator. The project boundary, climate variables, dam construction and maintenance, and water level values are monitored during project implementation. As WWF and partners have agreed to ensure that the project implementation will have impacts, and these impacts will depend on data availability and reliability, such activity will follow procedures as described below.

⁷⁵ VCS PD Annex 8 Leakage analysis: Report of Workshop on Understanding Sebangau Area Conditions and the Hope for the Future in District Pahandut, Kereng Bengkirai, 11 January 2003, the Municipality Government Palangka Raya in cooperation with WWF Indonesia - Central Kalimantan Sebangau Project, p. 9.

⁷⁶ VCS PD Annex 8 Leakage analysis: Sebangau National Park Monitoring Reports

Monitoring of waterways

Additional information on the location and characteristics of waterways will be obtained at the first verification event following baseline revision. The methods described in the document SOP Field Measurements of Canals⁷⁷ will be implemented to gather additional information on waterways.

Monitoring of climate variables

Climate variables are continuously collected from an automatic logger weather station known as a Weather Hawk Mini Station. This station is located in SSI Camp, Lat -2.580288 Long 114.041430 with elevations 18 m asl. This station was installed in 2006, and will supply weather data for running the SIMGRO model.

There are two climate variables which are critical for running the SIMGRO model, which are precipitation (mm/day) and evaporation. Evapotranspiration rates for running the SIMGRO model for *ex ante* calculations were obtained from the scientific literature.

For monitoring purposes, precipitation data will be collected using a gauge and evaporation data from an evaporation pan. Data on these two variables are collected on a daily basis. Data on daily precipitation and evapotranspiration will be stored in electronic format at the WWF Field Office in Palangkaraya.

Monitoring of project activities

Project activities are monitored to ensure that they are implemented according to the project management plan. In addition, water levels are monitored to evaluate the impact of project activities on water levels in the project area.

Monitoring of project boundary

The coordinates of each dam established are monitored as described below to demonstrate that all dams constructed are located within the project boundary and that the actual project area conforms to the area outlined in the project management plan.

As stated in Sebangau National Park 20 Year Management Plan⁷⁸, there are two types of measures implemented to maintain control over the National Park area, patrol and joint patrol. The patrol is conducted on a regular basis as described in detail in every yearly operational plan. On the other hand, joint patrol is usually the result of an extraordinary event as well as illegal activities such as fire accident, electro-fishing and any other illegal operation.

According to the National Park Management Plan, there will be 12 regular patrols per year. Each patrolling activity lasts for five days, involving three National Park personnel. Apart from the patrols described in their Management Plan, there will be additional supervision of any activity involving external visitors as well as WWF's regular activity in the project area, so that the frequency and extent of patrols will be sufficient to demonstrate that control is maintained over the land on which the project is taking place.

⁷⁷ VCS PD Annex 17 SOPs: SOP Field Measurements of Canals

⁷⁸ VCS PD Annex 13 Project management plan: Sebangau National Park Management Plan

Monitoring of dam establishment

The optimal location of dams is determined *ex ante* per the applied project methodology. The actual location of each dam established is recorded at dam construction. Dam information including geographic coordinates is recorded for each dam constructed and entered into a geodatabase. The monitoring form is detailed in Table 2.

Table 2 Dam construction monitoring form⁷⁹

No	Name after owner	Canal name	Dam code	coordinate		Year constructed	Pics			Dam type	hd (m)		S (m)	Remarks
				Lat	Long		1	2	3		u	d		
1	Tano	Bg1	Bg1.1			2010								

ArcGIS 9 (ArcMap version 9.3) is the software used for the geodatabase. Data collected from the field is plotted for a quick preview in Google Earth™ using GPS receiver readings. Once the geodatabase is complete, it is plotted in ArcGIS software.

Monitoring of dam maintenance

Dams are monitored two times per year, in August and February. Dams are monitored during the dry season because head difference, leakage, and construction failure are more easily assessed when water levels are relatively low compared to the wet season. A map which includes dam location and code/dam # is used in the field to verify that all dams are ground checked. Canals are navigated by foot or boat and the condition of each dam is assessed to evaluate

- Any leakage from construction failure;
- Sedimentation;
- Surrounding vegetation; and
- Water level or head difference.

This information is recorded in the form in Table 3.

Table 3 Dam maintenance monitoring form⁸⁰

Date:

Observer:

Sub-catchment :

No	Code/ Dam #	Dam type	Dams condition			Details description				Remarks
			Good	Good	damage	dc	hd	hdist	others	

⁷⁹ Column labels are abbreviated to fit window and content size – Pics: Pictures; Hd: Head difference; U: Upper dam; D: Downstream dam; S: Sedimentation

⁸⁰ Column labels are abbreviated to fit window and content size – dc: dam’s construction; hd: head difference; hdist: human disturbance; others: non-specified

Based on the information recorded in the field, each dam is assigned to one of three categories described below:

Good:

Dams are considered in good condition if they demonstrate the expected head difference (25 cm), good sedimentation and plants have grown surrounding the dam.

Moderately damaged:

Dams are considered moderately damaged if they demonstrate the expected head difference, but have minor construction failure such as asymmetric dimension or if the mean difference is higher than soil surface.

Severely damaged:

Dams are considered severely damaged if they show major construction failure and/or human presences or even disturbance.

For moderately or severely damaged dams, one of the following actions is taken:

Repair:

If possible, dams are repaired. The decision to repair or not repair is based on the severity of the construction failure observed in the field.

Relocate:

Dams are relocated in cases where the dam is completely broken. Completely broken dams are impossible to fix. The dam may be moved forward or backward, carefully considering its impact on other dams in the same canal (head difference). Alternatively the dam may be relocated to another canal if conditions in the field are not appropriate to move the dam location forward or backward in the canal, for example if the canal bed is not firm or no site will support dam construction.

Where dams are in good condition but are not sufficient to reach the optimum head difference, additional dams may be added.

The geographic coordinates of relocated and additional new dams are recorded in the field and the geodatabase is updated. The geographic coordinates of moderately or severely damaged dams that are not repaired or relocated are deleted from the geodatabase. The geographic coordinates of dam locations will be stored in paper and electronic format at the WWF Field Office in Palangkaraya. Updated information on dam location is input into SIMGRO for each verification event.

Monitoring of excluded area of watershed

Monitoring of land use activities in the Excluded Area of Watershed(s) will be accomplished by regular patrols of activities in the area surrounding Sebangau National Park by the Park Authority as detailed in the Park Management Plan. All activities surrounding the Park are monitored by Park Rangers as part of their routine activity. The results of patrolling will be recorded in Sebangau National Park monitoring reports. The patrols will verify that land use activities within the Excluded Area of Watershed(s) do not include the creation of additional drainage waterways deforestation, land use conversion, crop production, or grazing of animals. At each monitoring event Sebangau National Park monitoring reports will be provided as documented evidence demonstrating that current land use activities in the Excluded Area of Watershed(s) meet these requirements. If the creation of additional drainage waterways deforestation, land use conversion, crop production, or grazing of animals occur in the Excluded Area of Watershed(s) during the project crediting period, the selected methodology must be revised to be applicable to the project activity.

Monitoring of baseline and project emissions

Water levels are monitored once a month at the end of the month at permanent sampling points located within the project area. The location of sampling points was determined by selecting a random location along accessible canals. Sampling points were then established at regular intervals perpendicular to the canal. The geographic locations of ground water level sampling points are show in Figure X provided in the supplementary documents to the VCS PD⁸¹.

⁸¹ VCS PD Annex 7 GIS Data: Groundwater Level Sampling Locations

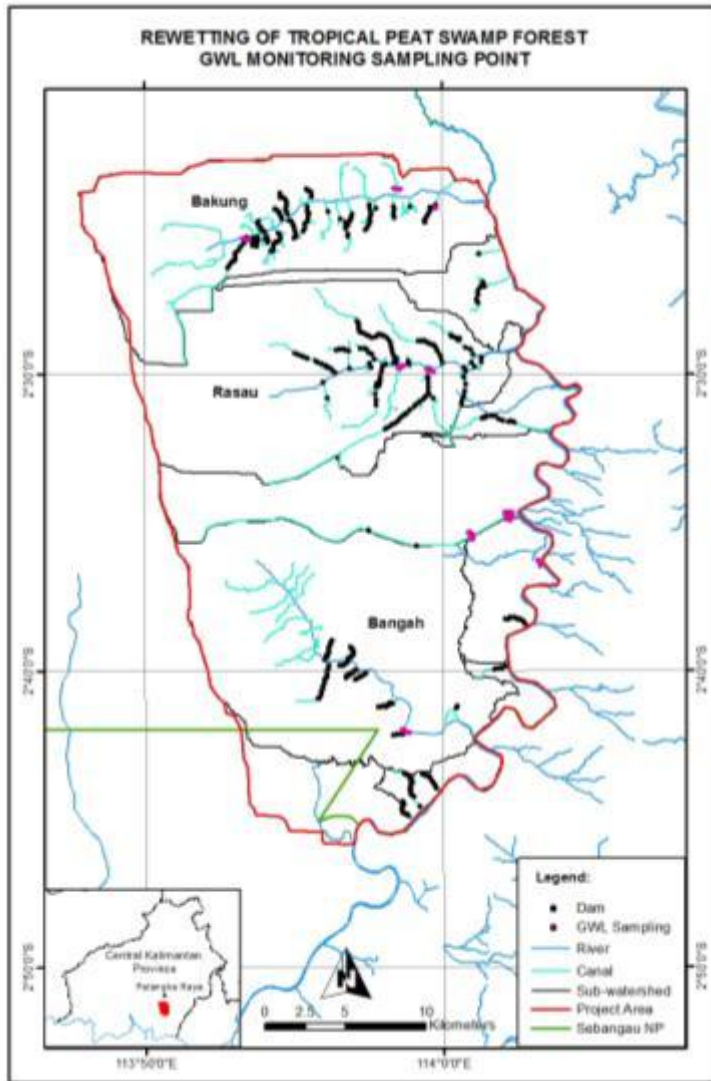


Figure 27 Sampling points for monitoring of ground water levels in the project area

Automatic data loggers will be used to measure water levels. The data loggers use a water level sensor to detect water levels can be programmed to record water levels periodically. The information can then be collected from the data loggers at a later time. The data logger is also important to maintain accuracy in measurement of water levels since the possibility for peat particles to block the tubewells pores exists; in other words accumulation might occur in tubewells pores that potentially decrease the accuracy level of Ground Water Level reading.



Figure 28 Installation of tubewells for monitoring of ground water levels in project area

The location, water table level relative to the peat surface, and date of measurement will be recorded in a geodatabase and stored in electronic format at the WWF Field Office in Palangkaraya.

Monitoring of baseline emissions

SIMGRO will be run at each verification event at a minimum to monitor baseline emissions following the procedures described in the selected methodology. This task will be accomplished by a consultancy under the supervision of the Monitoring Officer in the WWF Field Office. The results of SIMGRO modeling will be archived in paper and electronic format at the WWF Field Office in Palangkaraya.

Monitoring of project emissions

SIMGRO will be run at each verification event at a minimum to monitor baseline emissions. This task will be accomplished by a consultancy under the supervision of the Monitoring Officer in the WWF Field Office. The results of SIMGRO modeling will be archived in paper and electronic format at the WWF Field Office in Palangkaraya.

COMMUNITY SECTION

CM1. Net Community Impacts

CM1.1. Impact on community

Impacts of the project on communities were examined in the 2011 baseline study⁸². A questionnaire was used as part of the study to obtain data on the types of natural resources in the project area utilized by the communities, intensity and seasonal pattern of the utilization and factors that may affect the yield. In-depth interviews were conducted with several key informants to further explore information on the most important resources in the area for the local communities, the changes in the resources, and factors causing changes. Focus group discussions were carried out with the informants to explore possible indicators that may be used to monitor the impacts of the project on communities.

The 2011 study shows that fish are the most important natural resource for local communities. Around 70 fisherman families from Kereng Bangkirai are intensively fishing in the area. There are temporary shelters built by fishermen in 12 clusters along the Sebangau River. In focus group discussions fishing yield was identified as the potential main indicator to monitor project's impacts on communities. Informants added *jelutung* sap as the second indicator, representing an NTFP that can be sustainably harvested in the Sebangau National Park area.

Indicators that can be monitored in a participatory way with the local community are as follows:

- a) Number of fish species and abundance: Hydrological restoration in the project area will result in flooding of lakes that are the spawning ground for the fish. Community members mainly use the area for fishing, and they will benefit from the recovery of fishery resources.
- b) Occurrence of illegal fishing gear (e.g. poison, electricity) used in the Sebangau National: Fishing gear is a proxy indicator of the abundance of fish. A reduction in the use of illegal fishing gear indicates and increase in the abundance of fish in the project area. Illegal fishing reduce the fishery resource in the long run, because in addition to adult fish it kills the fries (young small fishes) which are simply thrown away because they have no economic value.
- c) Sustainability of non-timber forest products, especially the production of *jelutung* sap: *Jelutung* sap is a traditional commodity of the area since before the National Park designation. Monitoring will done on the yield of *jelutung* sap from the project area.
- d) Fire occurrence: Less fire will mean less smoke. This will have positive impacts the health of the community as well as create safer boating conditions on the river (smoke reduces visibility). Monitoring of fire is supported by hot spot monitoring which is conducted daily by the Ministry of Forestry.

⁸² Mahin. 2011.

CM1.2. Impact of High Conservation Values

It has been mentioned in section G1.4.8 that the whole Sebangau National Park and the Project Area is HCV 1.1. The rewetting project is an attempt to restore the peat swamp forest ecosystems in the Sebangau National Park. Therefore, if project activities are successful in achieving the objective of rewetting the drained peatland, no negative impact of the project on High Conservation Values are expected.

CM2. Offsite Stakeholder Impacts

CM2.1. Potential offsite impacts

The project may potentially have negative impacts on offsite stakeholders who are accustomed to using illegal means of fishing, such as using poison and electricity. The illegal fishing will be inhibited by the strengthening of customary laws. However, Governor Regulation No. 13/2009 states that “Citizens from outside the area, either a permanent or temporary residency, must learn and respect the customs and the local Dayak customary law” (Article 39 Paragraph 1). Therefore the practice is already prohibited by law.

CM2.2. Mitigation plan of potential negative impacts

The section above explains that the only negative impact that is likely happen to the offsite stakeholders is inhibition of fishing by illegal means of fishing. However this activity is already not in compliance with existing laws.

CM2.3. Net stakeholder impacts

Customary laws, regional and national laws will be enforced to support achievement of project objectives. Illegal practices in the project area will be prevented, and anyone who used to benefit from the activities will experience income reduction. Eventually they will adapt to the new situation and find other ways of income generation. Central Kalimantan is a growing region, where new businesses like oil palm plantation and coal mining have developed rapidly in the last decade. The businesses bring new opportunities, such as providing transportation, food, lodge and other service based ventures.

CM3. Community Impact Monitoring

CM3.1. Community monitoring plan

Three indicators, the number of fish species and its abundance, number of fishing gear, and the yield of *jelutung* sap will be recorded by local workers (ideally local fishermen) who are recruited for monitoring purposes. These fishermen will also regularly record ground water level. The other indicator, fire occurrence, will be monitored in a yearly participatory event which will involve the key stakeholders in the project area. Clarification of the recorded monitoring data will also take place in the participatory monitoring session. Participatory fire monitoring will be complemented by hot spot monitoring, which is provided daily by the Ministry of Forestry. The conceptual guideline to develop further indicators can be seen in Figure 29 below.

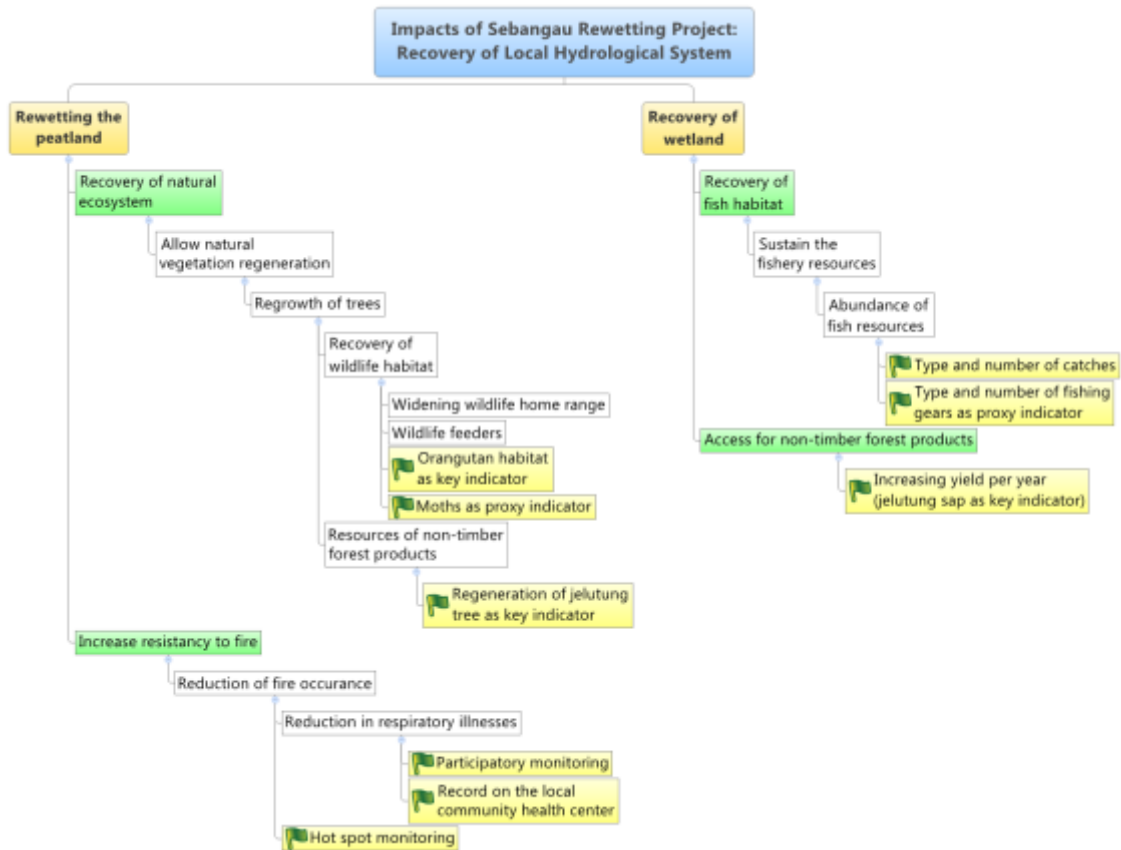


Figure 29 Community monitoring indicators

CM3.2. High Conservation Values monitoring plan

The collection of field data relevant to HCV 5 and 6 (Social, Economic, and Cultural Aspects) relies heavily on interviews and direct observation. According to the toolkit, HCV 5 aims to identify areas serving the important function of sustaining local communities, by helping to meet basic needs. Provision of such needs can be direct (e.g., animal protein obtained from locally caught fish), or indirect, through the commercial sale of forest products (or other natural products) for cash used to purchase one or more basic need.

To measure HCV 5 (Natural Areas Critical for Meeting the Basic Needs of Local People), the project can use related data (Food, Water, Clothing, Materials for building and tools, Firewood, Medicines, Fodder for livestock) found in the related reports to define indicators. But because of the status of the project area is National Park, the economic activities of the local people (e.g. fishing, collecting NTFP, etc.) inside the area should be based on the agreement between Sebangau National Park authority and community.

BIODIVERSITY SECTION

B1. Net Positive Biodiversity Impacts

B1.1. Biodiversity impacts

Forest cover may be used as a proxy for estimating the size of the orangutan population⁸³. Five different habitat types have been distinguished in the project area through aerial observation:

Type B - Pole Forest: Trees can be tall but they appear to have a rather small dbh (diameter at breast height). The canopy is open with no connection between trees. Waterlogged areas are frequent. Trees with white tree trunks are frequent (*Lauraceae*) and other trees that can be identified include *Myrtaceae*, *Euphorbiaceae* and *Theaceae*.

Type C - Combination of *Combretaceae* and *Camnospermae* – *Anacardiaceae*: This type belongs to the Pole Forest but tree composition is slightly different than Type B.

Type D - Degraded Forest: The composition of the forest canopy appears more diverse than in types B and C in terms of crown diversity, structure, size and color. Emergent trees are evident in at least two to three different strata, and the forest is taller.

Type M - Mixed Forest: Presence of tall emergent trees; the canopy is rather closed to semi-closed. *Combretocarpus* are common in the tallest stratum while *Myrtaceae* (especially *Syzigium*) are common in the understorey. Canopy appears diverse (crown shapes, color, distribution).

Type U - Unsuitable: Habitat with few or no tree corresponding to old burnt areas or swamps.

A general average density of 1.70 orangutan/km² (95% CI: 0.62-4.64) is found throughout the survey area, with slightly more orangutans in the mixed swamp forest (MSF) and tall interior forest (TIF) habitats mixed together (Dou= 1.85 ind./km²; 95% CI: 0.67-5.08) than in low pole forest (LPF) habitat (Dou= 1.42 ind./km²; 95% CI: 0.52-3.87). The general pattern identified for nest densities is of course similar to the general pattern identified for orangutan densities:

1. No significant difference in orangutan density between latitudinal classes.
2. Higher orang-utan density in habitat (M+D) than (B+C), but the difference is not significant.
3. Slight increase of orangutan densities along a North/South gradient within the survey area.
4. No difference between the Sebangau and the Katingan catchment areas.

The "with project" scenario, will reverse the condition described in Section G2.5. First, the project is trying to create enabling condition in terms of ground water level, so that the desired ground water level fluctuation over time is within ideal range (80- 100 cm) both in dry and wet season. It will also allow create sufficient humidity of the peat soil to encourage the regrowth of vegetation.

⁸³ See Panda et al (2010) for estimation of population densities results.

Natural regeneration, which is also assisted with replanting activities by the project, will restore biodiversity at the project area. The Important plants in the project area are plants that provide food for wildlife, especially endangered and protected species like orangutans. If their food source is increased, the orangutan population will also increase. In addition to affecting terrestrial wildlife, ecosystem restoration will have positive effect on fish habitat. The population size and diversity of fish species is also expected to increase.

B1.2. Impact on High Conservation Values

The area is peatland and a National Park, according to the 2008 Indonesia HCV toolkit peatland is categorized clearly as HCV 4.1. One of the objectives of the restoration activity is to make the area an appropriate habitat for orangutan and others important species.

For HCV 4.3 peat land categorized as “Areas that Function as Natural Barriers to the Spread of Forest or Ground Fire”. An area with biota or other properties capable of deterring the spread of large scale forest or ground fires is considered HCV 4.3. Wetlands can prevent the spread of fires and are critical landscape features in fire prone areas. Several natural forest types in good condition have this physical characteristic, as do some non-forest ecosystems such as deforested peat lands with a functionally intact hydrological system, freshwater swamp, other wetlands and green belts.

Peatland is also mentioned in HCV 1.1 “Areas that Contain or Provide Biodiversity Support Function to Protection or Conservation Areas”; HCV 2.1 “Large Natural Landscapes with Capacity to Maintain Natural Ecological Processes and Dynamics”. As a National Park, the area is clearly categorized as HCV 1.1. The method to monitor the impact on HCV is to track forest cover, using the HCV Principles and Criteria in the toolkit to monitor the condition.

B1.3. Species used by the project

Dam construction uses local materials, such as *gelam* (*Melaleuca spp.*) wood, and did not use any introduced species.

The following species are used for dam construction:

1. *Gelam* (*Melaleuca cajuputi*): This species is abundant abundance in the southern part of Sebangau National Park, and extensively used as materials for road development.
2. *Kahoi/belangeran* (*Shorea belangeran*); This species is very well known as a good material for building.

According to the design, *gelam* is used for pillars or fences. In the design for dam with spillway, *gelam* wood is used as the foundation and basic frame of the dam itself. *Belangeran* (*Shorea belangeran*) is attached to the fram and forms the wall of the dam. In a permanent design, the dam is made entirely of *gelam* wood. A wall of vertical *gelam* poles is held in place by a horizontal *gelam* pole.

For replanting activities, according to analysis of vegetation on ex-burnt areas by WWF and Bogor Institute of Agriculture (2006 and 2007), there are six potential trees. All of the potential trees are local species, i.e. *jelutung* (*Dyera lowii*), *kahoi* (*Shorea belangeran*), *tutup kabali*

(*Diospyros spp.*), *geronggang* (*Cratoxylon spp.*), *tumih* (*Combretocarpus rotundatus*) and *gelam* (*Melaleuca cajuputi*).

B1.4. Exotic species in the Project Area

The project only uses native species for dam construction and replanting activities, as described in Section 1.3.

B1.5. Genetically Modified Organisms

The project will not use genetically modified organisms. Based upon previous studies conducted by WWF, in cooperation with Indonesian Science Institute (2008) and Bogor Institute of Agriculture (2006, 2007 and 2008) no activities will use external sources in term of sources of seedlings for reforestation. As for dam construction materials, as explained above local species will be used.

B2. Offsite Biodiversity Impacts

B2.1. Potential offsite biodiversity impacts

Negative impacts of the project on biodiversity outside the project area are unlikely to occur, and so far have not been identified. The pattern of local livelihoods, most of which rely on fish resources, indeed benefit from the positive impact of the project on these resources.

B2.2. Mitigation plan of offsite biodiversity impacts

Although unlikely, any offsite biodiversity impacts that may occur will be detected through monitoring activities. Through an adaptive management approach, mitigation measures will be carried out, according to the evolving situation.

B2.3. Evaluation of potential negative offsite biodiversity impacts

As mentioned in Section B2.1. so far no potential negative offsite biodiversity impacts were identified. Thereby it can not be evaluated at this stage.

B3. Biodiversity Impact Monitoring

B3.1. Biodiversity impacts monitoring

Changes on biodiversity will be monitored through:

1. Population dynamics and vegetation analysis. Specific species to be determined.
2. Permanent transects, initiated by National Park authority in SSI area (2012). There are three major indicators that have to be considered: Density (number of species/unit area), Frequency (number of species/unit area/unit time) and Dominance (number of species/unit area); for other species density, e.g. fishes: calculate catches per unit time. Monitoring will be carried out once a year.
3. Intermediate Indicator: Food (feeding trees) availability for orangutan⁸⁴.

⁸⁴ See Panda et al (2010) for Tables of Orangutan Food Species.

Indicator species also provide a cost and time efficient way to measure the quality of habitat, as well as a method to measure anthropogenic disturbances. These indicator species should respond both rapidly and predictably to changes in habitat quality. Moths are a potential group that may satisfy these conditions, and this project will therefore investigate their potential as indicator species in tropical peat-swamp forest.⁸⁵ There are no specific moths which are solely distributed at the peat swamp forest Sebangau since they are mostly polyphagous. For example: *Maxates indesoides*, *Metallophia cineraceae*, *Thalassodes sundissepta* (Geometridae), *Theretra suffuse* (Sphingidae), *Setora cupreistriga* (Limacodidae), *Miltochristra aberans* (Arctiidae), *Agrotera scisalis* (Pylalidae), *Kunugia ferox*, *Kunugia gynandra* (Lymantridae), *Camptopsestis malayana* (Drepanidae) were found at the peat swamp forest, but they have also been reported to be distributed from the low land to high montana.⁸⁶

B3.2. High Conservation Values impacts monitoring

Biodiversity related HCVs that will be monitored are as follows:

1. HCV 1.1 Areas that Contain or Provide Biodiversity Support Function to Protection or Conservation Areas
2. HCV 1.2 Critically Endangered Species
3. HCV 1.3 Areas that Contain Habitat for Viable Populations of Endangered, Restricted Range or Protected Species
4. HCV 2.1 Large Natural Landscapes with Capacity to Maintain Natural Ecological Processes and Dynamics
5. HCV 2.3 Areas that Contain Representative Populations of Most Naturally Occurring Species

Monitoring of these HCVs will be included in the monitoring plan.

B3.3. Monitoring plan implementation

The monitoring plan will be completed in the first half of 2013 and will integrate monitoring for community and biodiversity impacts. By the end of 2013 primary stakeholders in the project area, including district and provincial government, will be consulted on the design of the monitoring plan.

GOLD LEVEL SECTION

GL3. Exceptional Biodiversity Impacts

Under the CCB Standards the presence of at least a single individual of an Endangered species included in the IUCN Red List is sufficient demonstration of exceptional biodiversity benefits. As detailed in previous sections, Sebangau National Park has been surveyed⁸⁷ and the presence of Bornean Orangutans (*Pongo pygmaeus*) in the project area has been demonstrated. The

⁸⁵ Veghel H. 2011. Moth as potential indicators of habitat quality in tropical peat-swamp. Research articles. University of Applied Science's Hertogenbosch.

⁸⁶ Sutrisno H. 2005. Moth Diversity at Sebangau Peat Swamp and Busang River Secondary Rain Forest, Central Kalimantan. Hayati Vol. 12 (3). pp. 121-126.

⁸⁷ Panda et al. 2010

Bornean Orangutan is included in the IUCN Red List of Threatened Species as an Endangered species⁸⁸ and thus the project meets criteria for Gold Level status under the CCBS.



Figure 30 Bornean Orangutan (*Pongo pygmaeus*)

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⁸⁸ IUCN 2012. IUCN RedList of Threatened Species. Version 2012.2. www.iucnredlist.org. Downloaded on 25 October 2012.

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Supplementary Documents

Documentation of Free Prior and Informed Consent Process for DA REDD+ in Sebangau National Park

Implementation of free prior and informed consent principle for the demonstration activity of REDD+ in Sebangau NP carried out in stages as follows:

1. Consultation with the *Damang Kepala Adat* (Customary Chief) of Sub-district Sabangau on 13 September 2011

Demonstration activity of REDD+ in Sebangau NP located in three watersheds, e.g., River Bakung, River Rasau and River Bangah. Information obtained from Basel A. Bangkan, the Customary Chief based on Kereng Bangkirai (the capital of Sub-district Sabangau), that the three rivers managed by families from Kereng Bangkirai since Dutch colonial era. Heirs who now manage are the fourth descendant of the people who first gained the right to manage the rivers. The certificate of management rights updated and issued by the Head of Village Pahandut in 1957-1958. These management rights associated with the utilization of fisheries resources, but the holder also levy a fee on *pantung* sap that transported through the river that they manage.

Current management rights over River Bakung delegated to Jumady; River Rasau to Cakun; and the management of River Bangah split to about ten heads of the family (which among other delegated to Bahran and Rusliansyah). When there are problems in the field, holders of the River Bakung and River Rasau report to *Damang* in Kereng Bangkirai. However, holder of River Bangah report to the *Damang* in Paduran Sebangau (Sub-district Kuala Sebangau, District Pulang Pisau). This mechanism occurs naturally, only with consideration that River Bangah is closer to Paduran Sebangau, while River Bakung and Rasau closer to Kereng Bangkirai. Both *Damangs* never specifically define their working areas, but equally accept a mechanism that occurs naturally.

2. Coordination with stakeholders in Paduran Sebangau on 16 September 2011

After obtaining information from *Damang* in Kereng Bangkirai, as described above, and the opinion from Programme Manager of WWF-Indonesia in Central Kalimantan that in socialization should also invite the local government, then on 16 September 2011 we went to Paduran Sebangau to meet with stakeholders there. Mr. Basel participated in this coordination, to help communicate the importance of socialization for the community, especially in terms of customary management rights. Ijen I. Piter, *Damang* of Sebangau Kuala, confirms that customs-related issues that occur in the River Bangah resolved in Sebangau Kuala. Furthermore, he suggested to invite Bahran, Rusliansyah and Imau as the representatives of the family that manages River Bangah. Invitations to the Head of Sub-district Sebangau Kuala, and Paduran Sebangau Village Chief and Community Forum of Sebangau Kuala submitted at the same time. While the invitations to the holders of the rivers and fishermen who stay in the DA location delivered on the way back to Palangka Raya.

3. Socialization of Sebangau DA REDD+ on 20 September 2011

The event was held at the Field Office in Sebangau Sanitra Indah (SSI), with consideration of the location is more or less in the middle between Kereng Bangkirai and Paduran Sebangau so easy to reach by the invitees. Participants who attend as many as 76 people, outside of WWF staff and Sebangau NP staff. Government officials in attendance were: the Head of Sub-district Sebangau Kuala, representative of the Head of Sub-district Sabangau, Chief of Sector Sebangau Kuala Police Station, Security Officer of Sub-district Sebangau Kuala, Acting Village Head of Paduran Sebangau, and representative of Kereng Bangkirai Village Head. While community leaders in attendance were: *Damang Kepala Adat* of Sub-district Sabangau, *Damang Kepala Adat* of Sebangau Kuala, Chairman of Sabangau Community Forum, Chairman of Sebangau Kuala Community Forum and its two members. The holders of River Bakung, River Rasau and River Bangah present with 62 fishermen from 10 temporary fishermen settlements in the DA REDD+ location (details, from Bakung: 4 people; Rasau: 7 people; Timba: 3 people; Karanen: 5 people; Mangkok: 9 people; Salawati: 6 people; Oles: 7 people; Pakuyah people: 5; Bangah: 13 people; Baluh: 3 people). The only head of the family who settled in Bandera River is not present.

Socialization conducted in two sessions: (i) Session I with the holders River Bakung, River Rasau and River Bangah, (ii) Session II with the fishermen. Prioritized to meet with the holders, as it requires their approval to register the activities of the blocking of the canals into REDD+ scheme. While meeting with fishermen, other than to notify the REDD+ scheme, also to explore the benefits canals blocking for them and how to maintain the economic and ecological benefits.

4. Results

Results from a series of activities mentioned above are:

- The holders of the rivers, namely Jumady as the holders on the River Bakung, Cakun the holders of River Rasau, and Bahrans representing the holders of River Bangah, agreed that the canals blocking registered to REDD+ scheme. When necessary they are willing to sign a consent statement.
- Because of the three watersheds was located in the District of Pulang Pisau, the Head of Sub-district Sebangau Kuala called for the fishermen to register as the resident of Pulang Pisau. Currently almost all the fishermen in these locations have ID cards issued from Kereng Bangkirai Village (under Palangka Raya Municipality administration area).
- The Head of Sub-district Sebangau Kuala also supports the compensation scheme to be given in the form of public assistance to develop the socio-economic of communities in the DA REDD+ locations. He gave the example, that the aid can include fishing gear, making *beje* (traditional fish ponds), etc.
- Chief of Sector Sebangau Kuala Police Station stated that the canals blocking in Sebangau region has helped reduce the negative activities, including fire and logging. Electrocuting the fish, which lately is often the case and formally an illegal activity, still beyond the reach of the

police due to the lack of resources. Therefore he suggested that the problems as far as possible be resolved at the community level.

- *Damang Kepala Adat* of Sub-district Sabangau convey that conservation efforts in fact are aligned with community life here. Conservation is about protection of natural resources, while the lives of some people still relies on the utilization/management of natural resources. In addition, there are strong ties between the Dayak communities with the surrounding forest. He suggested that the area that could be explored and what can be done in it need to be clarified.

- Chairman of Sabangau Community Forum convey that, if compensation of REDD+ schemes could be realized, they will take the role to oversee the compensation to be right on its targets. Furthermore, he suggested that communication continues to be built between Sebangau NP management, WWF, and elements of local government that conservation activities can be linked with local development efforts.

- Having been accustomed to be involved in the building the dams in the canals, the fishermen demanded that they are also involved in other activities. They were disappointed when the replanting project, facilitated by other institution carried out by contractors who bring workers from outside.

- Climate change is felt by the fishermen in Sebangau as the change of seasons, where is no longer predictable. Usually fishermen prepare different types of fishing equipment for the dry season and rainy season. Now they no longer know what to prepare, and just follow the flow of short-term seasonal changes.

- Regarding the benefits of canals blocking, the fishermen said that:

- Lakes that were once dried due to the building of the canals, now reflooded with water and become breeding sites for the fish. From these symptoms, fish populations should normally increase. However, because the fishermen who catch fish also increased (possibly coupled with fishermen and anglers from outside of the area), then the local fishermen just do not feel the increase in fish catches.
- In the dry season fishes still can be found behind the dams. Before the canals blocked fishes run to other location, while the canals dried within the first month in the dry season.
- Fire is much reduced. Even some fishermen convey that fire accidents reduced to 50% when compared with the period before canals blocked up.
- There is still a supply of water in the dry season to extinguish the fire.
- Because there is still water in the blocked canals, in the dry season *jelutung* sap can still be transported out of the forest area.

- To keep the area from fires and also to overcome the electrocution of fish, the fishermen agreed to re-establish customary rules formerly applicable. *Damang Kepala Adat* said that the customary rules can be updated to cope with new problems. For example, there is existing customary rule that forbid anyone to use the *tuba* (natural poison) to catch fish. Definition of the word "*tuba*" can be extended to the use of chemical poison and electrocution.

5. Follow-up Notes

Some notes for follow up:

- *Damang Kepala Adat* of Sub-district Sabangau will begin collecting customary rules that exist, and then compile them in a book form. There are suggestions from the fishermen that the customary rules that have been recorded as a book also submitted to the Palangka Raya Municipality and Pulang Pisau District Government, to be distributed to the citizens who are concerned with the utilization of natural resources in Sebangau region.
- One indicator of the canals blocking benefits for society, as we assume, is the increase of fish populations. The possibility of the fish population growth is not perceived at the level of individual fishermen, because the number of fishermen also increased. We should think about other measurable indicators or proxy indicators to demonstrate the benefits to the society.
- Fishermen reported dams that is damaged and leaking. Some fishermen proposed the improvement of its construction. Construction of new dams should involve local fishermen in the plan, up to the monitoring and evaluation. Thus, their ownership of the dams are stronger built, and they will jointly maintain it because felt the benefits for their economies.
- Fishermen also proposed to add dams to the segments of a long canal, and also at the mouth of small river like River Bangah. In the case of River Bangah, as to avoid a wide dam construction, fishermen proposed a narrow location below a natural lake.

MEMORANDUM OF EVENT⁸⁹

On this day, Tuesday September the twenty year two thousand and eleven, in the Socialization of Climate Change Mitigation in Sebangau National Park held in Sanitra Sebangau Indah, we:

1. Jumady A. Usup, as representative of the holder of the Right to Fishing on the River Bakung;
2. Cakun, as representative of the holder of the Right to Fishing on the River Rasau; and
3. Bahran and Rusliansyah, as representatives of the holder of the Right to Fishing on the River Bangah;

state with the fact that:

1. We inherit these rights on from generation to generation.
2. We do not mind if canal blocking on the rivers mentioned above are registered as an effort to reduce of greenhouse gas emission (REDD+).

Meanwhile, to keep the area from adverse actions, we agreed to implement customary laws based on guidance from the *Damang Kepala Adat* (Customary Chief) in their respective areas.

Accordingly, the Minutes was made in quadruplicate (4) to be used as appropriate.

Sanitra Sebangau Indah, 20 September 2011

Representative of the Rights Holder
on River Bakung

JUMADY A. USUP

Representative of the Rights Holder
on River Rasau

CAKUN

Representative of the Rights Holder
on River Bangah

BAHRAN

RUSLIANSYAH

Done in the presence of,

Village Head of Kereng Bangkirai

NURDIN

Chairman of Kereng Bangkirai
Village Community Institution

M. DIMBE

Sabangau Customary Chief

BASEL A. BANGKAN

Head of Sabangau Sub-district

NURANI MAHMUDIN

Village Head of Paduran Sebangau

AFNER GUNTUR

Chairman of Paduran Sebangau
Village Consultative Body

PANDIANSYAH

Sebangau Kuala Customary Chief

IJEN I. PITER

Head of Sebangau Kuala Sub-district

H. M. ISTANI

⁸⁹ Translation from the original document in Bahasa Indonesia.

MEMORANDUM OF UNDERSTANDING⁹⁰

DEMONSTRATION ACTIVITY REDUCTION EMISSIONS FROM DEFORESTATION AND FOREST
DEGRADATION

IN RIVER BAKUNG, RIVER RASAU AND RIVER BANGAH

SEBANGAU NATIONAL PARK, CENTRAL KALIMANTAN PROVINCE

BETWEEN

WWF - INDONESIA CENTRAL KALIMANTAN

AND

RIGHTS HOLDER OF RIVER BAKUNG

AND

RIGHTS HOLDER OF RIVER RASAU

AND

RIGHTS HOLDER OF RIVER BANGAH

AND

KERENG BANGKIRAI VILLAGE COMMUNITY INSTITUTION

AND

PADURAN SEBANGAU VILLAGE CONSULTATIVE BODY

AND

VILLAGE GOVERNMENT OF KERENG BANGKIRAI

AND

VILLAGE GOVERNMENT OF PADURAN SEBANGAU

AND

COMMUNITY FORUM OF SABANGAU

AND

COMMUNITY FORUM OF SEBANGAU KUALA

AND

CUSTOMARY CHIEF OF SABANGAU

AND

CUSTOMARY CHIEF OF SEBANGAU KUALA

⁹⁰ Translation from the original document in Bahasa Indonesia.

On this day, on Monday April the second Year Two Thousand Twelve, each of the undersigned:

1. DIDIEK SURJANTO, Socio-Economic Development Coordinator WWF-Indonesia, based in Central Kalimantan, Palangka Raya, in this case acting for and on behalf of WWF-Indonesia Central Kalimantan, hereinafter called the FIRST PARTY.
2. JUMADY A. USUP, Authorization for the Heirs of Rights Holder on River Bakung, based in Kereng Bangkirai, in this matter acting for and on behalf of the rights holders on River Bakung, hereinafter called the SECOND PARTY.
3. CAKUN, Authorization for the Heirs of Rights Holder on River Rasau, based in Kereng Bangkirai, in this matter acting for and on behalf of the rights holders on River Rasau, hereinafter called the THIRD PARTY.
4. BAHRAN and RUSLIANSYAH, Authorization for the Heirs of Rights Holder on River Bangah, based in Kereng Bangkirai, in this matter acting for and on behalf of the rights holders on River Bangah, hereinafter called the FOURTH PARTY.
5. M. DIMBEE, Chairman of Kereng Bangkirai Village Community Institution, based in Kereng Bangkirai, in this matter acting for and on behalf of the residents of Kereng Bangkirai Village, hereinafter called the FIFTH PARTY.
6. YUNITA, Member of Paduran Sebangau Village Consultative Body, based in Paduran Sebangau, in this matter acting for and on behalf of residents of the Paduran Sebangau Village, hereinafter called the SIXTH PARTY.
7. NURDIN, S.Sos, Village Head of Kereng Bangkirai, based in the city of Palangka Raya, in this matter acting for and on behalf of the Kereng Bangkirai Village, hereinafter referred to as the SEVENTH PARTY.
8. RUDY HAMID, Village Head of Sebangau Paduran, based in Paduran Sebangau, in this matter acting for and on behalf of the Paduran Sebangau Village, hereinafter referred to as the EIGHTH PARTY.
9. SABRAN H. M. USIN, SH, Chairman of the Sabangau Community Forum, based in Kereng Bangkirai, in this matter acting for and on behalf of the Sabangau Community Forum, hereinafter referred to as the NINTH PARTY.
10. IDARWAN, SE, Chairman of Sebangau Kuala Community Forum, based in Sebangau Permai, in this matter acting for and on behalf of the Sebangau Kuala Community Forum, hereinafter referred to as the TENTH PARTY.
11. BASEL A. BANGKAN, Customary Chief of Sabangau, based in Kereng Bangkirai, in this matter acting for and on behalf of *Kedamangan* (Customary Area of) Sabangau, hereinafter referred to as the ELEVENTH PARTY.

12. IJEN I. PITER, Customary Chief of Sebangau Kuala, based in Paduran Mulya, in this matter acting for and on behalf of *Kedamangan* Sebangau Kuala, hereinafter referred to as the TWELFTH PARTY.

In this agreement FIRST PARTY, SECOND PARTY, THIRD PARTY, FOURTH PARTY, FIFTH PARTY, SIXTH PARTY, SEVENTH PARTY, EIGHTH PARTY, NINTH PARTY, TENTH PARTY, ELEVENTH PARTY, and TWELFTH PARTY hereinafter referred to as THE PARTIES agree to cooperate, including:

Demonstration Activity of Reduction Emissions from Deforestation and Forest Degradation

Rationale:

Sebangau National Park including large area in size, covers an area more or less 568,700 hectares. Located between two big rivers, River Sebangau and River Katingan, with many tributaries and lakes up to the center of the Park. Purpose of the enactment of the Sebangau National Park is to save the peat swamp forest ecosystem and its biodiversity and natural uniqueness for the sake of improving the quality of human life and the generations to come.

Sebangau area designated as a National Park from which was once a Production Forest. Traces of timber production seem from the many canals built to take out the timber harvested from the forest. The canals shown to cause rapid drying of peat swamp in the dry season. As a result the peat become flammable, no longer able to absorb water, and reduced its ability as the habitat of protected flora and fauna, including the loss of fisheries resources for the benefit of surrounding communities.

In order to maintain ecosystem functions Sebangau TN area can run optimally, it needs restoration efforts, especially regarding the water system in the region. Restoration of peat swamp forest ecosystem, in a way of making dams to close the canal has been successfully performed in the tributary of River Bakung, River Rasau, and River Bangah since 2004.

In 2008, after developing an understanding of climate change, it is known that the effort to keep the peat in wet condition with the channel blocking also reduce the release of greenhouse gases. Then through the scheme Reducing Emissions from Deforestation and Forest Degradation, restoration efforts are likely to obtain forest carbon credits.

Forest carbon scheme developed in Sebangau National Park can be categorized as a demonstration activity because it: (i) conducts the testing and development of technologies to reduce carbon emissions from peatlands: (ii) perform the testing and development of measurement methods on peat carbon emissions, (iii) pilot benefit-sharing scheme between the National Park Authority with the surrounding communities, which traditionally use natural resources in place. Presidential Regulation No. 61 of 2011 on the National Action Plan for Greenhouse Gas Emissions Decrease sets restoration in the Park as demonstration activity in the peatland conservation area.

REDD+ mechanism has not been set completely, both nationally and internationally. However, based on the result of the Socialization of Climate Change Mitigation in Sebangau National Park held in, which was held at Sanitra Sebangau Indah (SSI) Field Camp on September 20, 2011, THE PARTIES make the following agreement:

1. Rights holders of River Bakung, River Rasau and River Bangah approved that the canal blocking in the region listed on REDD+ scheme.
2. WWF-Indonesia to facilitate the preparation and registration of REDD+ activities documents.
3. The progress of REDD+ pilot activities registration, either success or failure, will always be communicated by WWF-Indonesia to THE PARTIES who signed this Memorandum of Understanding.
4. If the REDD+ pilot activities succeeded in obtaining compensation for carbon credits, the distribution and its utilization will be discussed further by THE PARTIES who signed this Memorandum of Understanding.
5. In order to get benefit in a sustainable manner, THE PARTIES in their respective capacity will keep the activities that could thwart efforts to reduce greenhouse gas release (e.g., fires, illegal logging, wildlife poaching, fishing with poison / electricity, etc.) does not occur in the region in question.
6. This agreement shall come into force from the date of this Memorandum of Understanding was signed, and if irregularities are found and there are things that have not been set, this MoU will be reviewed.

Accordingly, an agreement was made as a form of engagement of THE PARTIES and become a reference in the implementation of related activities.

To the agreement:

FIRST PARTY,	SECOND PARTY,	THIRD PARTY,
<u>DIDIEK SURJANTO</u>	<u>JUMADY A. USUP</u>	<u>CAKUN</u>
FOURTH PARTY,	FIFTH PARTY,	SIXTH PARTY,
<u>BAHRAN DAN RUSLIANSYAH</u>	<u>M. DIMBEE</u>	<u>YUNITA</u>
SEVENTH PARTY,	EIGHT PARTY,	NINTH PARTY,
<u>NURDIN, S.Sos</u>	<u>RUDY HAMID</u>	<u>SABRAN H.M. USIN, SH</u>
TENTH PARTY,	ELEVENTH PARTY,	TWELFTH PARTY,
<u>IDARWAN, SE</u>	<u>BASEL A. BANGKAN</u>	<u>IJEN I. PITER</u>

Documentation of Communication Mechanism for DA REDD+ in Sebangau National Park

REDD is a complex project, involving stakeholders at different levels. Community who live in and surrounding the project area should be engaged and attain information about the project. They are the first who experience the impacts of the new kind management of land and resources use, which in certain degree brings limitation of access. People in the project area would also taking roles for keeping the area, and bear the risk if the project failed. An effective mechanism of communication between project proponent and the relevant communities should be properly established, as to support the success of the project. Communication mechanism would also promoting mutually constructive relationship, while providing an effective way to address community concerns.

The main goal of the establishment of a communication mechanism are as follows:

- Provide an effective means to convey information about the project to the relevant stakeholders.
- Provide a clear access for the community to expressing their concerns.
- Provide clear and definite procedures for handling complaints.
- Provide and effective procedures to resolve disputes and problems occurred in the preparation and implementation of the project.

Design of communication channeling and dispute resolution consulted with the Head of Sebangau National Park and *Damang Kepala Adat* (Customary Chief). Communication between the project and community arranged following the National Park management structure. At the site and village level communication handled by the Resort Management Units. There are two resorts in the project area, i.e., River Mangkok Resort and River Bangah Resort. The two resorts will supported by other resorts which located at nearby villages, i.e., one at Kereng Bangkirai and the other at Paduran Sebangau. Inquiries and complaints from community also accommodated by Resort Management Units. Thereby, National Park staff assigned at these resorts should hold updates of the project development.

Sometimes people do not have enough confidence to ask questions or report directly to the government officers. In the case they can bring up their concerns through the Village Representative Board or through the Village Head. Members of the Board elected every five years, and have a role to represent the community in formal situations. The Boards exist at Kereng Bangkirai and Paduran Sebangau Village.

At the higher level, there are two Section Management Units which coordinate and supervise staff in the Resort Units, i.e., Palangka Raya Section and Pulang Pisau Section. Section Management Units handle communication and complaints at subdistrict level. The community, at this level, may represent by Community Forums or by *Camat* (Subdistrict Head). Members of the forum also elected every five years and represent the community in a broader situations. The Forums established in six subdistrict around Sebangau National Park in 2006. Role of the Forums is to represent community concerns on the management of the National

Park. The Forums fostered to be effective partner in the National Park Management through informal channels.

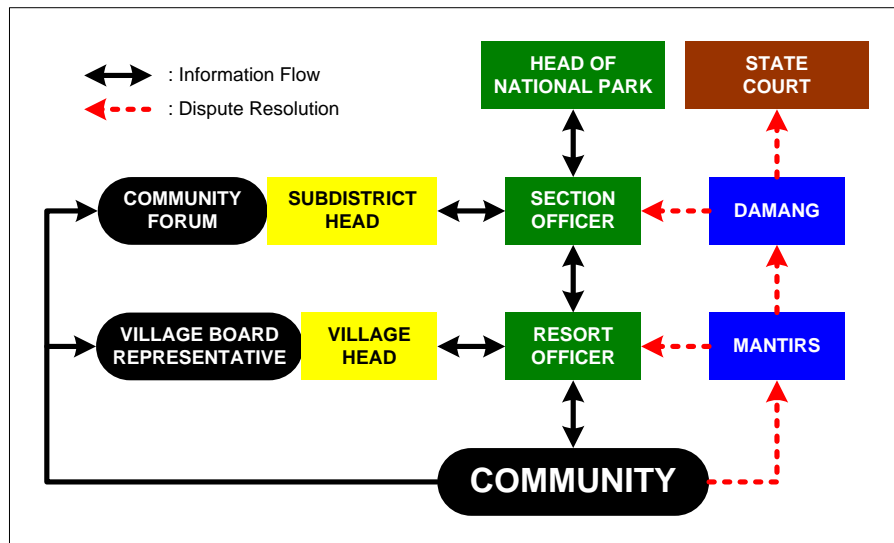


Chart of Communication and Dispute Resolution

Problems are often resolved more easily, cheaply, and efficiently when they are dealt with early and locally. Any complaints and disputes firstly will be resolved at the lowest level of coordination, i.e. at the Resort Management Units. Any dispute which need judgements and involving local customs would be handled by customary elders. There are *Mantirs* at village level who will help to resolve disputes at village level. *Mantirs* coordinate the matters with the Resort Management Unit. If the matters need higher level of authority, it will raise up to the *Damangs*, who stay at Sabangau and Sebangau Kuala Subdistrict. In the case, the *Damangs* coordinate with Section Management Unit.

If only the matters cannot be settled at the above points, it will bring up to the Head of National Park Management Unit. The Official will find the best solutions, and if it still cannot resolved at the National Park Management Unit the dispute will be brought to the state court.

Community life is very dynamic, as well as the carbon project. A flexible mechanism of communication and resolution should be placed to anticipate any change occurred in the field, and also at policy level. Evaluation on the mechanism performed at the end of each fiscal year, involving National Park Management Unit, representatives of the community, Customary Chiefs, as well as representatives of the government at village and subdistrict level. Officials at higher level and academia could be consulted to get a broader views. Adjustment will be made based on the evaluation.

**ARAHAN PROGRAM DAN RENCANA
OPERASIONAL**

**PEMANFAATAN JASA LINGKUNGAN
REDD+ DI KAWASAN
TAMAN NASIONAL SEBANGAU DAN
TAMAN NASIONAL TESSO NILO**

ANTARA
DIREKTORAT PEMANFAATAN JASA
LINGKUNGAN KAWASAN KONSERVASI
DAN HUTAN LINDUNG
(PJLK2HL)
DENGAN
YAYASAN WWF INDONESIA



Disetujui dan disepakati oleh kedua belah pihak

Di : Bogor

Pada tanggal : 1 Maret 2011

Nomor Dit. PJLK2HL : PKS .1/PJLKKHL-6/2011
Nomor WWF-Indonesia : 01/POSPFW/WWF-TDP/03-11

PIHAK KEDUA

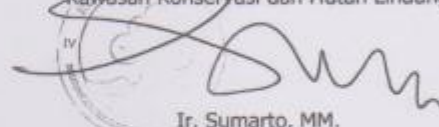
WWF Indonesia
Direktur Kehutanan, Spesies dan
Air Tawar



Ir. Anwar Parwoto, M.Sc.

PIHAK PERTAMA

Direktorat Pemanfaatan Jasa
Lingkungan
Kawasan Konservasi dan Hutan Lindung



Ir. Sumarto, MM.
NIP. 19610708 198703 1 002

KATA PENGANTAR

Pemanfaatan jasa lingkungan secara berkelanjutan merupakan salah satu upaya konservasi sumber daya alam hayati dan ekosistemnya yang berperan sangat penting dalam mempertahankan keberadaan keanekaragaman hayati (*biodiversity*) sekaligus turut mendukung pembangunan nasional yang berkelanjutan.

Salah satu pemanfaatan jasa lingkungan adalah perdagangan karbon. Perdagangan karbon merupakan inisiatif internasional untuk merespon perubahan iklim akibat dari peningkatan jumlah emisi di atas permukaan bumi. Kementerian Kehutanan bekerjasama dengan WWF-Indonesia telah melakukan Perjanjian Kerjasama upaya-upaya konservasi yang ditandatangani pada tanggal 13 Maret 1998. Kegiatan pemanfaatan jasa lingkungan melalui pembuatan *Demonstration Activities* (DA's) REDD+ di 2 (dua) kawasan konservasi yaitu di Taman Nasional Sebangau dan Taman Nasional Tesso Nilo menjadi salah satu kegiatan penjabaran dari kerjasama tersebut. DA's penyerapan dan penyimpanan karbon tersebut dimaksudkan sebagai lokasi percontohan yang hasilnya akan dipergunakan sebagai bahan acuan untuk penyusunan kebijakan perdagangan karbon di kawasan konservasi lainnya.

Kami mengucapkan terima kasih kepada semua pihak yang telah membantu penyusunan arahan program dan rencana operasional pemanfaatan jasa lingkungan REDD+ di kawasan Taman Nasional Sebangau dan Taman Nasional Tesso Nilo. Semoga kegiatan kerjasama ini dapat berjalan dengan baik dan bermanfaat bagi kedua belah pihak, masyarakat, dan negara.

Direktur PJLK2HL,

Ir. Sumarto, MM.

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I. PENDAHULUAN

A. LATAR BELAKANG

Berdasarkan Rencana Strategis Direktorat Pemanfaatan Jasa Lingkungan Kawasan Konservasi dan Hutan Lindung (PJK2HL), Kementerian Kehutanan 2010 – 2014, salah satu sasaran strategis yang dinyatakan dalam Indikator Kinerja Utama (IKU) dalam pemanfaatan jasa lingkungan adalah Pengembangan 2 (dua) *Demonstration Activities* (DA's) REDD+ di kawasan konservasi. Sebagai bentuk implementasi renstra tersebut Taman Nasional (TN) Sebangau dan Taman Nasional (TN) Tesso Nilo telah dipilih sebagai lokasi pengembangan DA's di kawasan konservasi.

Pemilihan lokasi TN Sebangau didasari pada keunikan kawasan yang memiliki karakteristik lahan didominasi oleh gambut dan juga sebagai habitat satwa liar Orang Utan (*Pongo pygmaeus*). Lahan gambut merupakan salah satu jenis habitat alam yang disatu sisi memiliki cadangan biomass besar tetapi disatu sisi juga berpotensi sebagai sumber pelepasan emisi bila tidak dikelola dengan baik. Sedangkan kawasan TN Tesso Nilo merupakan salah satu contoh ekosistem hutan hujan tropis yang menjadi habitat bagi beberapa satwa penting Sumatera seperti Gajah (*Elephas maximus sumatranus*) dan Harimau (*Panthera tigris sumatrae*). Saat ini TN Tesso Nilo menjadi salah satu kawasan konservasi yang menghadapi tantangan besar dari aktivitas ekonomi di sekitarnya yang sejauh ini berdampak negatif terhadap keutuhan kawasan.

Sejalan dengan prioritas Kementerian Kehutanan tersebut, WWF-Indonesia sebagai salah satu mitra Kementerian Kehutanan telah memiliki program pengembangan DA's REDD+ di TN Sebangau dan TN Tesso Nilo, sedangkan kemitraan pembangunan DA's REDD+ dapat diwujudkan.

B. TUJUAN

Arahan Program dan Rencana Operasional ini dibuat sebagai penjabaran perjanjian kerjasama No. :188/DJ-VI/Binprog/1998 dan No. CR/026/III/1998 tanggal 13 Maret 1998 yang ditandatangani oleh Direktur Jenderal Perlindungan Hutan dan Konservasi Alam (PHKA) dengan WWF-Indonesia dalam rangka pelaksanaan program Konservasi Sumber Daya Alam Hayati dan Ekosistemnya di Indonesia.

Arahan program ini bertujuan untuk meningkatkan pemanfaatan jasa lingkungan melalui implementasi REDD+ di kawasan konservasi khususnya di TN Sebangau dan TN Tesso Nilo.

II. PROGRAM KEGIATAN DAN JADWAL PELAKSANAAN**A. ARAHAN PROGRAM**

Pelaksanaan kegiatan dilakukan selama jangka waktu 5 (lima) tahun dimulai pada tahun 2011 sampai tahun 2016 dengan mengacu pada Renstra Direktorat PJLK2HL dan program kerja WWF-Indonesia. Pelaksanaan kegiatan di lapangan dilakukan selambat-lambatnya 3 (tiga) bulan setelah ditandatanganinya arahan program dan rencana operasional yang telah disepakati bersama dengan garis besar arahan program, jadwal pelaksanaan dan rencana anggaran seperti yang tertuang dalam Tabel 1. di bawah ini.

Tabel 1. Arahan Program, Jadwal Pelaksanaan dan Rencana Anggaran

No.	Arahan Program	Penjelasan	Jadwal pelaksanaan	Rencana anggaran (x juta)
1.	<i>Carbon Baseline</i>	a. Menghitung dan menetapkan REL dan RL di lokasi proyek sebagai baseline dengan tingkat akurasi tier	2011-2012	1.500

		3. b. Perancangan/kajian teknis, regulasi, administrasi dan simulasi teknis.		
2.	MRV (Carbon, biodiversity dan sosial ekonomi) dan Validasi	MRV tidak hanya pada aspek karbon tetapi keragaman hayati dan sosial ekonomi dengan referensi pada standar VCS/CCBS	2011 - 2013	3.400
3.	Peningkatan kapasitas	a. Meningkatkan kapasitas individu dan lembaga terkait yang akan terlibat dalam implementasi REDD+ di lokasi terkait. b. Seminar/workshop.	2011 - 2016	1.000
4.	Pelaksanaan pengurangan emisi	Intervensi dalam bentuk aktivitas mitigasi yang berdampak pada pengurangan emisi di lapangan : a. Pembangunan KSDA Terapan/Go Green (penyusunan juknis, demplot, sosialisasi dan	2011 - 2016	18.000

		<p>penerapan skala luas).</p> <p>b. Pembuatan Permanent Sample Plot (PSP) pengawetan keanekaragaman hayati, pembinaan habitat dan populasi (penyusunan juknis, demplot, sosialisasi dan penerapan skala luas).</p> <p>c. Peningkatan keanekaragaman hayati melalui perbaikan habitat keanekaragaman satwa.</p> <p>d. Pemberdayaan masyarakat yang bertujuan perlindungan melalui pemanfaatan HHBK dan pemantapan batas luar kawasan hutan/<i>green belt</i> (penyusunan</p>		
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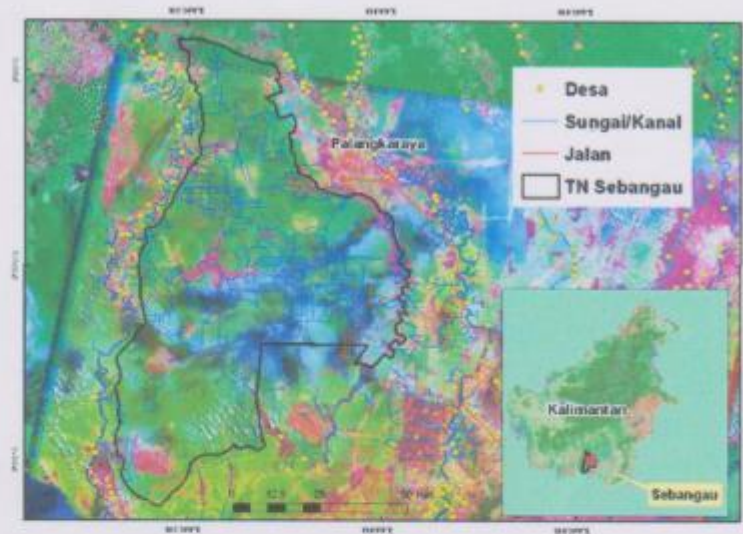
		<p>juknis, demplot, sosialisasi dan penerapan skala luas).</p> <p>e. Sertifikasi usaha ekonomi masyarakat berbasis sumberdaya TN.</p> <p>f. Pemanfaatan jasa lingkungan (penyusunan juknis, demplot, sosialisasi dan penerapan skala luas).</p> <p>g. Pengembangan wisata alam.</p>		
5.	Penguatan kelembagaan	a. Mengembangkan lembaga pengelola REDD+ yang mandiri dengan kapasitas untuk mengembangkan potensi pendanaan melalui dana publik dan pasar, mengembangkan mekanisme pembagian keuntungan	2011 - 2013	1.000

		(<i>benefit sharing mechanism</i>).		
		b. Konsultasi publik pembangunan DA's REDD+.		

Lokasi kegiatan yang terdapat dalam arahan program ini adalah di TN Sebangau, Propinsi Kalimantan Tengah dan TN Tesso Nilo, Propinsi Riau.

1. Taman Nasional Sebangau

Taman Nasional (TN) Sebangau di Propinsi Kalimantan Tengah merupakan salah satu Taman Nasional di Indonesia yang cukup luas. Wilayah TN Sebangau luasnya sekitar 568.700 ha yang luasannya tersebar yaitu 341.220 ha (60%) berada di Kabupaten Katingan, 170.610 ha (30%) berada di Kabupaten Pulang Pisau, dan 56.870 ha (10%) kawasan berada di Kota Palangkaraya sebagaimana terlihat dalam Gambar 1. di bawah ini.



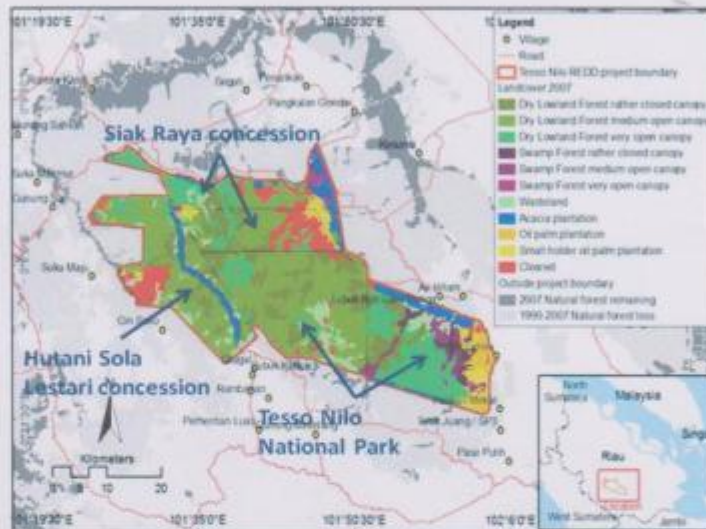
Gambar 1. Peta Kawasan Taman Nasional Sebangau

Di sekitar kawasan TN Sebangau terdapat sekitar 46 (empat puluh enam) desa, dimana kehidupan masyarakatnya bergantung dari hasil hutan kayu dan non kayu yang berasal dari dalam kawasan.

TN Sebangau merupakan kawasan bergambut yang memiliki keanekaragaman hayati yang tinggi terdiri dari potensi flora dan fauna. Kawasan ini merupakan habitat bagi satwa liar Orang utan Kalimantan (*Pongo pygmaeus*). Salah satu permasalahan pada kawasan ini adalah emisi dari gambut yang disebabkan oleh menurunnya muka air karena proses kanalisasi yang dibuat sebagai jalur transportasi kayu sebelum kawasan ini menjadi taman nasional. Intervensi utama proyek REDD+ pada kawasan ini adalah menaikkan muka air sehingga dapat menggenangi permukaan gambut yang berakibat menghambat emisi gambut. Pada saat ini lebih dari 650 dam sudah dibangun semenjak tahun 2005.

2. Taman Nasional Tesso Nilo

Kawasan Tesso Nilo ditetapkan menjadi taman nasional pada tahun 2008 dengan luas 82,858 ha. Taman Nasional (TN) Tesso Nilo secara administratif terletak di Kabupaten Pelalawan, Propinsi Riau sebagaimana terlihat pada Gambar 2. bawah ini.



Gambar 2. Peta Kawasan Taman Nasional Tesso Nilo

Pada bagian utara dan barat kawasan ini berbatasan dengan hutan produksi yaitu HPH PT. Hutani Sola Lestari (36,185 ha) dan PT. Siak Raya Timber (39,779 ha) dan pada bagian selatan berbatasan dengan perkebunan sawit PT. Inti Indo Sawit dan PT. Musim Mas. Pada bagian timur berbatasan dengan Hutan Tanaman Industri akasia PT. Arara Abadi dan PT. RAPP.

Di sekitar TN Tesso Nilo terdapat 22 (dua puluh dua) desa, yang dihuni sekitar 45.000 jiwa. Desa-desa ini merupakan bagian dari Kabupaten Pelalawan, Indragiri Hulu, Kuantan Singingi dan Kampar.

Kawasan ini merupakan salah satu kawasan prioritas konservasi kunci bagi keberlangsungan hidup satwa liar Harimau (*Panthera tigris sumatrae*) dan Gajah Sumatera (*Elephas maximus sumatranus*) yang terancam punah. Sampai dengan saat ini, diperkirakan masih terdapat 15-20 ekor Harimau Sumatera dan 70-100 ekor Gajah Sumatera yang terdapat dalam kawasan ini.

Berdasarkan hasil studi yang telah dilaksanakan oleh Lembaga Ilmu Pengetahuan Indonesia (LIPI), ditemukan bahwa kekayaan jenis flora pada kawasan ini melebihi kekayaan flora pada tempat lainnya di Sumatera. Dengan demikian LIPI merekomendasikan kawasan ini kepada Kementerian Kehutanan sebagai kawasan yang dilindungi. Salah satu permasalahan dalam kawasan ini adalah adanya ancaman konversi lahan menjadi lahan pertanian perkebunan kelapa sawit massif oleh masyarakat, khususnya yang dilakukan oleh para pendatang. Pada tahun 2009, sekitar 28.000 ha kawasan sudah dirambah menjadi perkebunan kelapa sawit yang diduduki hampir 2.000 kepala keluarga.

Dalam pelaksanaan program, WWF Indonesia berkoordinasi dengan Direktorat PJLK2HL, sedangkan dalam pelaksanaan kegiatan dilapangan, WWF Indonesia di Palangka Raya berkoordinasi dengan pihak Balai TN Sebangau dan di Pekanbaru dengan Balai TN Tesso Nilo.

Arahan program disertai dengan Rencana Kerja Lima tahunan (RKL) yang selanjutnya akan dituangkan dalam Rencana Kerja Tahunan (RKT) yang disusun dan disetujui bersama antara WWF-Indonesia dan pihak Balai Taman Nasional. RKT disusun dan disetujui bersama oleh Kepala Balai TN terkait dan Project leader WWF-Indonesia terkait berdasarkan RKL dengan dikonsultasikan kepada Direktur PJLK2HL dan Direktur Program Kehutanan WWF-Indonesia.

B. PELAPORAN DAN EVALUASI

1. Pelaporan

- a. Laporan Tahunan akan disusun bersama Balai TN Sebangau dan WWF Indonesia di Palangka Raya untuk kegiatan di TN Sebangau dan WWF Indonesia di Pekanbaru dengan Balai TN Tesso Nilo untuk TN Tesso Nilo. Laporan tersebut disampaikan kepada Direktur Jenderal PHKA atau Sekditjen PHKA, Direktur PJLK2HL, apabila dipandang perlu atas persetujuan kedua belah pihak.
- b. Laporan tahunan berisi perkembangan pelaksanaan, rencana operasional termasuk permasalahan yang dihadapi.
- c. Laporan akhir disusun oleh Balai TN Sebangau dan WWF Indonesia di Palangka Raya untuk TN Sebangau dan Balai TN Tesso Nilo dan WWF Indonesia di Pekanbaru untuk TN Tesso Nilo setelah masa Perjanjian Kerjasama berakhir dan diserahkan kepada Direktur Jenderal PHKA paling lambat 3 (tiga) bulan sebelum berakhirnya Perjanjian Kerjasama.

2. Monitoring dan Evaluasi

- a. Monitoring dilaksanakan oleh Direktur PJLK2HL dan WWF Indonesia
- b. Evaluasi akan dilaksanakan dua kali dalam siklus proyek dengan waktu yang disepakati kedua belah pihak.
- c. Setiap akhir tahun Balai TN Sebangau dan Balai TN Tesso Nilo akan menyusun laporan perkembangan kegiatan tahunan dan melaporkan kepada Ditjen PHKA.
- d. Laporan perkembangan kegiatan tahunan disusun untuk memonitor, mengarahkan dan memperbaiki pelaksanaan kegiatan yang disesuaikan dengan perencanaan.
- e. Evaluasi akhir dilaksanakan selambat-lambatnya 6 (enam) bulan sebelum kerjasama berakhir untuk menilai dan

mempertimbangkan keberlanjutan kerjasama dengan memperhatikan hasil kerjasama yang telah dicapai.

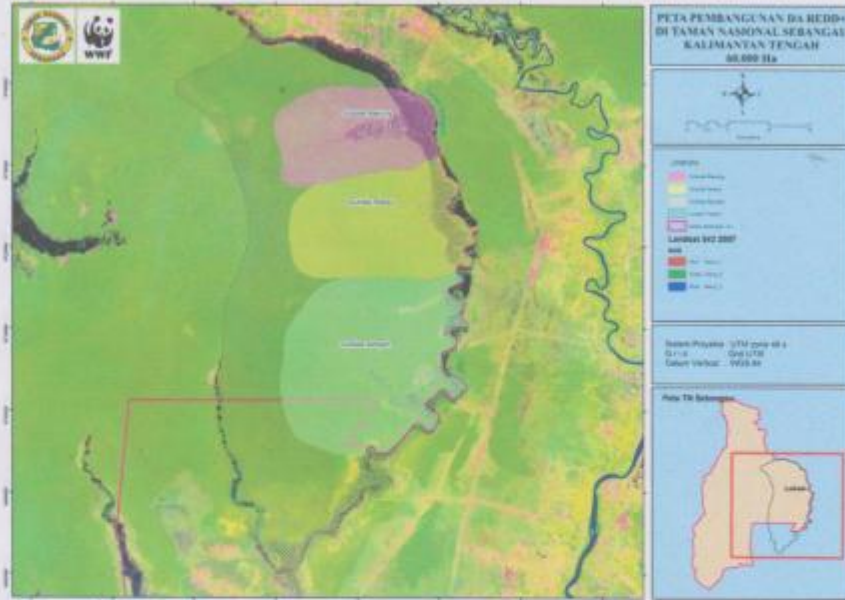
III. PENGGUNAAN TENAGA AHLI

Pengaturan penggunaan tenaga ahli dalam hal apabila diperlukan dalam pelaksanaan program dan kegiatan pemanfaatan jasa lingkungan DA's REDD+ ini akan dilakukan dengan mengacu pada aturan yang berlaku dan persetujuan kedua belah pihak.

IV. PENUTUP

Arahan program ini menjadi acuan dalam penyusunan RKL dan RKT yang terpisah untuk setiap kawasan TN Sebangau dan TN Tesso Nilo.

LAMPIRAN





KEMENTERIAN KEHUTANAN
DIREKTORAT JENDERAL PERLINDUNGAN HUTAN DAN KONSERVASI ALAM
BALAI TAMAN NASIONAL SEBANGAU
 Alamat : Jl. Mahir Mahar KM 1,2 Palangka Raya 73113. Telp. 0536-3327093
 Faks: 0536-3245877 Email: trsebangau@dephut.go.id
KALIMANTAN TENGAH

Nomor : S.PC²/BTNS-1/Jasling/2012 12 Juni 2012
 Sifat : Segera
 Lampiran : 2 (dua) buku
 Perihal : Permohonan Registrasi DA REDD TN Sebangau

Yth. Direktur Jenderal Perlindungan Hutan dan Konservasi Alam
 di
 Jakarta

Menindaklanjuti hasil rapat *Focus Group Discussion (FGD)* tanggal 29-30 Mei 2012 yang membahas draft Peraturan Direktur Jenderal Perlindungan Hutan dan Konservasi Alam tentang Tata Cara Permohonan dan Penilaian *Demonstration Activities* Emisi Karbon Dari Deforestasi dan Degradasi Hutan Konservasi, bersama ini dengan hormat kami sampaikan hal-hal sebagai berikut:

1. Tahun 2010 sampai dengan tahun 2012 merupakan tahapan persiapan didalam pelaksanaan *Demonstration Activities* REDD+ di Taman Nasional Sebangau dan telah dilaksanakan beberapa kegiatan diantaranya peningkatan kapasitas SDM, penyusunan baseline metodologi, penyusunan dokumen pendukung dari hasil pengumpulan data primer maupun sekunder, kegiatan restorasi hidrologis dan ekosistem gambut di lapangan dan penyusunan *Project Design Document* dengan standar tertentu (VCS dan CCBS).
2. Dapat kami sampaikan bahwa Pemanfaatan Jasa Lingkungan REDD+ di Kawasan Taman Nasional Sebangau sudah mendapatkan arahan program dan rencana operasional oleh Direktur Pemanfaatan Jasa Lingkungan Kawasan Konservasi dan Hutan Lindung (PJLKKHL) Ditjen PHKA dan Yayasan WWF Indonesia nomor PKS.1/PJLKKHL-6/2011 dan nomor 01/FOSPPW/WWF-TDP/03-11 tanggal 1 Maret 2011 serta sudah disusun Rencana Kerja Lima Tahun (RKL) Kerjasama Program Pemanfaatan Jasa Lingkungan REDD+ antara Balai Taman Nasional Sebangau dan WWF Indonesia nomor PKS.02/BTNS-1/UM/2011 dan nomor 043/WWF-Ind seb/III/2011 tanggal 1 Maret 2011.
3. Sesuai Peraturan Menteri Kehutanan nomor P.20/Menhut-II/2012 dinyatakan bahwa pemrakarsa kegiatan *demonstration activities* yang telah ada sebelum peraturan ini diundangkan wajib melakukan registrasi.
4. Berkenaan dengan hal-hal tersebut di atas, bersama ini mohon kiranya *Demonstration Activities* REDD+ Balai Taman Nasional Sebangau dapat diregistrasi. Sebagai bahan pertimbangan bersama ini kami sampaikan proposal usulan *Demonstration Activities* REDD+ Balai Taman Nasional Sebangau dengan dilampiri data pendukung diantaranya:
 - a. Data informasi kawasan.
 - b. Rencana Pengelolaan.
 - c. Rancangan *Demonstration Activities*.
 - d. Dokumen pendanaan kegiatan *Demonstration Activities*.

Demikian kami sampaikan, atas perhatian, perkenan dan arahan Bapak lebih lanjut kami ucapkan terima kasih.



Kepala Balai

Ir. Hariyadi
 NIP. 19580501 198903 1 001

Tembusan:

1. Sekretaris Direktorat Jenderal PHKA
2. Direktur PJLKKHL, Direktorat Jenderal PHKA
3. Direktur KKBHL, Direktorat Jenderal PHKA
4. Direktur Kehutanan, Spesies dan Air Tawar WWF Indonesia
5. Program Manager WWF Indonesia Kalimantan Tengah