Plan Vivo Project Design Document
COMMUNITY FOREST ECOSYSTEM SERVICES INDONESIA

Community Forests for Climate, People, and Wildlife
Hutan Desa Durian Rambun, Jambi

Intervention: Avoided Deforestation and Forest Conservation
Baseline: Un-Planned Deforestation

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Executive Summary

Forest-dependent communities on the island of Sumatra are developing an Avoided Deforestation and Degradation (ADD) Payment on Ecosystem Services (PES) project with Fauna & Fauna International (FFI) and local NGOs. The project initially focuses on the village forest (*Hutan Desa* [HD]) Rio Kemunyang in Durian Rambun village in Jambi and is expected to expand into other neighbouring community forests. These village forests are under threat from the migration of new settlers, particularly coffee farmers.

The size of HD Rio Kemunyang is 3,616 ha with 2,516 ha protection zone and 1,100 ha rehabilitation zone. The project will contribute to tree and forest cover protection by securing land tenure and implementing forest protection. These activities will be complemented by livelihood and social programmes developed by the communities. It is anticipated that over a 30-years project period, the project will result in a total of 770,911 tonnes of CO_2 emissions reduction or 25,697 tonnes of CO_2 per annum.

Part A: Aims and objectives

A1 Describe the project's aims and objectives and the problem(s) that the project will address

The community in HD Rio Kemunyang has been supported by NGOs like L-TB (*Lembaga Tiga Beradik*) in the process of obtaining government approval for their HD permits. Further, local and national NGOs provide support to the community in forest management and livelihood activities to assist community in managing their forest sustainably. The community is committed to protect their forest within the project area and to participate in livelihood activities, reducing threats to the forest.

The project intervention for HD Rio Kemunyang is Avoided Deforestation and Forest Conservation, with the objectives:

1) Conservation of natural forest, including old rubber and other tree species
2) Sustainable timber extraction, non-timber forest product (NTFPs) exploitation and maintenance of ecosystem services, and
3) Improving the well-being of the communities

Part B: Site Information

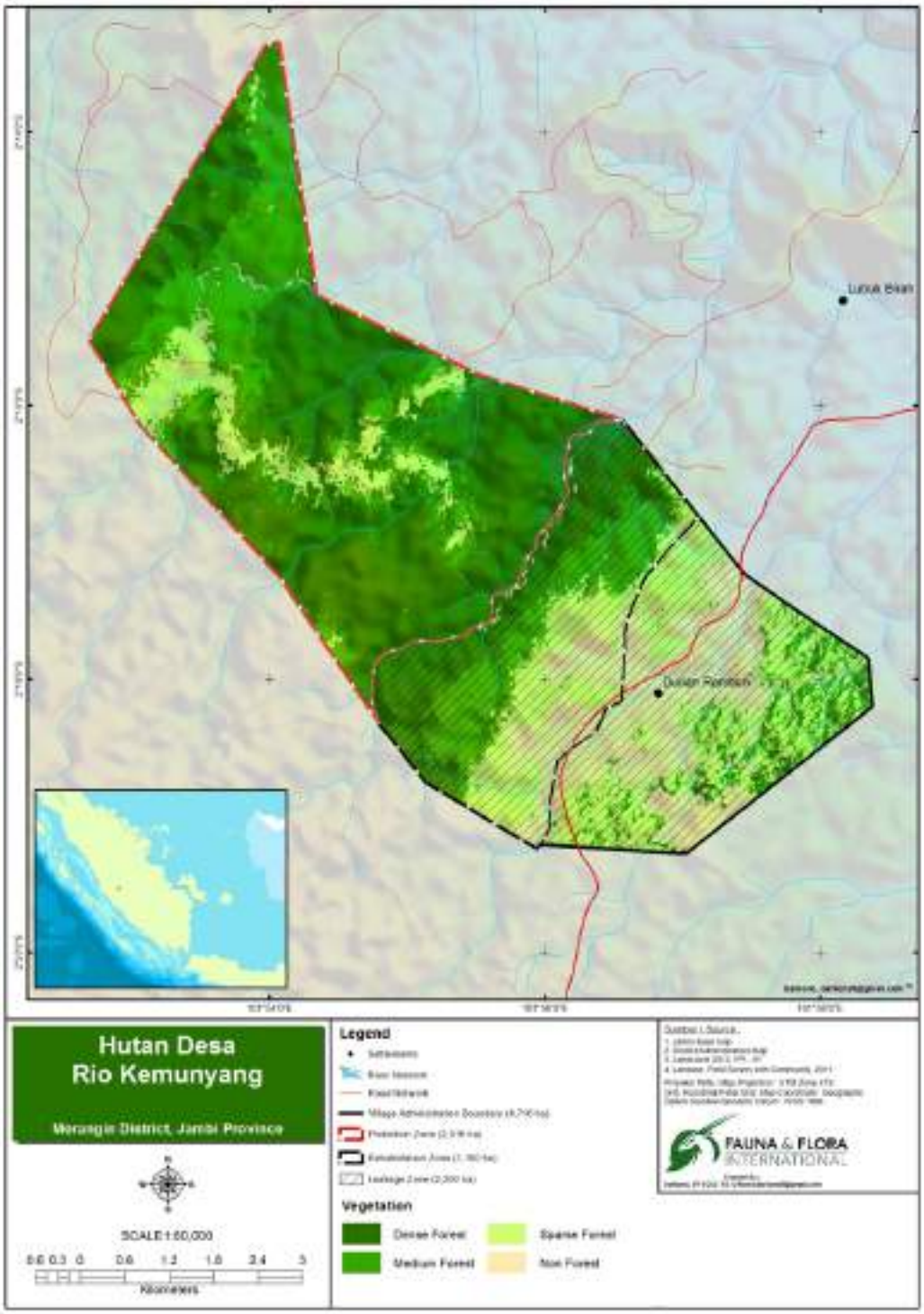
B1 Project location and boundaries

Three categories of boundary are referred to in this technical specification: the village administrative boundary, the HD boundary, and the project boundary (Figure B1). The village administrative boundary (4,719.12 ha) is designated by the Ministry of Interior. In the absence of clear village administrative boundaries, the project has facilitated participatory mapping of these boundaries by the communities and their neighbours. The HD boundary (3,616 ha) is the boundary granted by the Ministry of Forestry to the village community, based on recommendations from the District Head or *Bupati*. The project boundary (2,516 ha) is the boundary where the main project activities happen and where the carbon benefit are being counted and validated against the Plan Vivo Standard.

Durian Rambun village community has done a land-use zonation exercise within their HD boundary. There are two zones: protection zone and rehabilitation zone. The protection zone is the area where no deforestation or forest degradation will occur. The protection zone was delineated on the basis of intact forest cover type, and is the project boundary.

The rehabilitation zone contains less forest cover and is dominated by crops, shrubs, and fallow. Part of its function consists of a food security zone. Community actions that support the main project activities, however, will also occur in this rehabilitation zone. The protection and rehabilitation zones in HD Rio Kemunyang are shown in Figure B1.

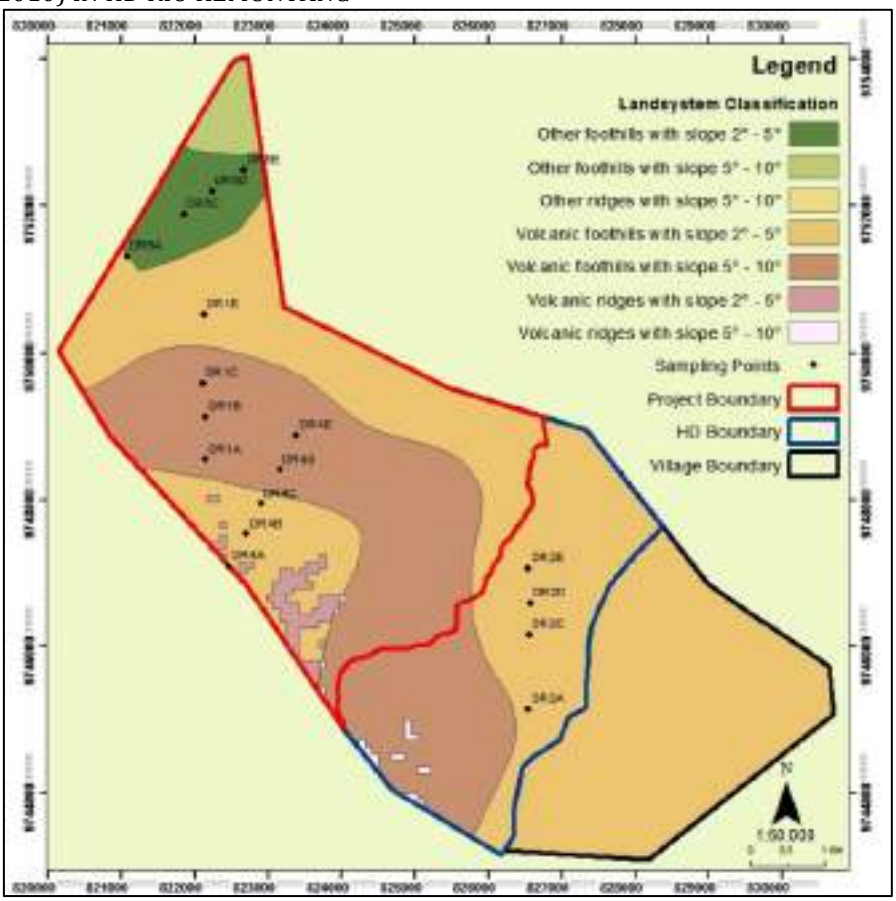
FIGURE B1. LAND COVER MAP OF HD RIO KEMUNYANG OF DURIAN RAMBUN VILLAGE WITH PROTECTION AND REHABILITATION ZONES



B2 Description of the project area (PV requirement 5.1.1)

Administratively, HD Rio Kemunyang is on the village of Durian Rambun under the District of Merangin and Jambi province. The *Hutan Desa* (HD) covers 3,616 ha and lies between 101.9°-101.8°E and 2.2°-2.3°S. Altitude is 377-628 m asl with a slope range between 10-20% (Figure B2). Most of the project area is on volcanic geology, with a small portion of metamorphic ridging, overlain by mineral soils with vegetation dominated by mature secondary lowland tropical rainforest. Based on the government land system map (RePPProT, 1999-1990), more than 90% of HD Rio Kemunyang was formed by Barong Tongkok (BTK), the rest was formed by Bukit Pandan (BPD). BTK was materialised from moderately dissected lava flows that was typically found on volcanic foothills, while the BPD was materialised from a precipitous orientated metamorphic ridges which was typically found on other foothills. This condition showed that the HD Rio Kemunyang is rich in soil nutrient and is suitable to grow any vegetation from monoculture plantation up to natural forest.

FIGURE B2. MAP OF LANDSYSTEM DERIVED FROM REPPPROT (1990) BY SAXON, EARL AND STU SHEPPARD (2010) IN HD RIO KEMUNYANG



Rainfall data is from Jambi City and covers 5 years of rainfall data (2005-2009, in Table B1). Rains peak between October to March with a seasonal high of 237mm in December; lowest rainfall occurs in August, with a low of 78mm. The project area forms part of the Batang Hari watershed and the forests play a critical role in local and regional water supply.

TABLE B1. THE AVERAGE MONTHLY-RAINFALL DATA IN 2005-2009 BASED ON THE NEAREST CLIMATE STATION OF HD RIO KEMUNYANG.

Month	2005	2006	2007	2008	2009

	mm	days	mm	days	mm	days	mm	days	mm	Days
January	253	18	371	16	233	17	233	17	233	17
February	289	12	256	16	293	13	293	13	293	13
March	347	20	167	15	219	14	219	14	219	14
April	78	10	161	25	75	9	75	9	75	9
May	228	11	109	6	109	10	109	10	109	10
June	215	10	169	9	99	5	99	5	99	5
July	206	11	35	5	97	7	97	7	97	7
August	176	7	172	6	78	6	78	6	78	6
September	198	16	188	6	104	14	104	14	104	14
October	135	16	250	11	226	14	226	14	226	14
November	178	10	270	19	222	17	222	17	222	17
December	110	14	244	14	237	18	237	18	237	18
Total	2,413	155	2,392	148	1,992	144	1,992	144	1,992	144
Average²/year	201	13	199	12	166	12	166	12	166	12

HCV assessment in Hutan Desa Durian Rambun was conducted in 2011 by FFI and community teams. As many as 92 tree species were recorded, with 8 belonging to Dipterocarpaceae family. Over 90 tree species considered as High Conservation Value, (with some listed as Critically Endangered species on the IUCN Red list of Threatened Species) were identified from the sampling plots. These include *Heritiera percoriacea* and *Symplocos junghuhnii*. These species are forest dependent species that are usually found in primary and mature secondary tropical forest.

A total 30 mammals species were found in the *Hutan Desa* area during the assessment with 10 of them are considered as HCV species. Those species are includes one species listed as critically endangered (CR), the Sumatran tiger (*Panthera tigris spp sumatrae*); four species listed as endangered (EN), the agile gibbon (*Hylobates agilis*), siamang (*Symphalangus syndactylus*), tapir (*Tapirus indicus*), and the Sumatran surili (*Presbytis melalophos*); two species listed as vulnerable (VU), the sun bear (*Helarctos malayanus*), and the southern red muntjak (*Muntiacus muntjak*); four species listed as appendix I CITES, and eight species listed as protected species under Indonesia's regulation.

A total of 119 bird species were recorded in the *Hutan Desa* area during the assessment. Among these species, 31 species were identified as HCV, including the great argus (*Argusianus argus*), and the blue – banded kingfisher (*Alcedo euryzona*) that are listed as vulnerable (VU) by IUCN; the helmeted hornbill (*Rhinoplax vigil*) that is listed as appendix I by CITES, 16 species that are listed as appendix II by CITES, and 26 species that are protected under Indonesia's laws.

A total of 32 herpetofauna species was recorded in the *Hutan Desa* area. Five species were identified as HCV including two reptiles species, the Sumatran cobra (*Naja numatrana*), and the Dumeril's monitor (*Varanus dumerilii*) that are listed as appendix II by CITES, and three frog species that are endemic for Sumatra.

B3 Recent changes in land use and environment conditions

Since the pre-colonial time, the community in the region depends on rice cultivation and agroforestry as the main sources of income. Now, jungle rubber agroforestry and coffee plantation are the main sources of income in this community. In Durian Rambun village, the community started to practice jungle rubber agroforestry in 2005, when a rubber agroforestry programme was introduced to them by the government, while they started coffee plantations in 2006. Before 2005, the main source income of this community came from cinnamon agroforestry. Rice is produced in upland fields, but a large quantity is imported from outside the village.

The total village forest area is state-designated 'production forest' (*Hutan Produksi, HP*) and was formally part of the PT Injapsin selective logging concession. Logging ceased in 2005. The project area borders Kerinci Seblat National Park (KSNP), a protected area established in 1982 under the jurisdiction of the Ministry of Forests. In the late twentieth century, a section of KSNP adjacent to the project area (the Sipurak Hook) was allocated as a selective logging concession (Sarestra II). It was reinstated as national park in 2004. KSNP is part of the Tropical Rainforest Heritage of Sumatra Natural World Heritage Site (WHS) and it was added to the list of WHS In Danger (sites) in 2011 because of illegal logging, agricultural encroachment and planned construction of new roads. Construction of roads brought more migrants clearing forests to establish lucrative smallholder coffee farming.

B4 Drivers of degradation

The main drivers of land degradation in Jambi Province include planned conversion of forestlands to commercial forestry/agricultural concessions or mining operations, and unplanned deforestation and degradation from illegal logging and mosaic encroachment. In 2009 forest-edge communities in Merangin District launched a campaign against proposed conversion of 80,000+ ha of ex-logging forest to pulp and paper plantation. The project area borders the proposed concession area, and was highly vulnerable due to the lack of clear forest management rights following expiry of the PT Injapsin selective logging concession. The communities, with NGO and local government support, were successful in their campaign to reject approval of the plantation license.

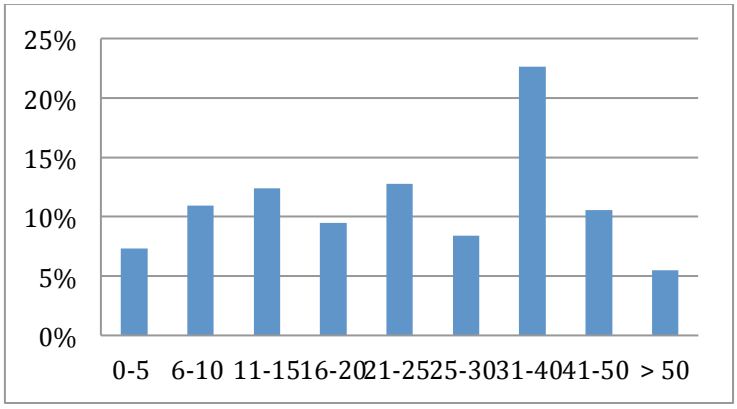
Illegal encroachment presents a major threat to the forest landscape. Following cessation of active management of production forest bordering KSNP in 2004/5, Merangin District became a target for in-migrants from South Sumatra, Bengkulu and Lampung Provinces seeking new land to clear for coffee plantations. Large-scale encroachment has been facilitated by individuals linked to the coffee industry, and weak enforcement of forestry laws has resulted in significant forest loss and complex horizontal conflicts between traditional and in-migrant communities. The target community is seeking to ensure that encroachment does not proceed into the project area.

Part C: Community and Livelihoods Information

C1 *Describe the* participating communities/groups (PV requirements 1.1, 7.2.1, 7.2.7 & 7.2.8)

Durian Rambun Village population is 274 individuals, which consists of 118 males and 156 females. Number of households in this village is 87, divided into 4 admistrative household groups (*RT: rukun tetangga*). Age composition is presented in Figure C1. The average household size is 3 or 4 family members. Iliteracy is relatively modest (3%), particularly among elders. As many as 8% of the population is children under school age. In general, level of education is relatively low. Over a quarter of the population (76%) have elementary school education. A smalller portion of the population went to junior high school (8%), high school (3%), and university (1%). The village has only a government elementary school.

FIGURE C1. AGE COMPOSITION



The village community is indigenous Malay-speaking people, with a strong Islamic tradition, occupying the Jambi highlands (*penghulu*) since pre-colonial times. The ancestors of this ethnic group is believed to come from a very distance part from Java and West Sumatra (Minangkabau). Most village inhabitants are related by either blood or marriage. The practice of rituals and taboo indicate respect of customary norms and traditions. Following matriliny pattern, inheritance of properties passed from mothers to daughters, but decision making remains with 'brothers and sons'.

The village was isolated from other settlements for decades. The main modes of transportation to reach the nearby market of Muara Siau were by raft along the river(s) or by foot. A logging road was constructed in the early 2000s, but the construction of a bridge and the upgrading of the road in 2011 have greatly enhanced access to the village. The distance from this village to capital city of Merangin Distict, Bangko is 64 Km. Basic literacy levels are high, but levels of education and income remain low. Numerous village inhabitants are recipients of the government's 'rice for the poor' (*beras miskin*) programme.

The village government is the lowest level government administrative structure, led by a democratically elected head and appointed secretary. Both receive a nominal salary from the district government budget. The village head reports to the democratically elected district head, but is directly supervised by a government-appointed sub district head. The village has a village-level legislative body (BPD) that supervises the performance of the village head and staff, and village customary institution (*lembaga adat*), whose leader is also democratically elected and is usually a village elder as the person occupying this role must understand traditional customs.

C2 Outline the Socio-economic context (PV requirements 7.2.2-7.2.5)

Farming/agriculture is the main source of income. Figure C2-1 shows household income from various farming sources. On the average, each family has 4.8 ha of farming land. The majority (nearly 80%) houshold have fallow lands. A portion (15%) of the population, however, are landless with no farm land. Over a third of the population (35%) involve in upland and wet rice field cultivation. Over a half of the population (65%) manage rubber-based agroforests. A quarter (25%) of the population also cultivate robusta coffee.

FIGURE C2-1. SOURCES OF HOUSEHOLD FARMING INCOME

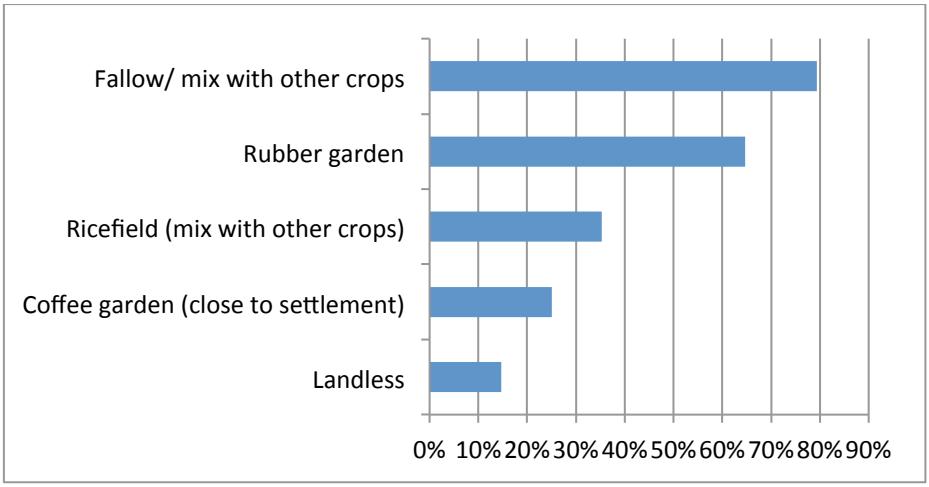


Figure C2-2 describes households posession of tools and goods. All t households got access to electricity from the village's mycro-hydro. Over a half of the population possesed basic modern goods: motorbike, TV, and handphone. Most households use firewood for cooking, only a few use gas stove with government-subsidized bottled gas. Only 6% of housholds were able to built 'ideal house' with cement wall and floor (see Figure C2-3), the rest still use wooden wall.

FIGURE C2-2. HOUSEHOLD GOODS

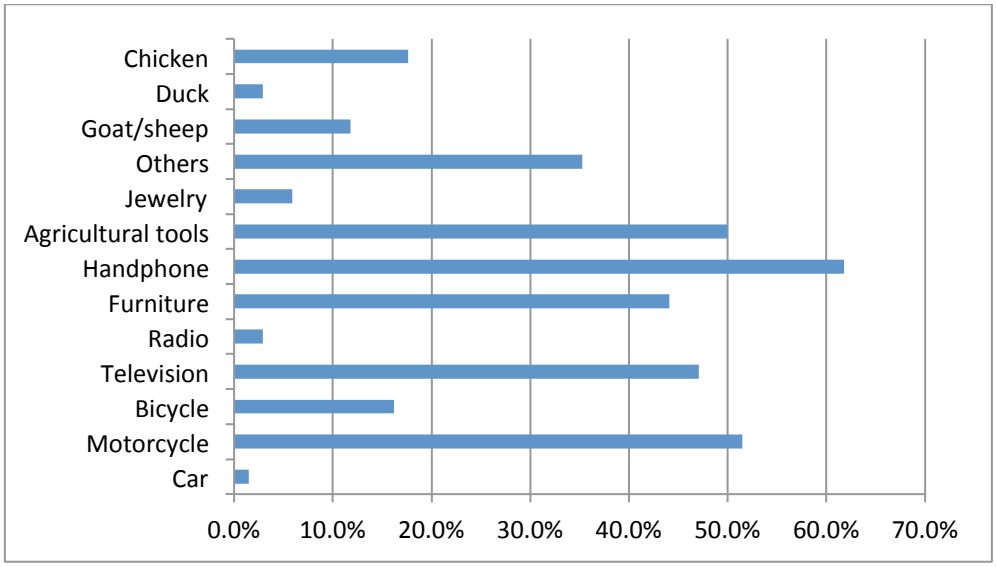
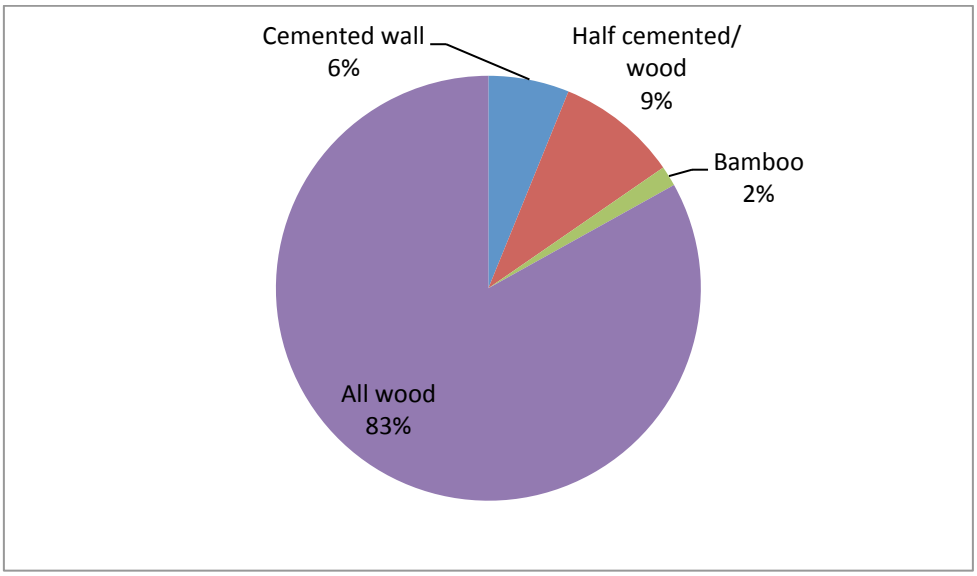
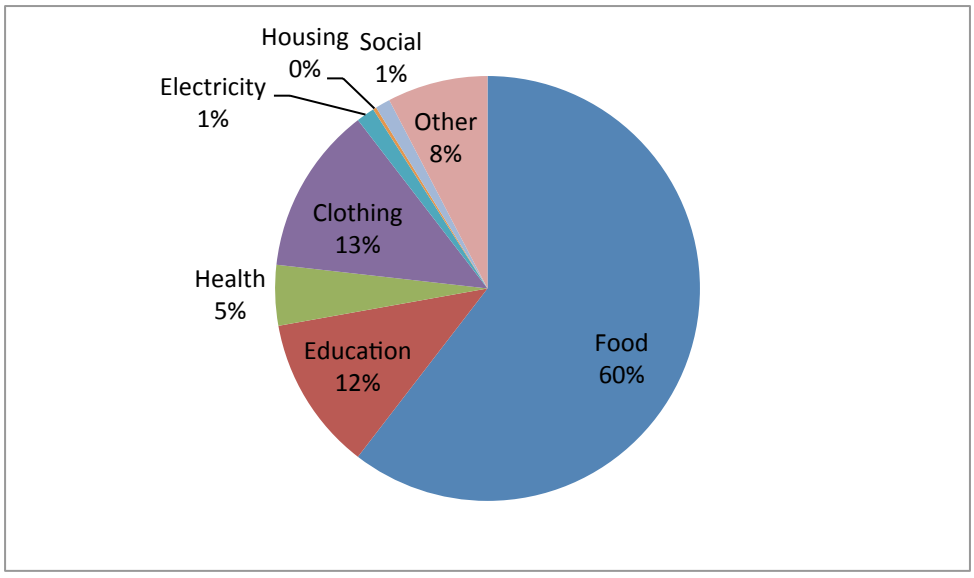


FIGURE C2-3. TYPES OF HOUSING CONSTRUCTION



The household surveys conducted in 2012 reveals an average household spending at IDR 17.1 million (USD 1423) per annum or IDR 1.42 million (USD 119) per month. Over a half of income (60%) were spent on food, indicating poverty and low income situation. Other important spending items included clothing (13%), children education (12%), and health care (5%). Detail information on household spending is presented Figure C2-4 below.

FIGURE C2-4. HOUSEHOLD EXPENDITURE



C3 Describe land tenure & ownership of carbon rights

The project area is inside the government-designated state forest zone and falls under the jurisdiction of the Ministry of Forestry (MoF), which has authority to award forest area and management rights either to the private sector or local communities. Some of the MoF's

authority has been devolved to local government as a result of a decentralisation process started in the late 1990s. Forest management and commercial utilisation plans are subject to MoF approval, periodic compliance monitoring determine whether management rights/ licenses are revoked or continued.

In the project area, the HD area licenses have already been awarded, and approval of the community forest management license is a priority activity of this project. The HD area license is a license awarded by the Ministry of Forestry that results in formal designation of the forest area as the HD of that community. The LPHD must be established before the area license is approved. The HD management license is awarded by the Provincial Governor and awards management authority and rights for sustainable utilisation of forest resources to the community. The HD management license must be processed within two years of approval of the HD area license, but development of the HD management plan and HD forest protection activities can start as soon as the area license is approved.

Similar to biomass (wood), carbon is considered government 'property', and commercial utilisation of this 'commodity' by the private sector and community requires government approval. This license will be secured for each HD as part of project activities. Approval for its dis/continuation is contingent on the results of monitoring. Government regulations on benefit-sharing must also be followed, as payment of government levies ('vertical' benefit-sharing) is regulated.

At the local level, while agroforests, agricultural fields and secondary forest/fallow areas are individually owned, forest is considered as either common property or as an open access area.

Part D: Project Interventions & Activities

D1 Summarise the project interventions

The type of intervention of this project is prevention of ecosystem conversion. This REDD+ project is expected to avoid the unplanned deforestation for conversion of the protection zone within the village forest area. There is a plan in the future to undertake ecosystem rehabilitation intervention (agroforestry) in the rehablitation zone. At at this moment the project is only focusing on preventing ecosytem conversion of the protection zone.

D2 Summarise the project activities for each intervention

TABLE D2. DESCRIPTION OF ACTIVITIES

Intervention type	Project Activity	Description	Target group	Ecosystem services contracted (yes/no)
REDD+	Forest protection	Regular community patrolling in forest area	Community group	Yes
	Forest regeneration	Enrichment planting and protection of natural regeneration of native species	Community group, smallholders	Not yet
	Forest rehabilitation	Tree planting, agroforestry improvement	Smallholders, community groups	Not yet
	Forest governance strengthening	Monthly meetings to discuss progress of forest patrolling activities and any other issues regarding forest management	Community groups	No
	Monitoring	A series of monitoring activities (including biodiversity, social and water monitoring) as listed in the Monitoring Plan (Table K2-1, K2-2 and K2-3)	Community group and FFI	No
	Capacity building	Patrolling, High Conservation Value/biodiversity and carbon surveys	Community group	No
	Sustainable livelihoods*	Establishment of sustainable enterprises focusing on improving coffee production and onsite processing. Other possibilities include small-scale fish-farming and improved vegetable gardens	Community group (paying particular attention to poorest and female headed households)	No
	Leakage mitigation	Leakage mitigation will include awareness raising and capacity building activities	Communities	No

* This project is taking a participatory and adaptive approach to supporting community-based sustainable livelihood strategies. While Durian Rambun villagers have expressed an interest in improving coffee production and on-site processing, establishing small-scale fish farming and improving vegetable cultivation, the socio-economic monitoring framework (Table K2-1) is allowing them to take stock of the relative contributions of these businesses in increasing their wellbeing. The project coordinator facilitates the continuous assessment of how well businesses are performing and encourages the community to expand enterprises which are performing particularly well and providing significant socio-economic impacts. In addition, preliminary comments provided by Plan Vivo on prioritising livelihood activities which increase the

cohesiveness of the community have been taken onboard. The field team will endeavour to facilitate livelihoods that strengthen the community as a more resilient unit against outside risks.

D3 Effects of activities on biodiversity and the environment

No negative impact on biodiversity and environtment is expected from this project. Forest patrolling will increase protection of species and habitats, as well as preventing deforestation and forest degradation. Forest regeneration and tree planting carried out by the community will help improve the forest cover. Improved forest cover will help maintain watershed functions, such water supply stability, water quality, and and stream flow regulation (preventing flood and drought). Table F3 outlines expected biodiveristy and environmental impacts of the project.

Part E: Community participation

E1 Participatory project design

Since 2010 LTB and FFI have assissted the Durian Rambun and neighbouring village communties in submiting request for *Hutan Desa* application to the district head and Minister of Forestry. The Minister of Forestry area approval was finally granted in 2012. The process of provincial governor village forest management license was completed in 2013. These include establishment of forest management structure and 35 years forest management plans (protection, rehabilitation, and utilisation).

After the Minister of Forestry approval, the following step was the village forest boundary delineation and marking. From 2012, a series of intensive community consultations were conducted to delineate the outer boundaries and the zoning of the village forest area. Within the village forest area, the village community has agreed to have a protection and a rehabilitation zone. In the protection zone, dominated with natural secondary forest covers, no new forest clearing is expected to take place and the harvest of wood/timber will be limited. The rehabilitation zone is the area for fallow, rubber garden (mixed with other tree crops) and upland-rice cultivation to ensure food security.

Since 2012, the idea of REDD+ project as an international mechanism to support forest conservation has been introduced to the Durian Rambun village government and community. Their response was positive. REDD+ awareness was undertaken by a team from Rimbawan Muda Indonesia (RMI). The workshop introduced the key concept of REDD+ (climate change, carbon trading, inter/national policy, FPIC) and all the basic steps in project development (identification of drivers, project activity, benefi sharing distribution). Also in 2012, FFI and LTB teams conducted household surveys, focusing on household assets, income, and spending.

Community consultations and planning for PES Plan Vivo project was intensified in 2012-2014. In the process, the communinty members were facilitated to assess ecosystem services that the village forest provide, threats/drivers of deforestation and forest degradation, activities to mitigate threats/drivers, and benefit sharing distribution. Initial meetings were conducted with village goverement officials, customary leaders, and members of village forest institution (LDPHD). The process was completed with LDPHD presenting the results in a villlage meeting, followed by the development of a detail workplan of project activities. The processes provided an opportunity for the removal barriers to greater participation of young generations, women, and the poor.

The *Hutan Desa* facilitation and PES designing process have also resulted in improved clarity

on governance structure at community level. The village forest insitution (LDPHD) with a treasury, a secretary, and other sections will take the overall responsibility. The village government and the customary leaders will provide advice, political support and oversight/supervision. The a ctivity groups (e.g. forest patrol, farmers group, women enterprise, social benefit) will undertake spesific project activities.

E2 Community-led implementation

The village forest zoning into protection and rehabilitiation/food security zones forms the basis of the *plan vivo*. After community consultation, LDPHD conducted field boundary delineation and marking. Both the outer village forest boundary and the inner protection zone were marked. Community members with agroforest, fallow, and agriculture lands in the village forest area were carefully consulted. Only lands that will not be used for upland- rice field were included in the protection zone. Lands under rotational upland-rice cultivation were placed in the rehabilitation/food security zone. That ensures that the zoning does not in conflict with the villagers' livelihood need for food. The results of village forest zoning boundary delineation and marking were presented in printed and 3-dimension maps, placed in the village hall.

The customary village forest regulation/law has also been promulgated through community consultation. It outlines prohibition of forest clearing, tree felling, and fire. It stipulates that sanctions based on customary practices to be enforced for those violating the law/regulation. It gives mandate to LPHD to carry out forest monitoring and patrolling.

The LPHD members have received basic training in forest patrol and monitoring. They were involved in HCV/biodiversity and carbon surveys. Since 2011, LPHD team has been conducting regular patrolling and monitoring of the village forest.

As the LPHD has started to establish a tree nursery, the seedlings will be made available to support community members to carry out forest enrichment in the protection zone and tree planting (agroforestry establishment) in rehabilitation zone.

Another additonal activity that has been coordinated by LPHD consists of women enterprise developement. The future plan is to provide support for home-industry, agroforestry and NTFP.

E3 Community-level project governance

The key approach in project designing and implementation is through community-wide participation. LDPHD takes a leading role, with customary/adat chiefs and village government officials providing oversight and support. Each sections in LPHD and activity groups (women enterprises, farmer groups, patrol team, social benefit) undertake project activities. With full participation of women and young generations, regular community meetings at village level that were initially conducted during the designing phase will then be insitutionalised and will continue to take place throughout the project implementation phase. The project's decision-making and management will be fully based on this participatory processes.

LDPHD will develop a grievance mechanism. Every members in the community is free to express complaints. They could be communicated directly to LDPHD members orally, in writing, or via SMS to designated cellphone number. The LPHD will assign a unit to record and provide response in 30 days at the latest. Matters related to enforcement of village customary laws/regulation will be taken over by a adat chief and village officials.

Complaints to project coordinator (FFI/CFES) will be received by a designated project member of staff, through oral communication, written notice, or SMS. FFI/CFES staff will record the complaint and, if necessary, consult LPHD to coordinate the response and solution.

Part F: Ecosystem Services & Other Project Benefits

F1 Carbon benefits

TABLE F1. CARBON BENEFITS

	1	2	3	4	2-(1+3+4)
Intervention type (technical specification)	**Baseline carbon uptake i.e. without project (t CO_2e/ha)**	**Carbon uptake/emissions reductions with project (t CO_2e/ha)**	**Expected losses from leakage (t CO_2e/ha)**	**Deduction of risk buffer (t CO_2e/ha)**	**Net carbon benefit (t CO_2e/ha)**
Avoided Deforestation and Forest Conservation	0	98.62	0	13.81	84.82
• Note that the underlying calculations in this table come from the technical specifications described in Part G					

F2 Livelihoods benefits

TABLE F2. LIVELIHOODS BENEFITS

Food and agricultural production	**Financial assets and incomes**	**Environmental services (water soil etc)**	**Energy**	**Timber & non-timber forest products (incl. forest food)**	**Land & tenure security**	**Use-rights to natural resources**	**Social and cultural assets**
Source of water for rice field irrigation	Additional income from sale forest products	Source water for drinking and cleaning	Firewood from planted and dead trees	Source wood for buliding, furniture, craft	Secure 35-year HD license, renewable	Access to wood products	Religous/ spriritual site
Source of water for livestock and vegatables	Additional income from livelihood activities	Micro-climate: cooler and fresher air		Harvest of fruits and vegetables	Preventing planned conversion	Access to NTFP	Recreation site, landscape beauty
Pollination	Increased saving	Prevention of disasters (fire, landslide, flood, drought)		Harvest of NTFP's		Secure land right for agriculture	Education site
Source of protein (e.g. fish, boar)				Herb and medicines			Social cohesion

F3 Ecosystem & biodiversity benefits

TABLE F3. ECOSYSTEM IMPACTS

Intervention type (technical specification)	**Biodiversity impacts**	**Water/watershed impacts**	**Soil productivity/conservation impacts**	**Other impacts**
REDD+	Protection of species	Water supply stability	Prevention of erosion/soil conservation	Micro-climate regulation
	Habitat protection	Water quality improvement	Provision of nutrients and minerals for soil fertility	Pollination
		Prevention of flood and drought	Land cover improvements	Cultural (landscape beauty, religious sites)

Part G: Technical Specifications

G1 Project activities

This section outlines the main threat-reducing activities.

Secure Community Forest Management Right
The granting of legal user rights is a pre-requisite to a community PES project; such rights strengthen local ownership over the forest and foster participation by communities in the conservation of forest. The process of *Hutan Desa* (HD) designation includes applications to the district government, to the Ministry of Forestry (MoF), and to provincial governments with subsequent issuance of HD license.

The first phase from the HD license issuance sequence is acquiring the District Head's (*Bupati*) recommendation on the participatory maps made by the community. Second, it is proposed to the Ministry of Forestry for the approval of working area based on the *Bupati*'s recommendation. In this phase, the same area cannot be allocated to another applicant such as logging or oil palm companies. The last phase is acquiring the Provincial Governor permit for the HD license, which is valid for 35 years.

The process of securing community forest management rights through *Hutan Desa* require the community to:

a) Establish an HD management unit (LPHD, *Lembaga Pengelola Hutan Desa*),
b) Delineate a clear HD boundary,
c) Formulate HD management plans for protection and utilization of forest resources, and
d) Develop official village-level laws (*Peraturan Desa*) pertaining to the governance and management of the *Hutan Desa.*

Formal verifications by the MoF and local government officials are required prior to approval of the management rights. The granting of management rights by the government to the community for 35 years bestows a measure of security and permanence, with scope for renewal of the *Hutan Desa* license after 35 years.

HD Rio Kemunyang has secured the HD area approval from the Minister of Forestry and HD management rights from the provincial governor.

Forest Protection
The obvious driver of deforestation is by in-migrant farmers from neighboring districts and provinces clearing forest illegally for coffee plantation. Efficient use of existing land, revitalize degraded land into productive land, and especially forest patrol are key elements in protecting HD forest.

Regular forest patrols will provide checks on illegal logging, encroachment, fire, and biodiversity monitoring. These patrols, where appropriate, will comprise joint government's forest rangers and village community teams. The patrol teams will be trained in how to patrol and to monitor deforestation and forest degradation. Team membership will be rotated among community members to ensure broad community participation in the project.

Sustainable Livelihood Activities
In addition to forest patrolling, it will be important to implement supporting activities that

provide livelihood activities such as agroforestry, NTFP, and microenterprise. Whilst integral to the project they are not factored in to carbon benefit calculations.

G2 Additionality and Environmental Integrity

Project activities are additional, in that they are not the product of legislative decree. However, the *Hutan Desa* designation and the management license are linked to government legislation, as discussed earlier in this document, and a *Hutan Desa* designation by itself does not guarantee protection to forest and community rights. The vast encroachment by the coffee farmers cannot be stopped only by legislative decree, but by a strong community institution and forest protection activities.

Application of VCS Additionality Tool VT0001.

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

Plausible alternative land use scenarios identified include the following:

1. Hutan Desa (HD) – IUPHHK Hutan Alam (HA): Hutan Desa with legal community logging license;
2. HD – IUPHHT Hutan Tanaman (HT): Hutan Desa with legal forest plantation license, such as rubber plantation;
3. Hutan Desa + Degradation: Hutan Desa alone, assumed to have small scale legal (up to 50m3 per year) and illegal logging, primarily for local use;
4. Hutan Desa + Deforestation & Degradation: with illegal logging and encroachment (forest conversion)
5. Hutan Desa: no Deforestation or Degradation: this option was eliminated from the suite of alternative land use scenarios as it was not considered to be plausible;
6. Hutan Desa + Oil Palm: this alternative was eliminated from the selection as sawit is a non-forest species and therefore illegal in Hutan Desa – conversion to sawit would be equivalent to scenario number 4.

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

Of the four alternative land use scenarios that were identified as plausible in 1a above, two (A & B) were considered to be consistent with applicable laws and regulations; whilst two (C & D) were identified as not consistent with applicable laws and regulations, but still possible land use scenarios due to very weak enforcement of said laws.

1. HD – IUPHHK-HA (community logging)

When areas present commercial timber trees with a dbh of 50+ exceeding a volume of 50m3/ha, then it is legally possible to apply for a community logging license in Hutan Desa. It is likely that such forest areas remain within sections of the project area. This project area is excluded from the current Logging Moratorium area. Whilst there are no previous examples of community logging licenses awarded on Hutan Desa, it is legally feasible and is therefore a possible alternative land use scenario.

2. HD-IUPHHK-HT (community forest plantation)

As for community logging scenario above, license for community-based forest plantation (agroforestry) on Hutan Desa is also consistent with applicable regulations.

3. Hutan Desa + Degradation: Degradation due to illegal logging is not consistent with regulations regarding management of state forest land, but the combination of local threat and very weak enforcement makes this a credible land use scenario.
4. Hutan Desa + Deforestation & Degradation: Forest encroachment for conversion to agriculture, often preceded by degradation due to logging, is not consistent with regulations regarding management of state forest land, but the combination of local threat and very weak law enforcement makes this a credible land use scenario.

The following matrix (Table G2) illustrates which of the barriers identified to the proposed AFOLU activity apply to which alternative land use scenario. In the case of three of the proposed alternative land use scenarios one or more of the barriers were considered strong enough as to prevent the land use, and thus led to their elimination from the baseline scenario. The strong barriers that made the argument for elimination of these alternative land use scenarios are highlighted in red.

TABLE G2. BARRIER ANALYSIS

#	Barrier Type	Barrier Detail	Project Activity	Alternative Land Use Scenario			
			HD-REDD+	HD-IUPHHK-HA	HD-IUPHHK-HT	HD + D	HD + DD
1	**Investment**	Funds to finance activity	Barrier	No barrier	No barrier	No barrier	No barrier
2	**Institutional**	Weak law enforcement	Barrier	No barrier	No barrier	Barrier	No barrier
3	**Technological**	Technical expertise to implement activity	Barrier	No barrier	No barrier	No barrier	No barrier
6	**Prevailing practive**	"First of kind"	Barrier	No barrier	No barrier	No barrier	No barrier
7	**Social conditions**						
7a		Demographic pressure	Barrier	No barrier	No barrier	Barrier	No barrier
7b		Social conflict	Barrier	Barrier	Barrier	Barrier	No barrier
7c		Widespread illegal practices	Barrier	No barrier	No barrier	Barrier	No barrier
7e		Shortage of skills	Barrier	No barrier	No barrier	No barrier	No barrier
8	**Lack of community organisation**	Lack of community organisation	Barrier	Barrier	Barrier	Barrier	No barrier
9	**Land Tenure / Property Rights**						
9c		Property rights	Barrier	Barrier	Barrier	Barrier	No barrier
9d		Formal & informal land holdings	Barrier	Barrier	Barrier	Barrier	No barrier
9h		Market Price	Barrier	No barrier	No barrier	Barrier	No barrier
9i		Rent capture	Barrier	No barrier	No barrier	Barrier	No barrier
	Alternative Land Use Scenarios eliminated due to preventive barriers*			**Eliminated**	**Eliminated**	**Eliminated**	
	Most Plausible Land Use Scenario ('Without Project Baseline')						**Baseline**

*Barriers highlighted in red were considered sufficiently large barriers as to prevent the alternative land-use to which they apply and therefore require their elimination as potential 'without project' baseline scenarios

Overall Conclusions of Additionality Assessment for Proposed AFOLU Project Activity:

Based on the results of alternative land use scenarios, barrier analysis and common practice analysis (steps 1, 3 and 4 detailed above), the following conclusions regarding additionality and project baseline are drawn:

1. The proposed VCS AFOLU project activity (Hutan Desa-REDD+) IS additional;
2. The baseline scenario (the alternative land use scenario facing the lowest barriers) is Hutan Desa with Deforestation and Degradation due to illegal logging and illegal encroachment;
3. The baseline scenario for deforestation and degradation is therefore one of 'Unplanned Deforestation'.

G3 Project Period

The license period for *Hutan Desa* is 35 years, yet the time limit for the implementation of REDD is maximum of 30 years; both can be extended (Ministry of Forestry, 2009). Thus, a 30 years project period is aimed for HD Rio Kemunyang. This period is subdivided into six 5-years phases with annual payments. Every five years, monitoring will be conducted by the project proponents, local government, and the Ministry of Forestry to evaluate the carbon accounting and the further phases of the project plan (Ministry of Forestry, 2009). With this strategy, a link between the payments and forest protection activities over sufficient time will be maintained.

The *Hutan Desa* area allocation was approved with support of this project in July 2011. *Hutan Desa* project activities under Plan Vivo started in December 2012 and the crediting period started in January 2013. The funding needed for the first three years (2013-2017) in the first phase (2013-2018) has been secured. Further funding is needed to carry the project into the further phase (2018-2042) to ensure the REDD objectives are achieved.

G4 Baseline scenario

Above-ground biomass and below-ground woody biomass were selected as the most significant carbon pools for the project areas (Table G4). Carbon pools were excluded if the cost and/or effort required for assessment or monitoring were likely to be disproportionate to the potential carbon benefits. The biomass estimations were calculated from a forest survey, which provided land cover and ecosystem classifications. The vegetation parameters collected were: number of trees in each DBH class, tree species, Diameter at Breast Height (DBH), and tree height.

TABLE G4-1. CARBON POOLS INCLUDED AND EXCLUDED FROM THE SURVEY OF CARBON STOCKS IN THE HD RIO KEMUNYANG

Carbon Pool	Included (yes or no)	Justification
Above-ground biomass (stems, branch wood and leaves)	Yes	Major carbon pool subject to the project activity. Calculated by measuring trees in sample plots through non-destructive sampling and the use of local allometric equations that have similar ecosystem types and conditions.
Above-ground non-tree biomass	No	Above-ground non-tree biomass is virtually absent from the site, and is not a significant carbon pool.
Below-ground biomass (roots)	Yes	Root biomass can be estimated using a model based on aboveground biomass estimates (Cairns, et al., 1997)
Dead wood (standing and fallen)	No	Conservative approach
Litter	No	Unlikely to be a significant carbon pool. Temporal variations in litter fall make quantification time-consuming and expensive, and unknown permanence of this carbon pool.
Soil organic carbon	No	Project site is on mineral soils which have insignificant carbon stock change. Soil is complex and heterogeneous and high costs makes measuring this carbon pool impractical.
Wood product	No	Conservative estimate that timber decays when it is removed from the site

Data Sources and Assumptions

- **Above Ground Biomass**

Several steps were incorporated in estimating the above ground biomass in HD Rio Kemunyang:

1) Determine the tree dimensions and characteristics (DBH, total height, and wood density). The plot sizes are described in Table G4-2. The wood density was derived from the Wood Density Database (ICRAF, 2012). A 0.66 gr/cm^3 wood density was used for species that was not listed in the database, based on research by ICRAF (GOFC-GOLD, 2010; van Noordwijk, 2007). Where a range rather than a mean wood density value was reported, the range was assumed to be the 90% confidence interval. IPCC states carbon to be 47% of its biomass and CO_2 to be 3.67 of its carbon (molecular weight). Statistical analyses were conducted using SPSS 20 (IBM® SPSS® Statistic 20.0).

TABLE G4-2. PLOT AND SUB-PLOT SIZES AND VEGETATION CATEGORIES (AVERY & BURKHART, 1994)

Plot Size	DBH	Categories	Class
10 m x 10 m	5 - 15 cm	Pole Trees	C
20 m x 20 m	15 - 30 cm	Small Trees	B
20 m x 125 m	> 30 cm	Large Trees	A

2) Select appropriate and validated allometric equation.
A non-destructive forest biomass sampling method was carried out and the allometric equation used follows Ketterings (2001):

$$AGB = (0.11)\ \rho\ D^{2.62}$$

where AGB is the above ground biomass (kg); ρ = wood density (gr/cm3); D is DBH bigger than 5 cm; N= 29, R^2 0.98; site study in tropical forest dominated by latex, naturally occurring wood and fruit species, Muara Bungo, Jambi Province.
Based on the Indonesian National Standards (SNI7724, 2011a; SNI7725, 2011b), the allometric equations used should be based on the highest r^2 correlation value between DBH and tree biomass (>0.5, *p*-value significant at 95% confidence level), the largest and smallest DBH trees falling within the DBH range of the trees within the project areas (which were used to derive the allometric equation), and the closest geographic locations and ecosystem type.

3) Estimate the AGB for each tree by using the allometric equation.
4) Estimate the AGB for each subplot by totalling the AGB for each tree in each subplot in the same plot.
5) Estimate the AGB for each plot and AGB of each forest stratum by following these equations (modified from SNI7724, 2011a and Manuri, et al., 2011):

$$AGB_{plot} = \left(AGB_{sub\ A} * \frac{10}{A_{sub\ A}}\right) + \left(AGB_{sub\ B} * \frac{10}{A_{sub\ B}}\right) + \left(AGB_{sub\ C} * \frac{10}{A_{sub\ C}}\right)$$

$$Biomass_{stratum} = \frac{\sum AGB_{plot} + \sum BGB_{plot}}{N_{stratum}}$$

where AGB_{plot} is mean AGB for each plot (ton/ha); AGB_{sub} is AGB in each subplot (kg); A_{sub} is subplot size (m^2); $Biomass_{stratum}$ is mean biomass on each forest stratum (ton/ha); $N_{stratum}$ is number of plots on each forest stratum.

- **Below Ground Biomass**

Below ground carbon includes roots (Eggleston, et al., 2006). Root to shoot ratio from the Indonesian National Standard (SNI7724, 2011a), 0.37, was used to obtain below ground carbon. The standard deviation follows the above ground carbon data.

- **Tree Density**

Tree density was derived from forest carbon inventory data within the project area by dividing number of trees (tree>30 cm DBH) with plot size (hectare). The estimated tree density is 76 trees per hectare with 59 trees as the lower-bound 95% confidence interval. To be conservative, the tree density used for carbon accounting is 59 trees per hectare.

- **Annual Allowable Cut**

By law, each Hutan Desa is entitled to a maximum Annual Allowable Cut (AAC) of 50m^3 (Ministry of Forestry Regulation P.49/2008 *juncto* P.14/2010). Although harvesting AAC is not formally part of management plan in HD Rio Kemunyang, due to this legal quota, law enforcement mechanisms that are being applied to deter illegal logging from outsiders cannot be applied to dis-incentivize this source of potential forest cover loss and emissions in the project scenario. Therefore ex-ante emissions from timber harvesting have been estimated and been included in the carbon benefit calculation. The tree-volume formula followed that of a common cylinder

$$V = \frac{(\pi)}{(4)} * (D^2) * L$$

where V is volume (m^3) and D is DBH tree diameter (m), and L is the tree-stand length (m)

By assuming the harvested tree DBH-diameter is 30cm with 20m in height, as much as 35 trees can be harvested every year.

- **Forest loss from AAC**

Forest loss from AAC was estimated by dividing AAC with tree density. As much as 0.6 ha of forest loss is estimated from harvesting AAC. This area is multiplied by the forest carbon stock to estimate average annual emissions of AAC. This AAC emission has been included in the ex-ante carbon benefit calculations and will be monitored ex-post through forest patrol.

Baseline Scenario

- **Carbon Stock**

Ketterings (2001) allometric equation was used to estimate the carbon stock due to its applicability to HD Rio Kemunyang. Given the lack of consensus on intact forest carbon and forest regrowth dynamics (Carlson, et al., 2012), we have used a conservative approach by excluding increment from the above ground carbon stock. We have assumed that 40% above ground biomass will be left from the logging activity (Carlson, et al., 2012), which means after every timber cutting period, there will be 40% of the biomass left in the forest.

The forest definition and classification follow Indonesian National Standard (SNI7645, 2010). The SNI 7645 (2010) forest classification is based on canopy density where 10-40% classified as sparse forest, 41-70% as medium forest, and >70% as dense forest. We interpret the canopy density as carbon stock distribution and so classify dense forest as forest cover with carbon stock 265 tonnes C/ha, medium with 139 tonnes C/ha, and sparse with 76 tonnes C/ha (Table G2). Due to sparse forest 95% confidence interval precision is more than 15% (see PV Technical Specification DR v8.xlsx tab.4 for more detail), we use the lower 95% CI carbon stock for calculating the total carbon stock in order to be particularly conservative.

We found a limitation that the carbon stock data was not normally distributed (skewed left), so it is unlikely to significantly (statistically) differentiate the forest strata. However, we employed the WinRock International (2006) tool, which is based on Avery & Burkhart's (1994) approach on estimating the number of sampling units by using actual field data (mean and standard deviation), the desired confidence interval, and the allowable error. As a result, the number of plots that we surveyed in each forest strata are more than enough to satisfy the requirement for 95% confidence level and 10% allowable error.

The protection zone in HD Rio Kemunyang has three types of land cover: dense forest, medium forest, and sparse forest. The mean carbon stocks are presented in Table G2-3 below.

TABLE G2-3. FOREST CARBON STOCK IN *HUTAN DESA* RIO KEMUNYANG

Land Cover Classes	Above Ground (tonnes C/ha)		Below Ground (tonnes C/ha)		TOTAL CARBON (tonnes/ha)
	Mean	Std Deviation	Mean	Std Deviation	
Dense Forest	193.48	21.41	71.59	7.92	265.07
Medium Forest	101.67	6.17	37.62	2.28	139.28
Sparse Forest	55.74	11.93	20.62	4.41	76.37

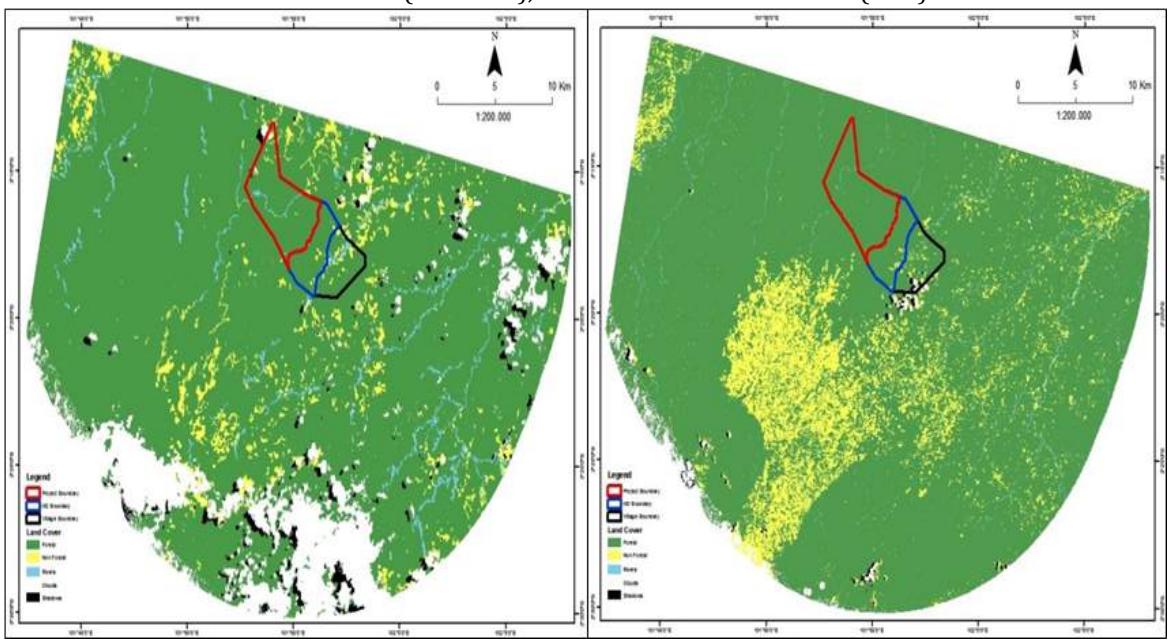
- **Baseline Emissions**

Additionality analysis shows that the baseline scenario in HD Rio Kemunyang is 'Unplanned Deforestation'. Forest bordering the Durian Rambun village has been cleared for: a). Jungle rubber agroforestry, b) Upland rice, c) Mixed agricultural crops (*ladang*).

Following forest definition and land cover classification process (SNI7645, 2010), the protection zone (2,516 ha) in HD Rio Kemunyang (3,616 ha) has three types of land cover: Dense Forest (1,670 ha), Medium Forest (608 ha), Sparse Forest (238 ha). Land cover classes were derived from satellite images and verified by field data analyses.

Remote sensing techniques were used to calculate the baseline scenario for land use land cover changes and to classify the latest land cover for project site. The baseline was calculated by analyzing the forest and non-forest cover changes between times. Satellite images from approximately ten years prior to the starting date of the project were used to calculate the baseline scenario. A period of 10 years was thought to be more representative because any early community engagement activities carried out by FFI in this area will have biased the overall trends to a lesser extent. The selection of satellite imageries were also based on the availability and the most cloud free images for the project area. The available images for the project site are in year 2000 (by Landsat 5) and year 2011 (by SPOT 5). Both images cover the project site, but the project site was not in the scene's center (Figure G4). Thus, the analyses took more of the southern part of HD Rio Kemunyang.

FIGURE G4. FOREST COVER (EXTEND TO 20 KM SOUTH) OF HD RIO KEMUNYANG IN 2000 FROM LANDSAT 5 (BOTTOM), AND IN 2011 FROM SPOT 5 (TOP).



An arbitrary 20 km buffer from HD Rio Kemunyang was implemented in the analyses by assuming 20 km as the farthest distance villager can walk for their livelihood. This image extent, bordered with equal scene-width among the satellite images, was then used to do the forest and non-forest cover changes between times. Hence, a rate of 1.99% per annum forest cover loss was calculated from the analyses and is used in the baseline scenario (Table G4.4). Despite the spatial resolution's discrepancy, the analyses are still able to catch the forest pressure pattern from the inward migration of coffee farmers from the south west side (Figure G4.). The latest image of SPOT 5 was then used to classify land cover not only in terms of forest and non-forest, but also in terms of forest classes.

Thus, by using the baseline forest loss rate of 1.99%, the estimated forest loss over 30 years is 1,139 ha (37.98 ha per annum) and the total carbon loss is 148,228 tonnes (4,940 tonnes per annum), see Table Table G4-5 below.

TABLE G4.4. AGGREGATED LAND COVER FOR JAMBI SATELLITE MAP AREA FROM 2000 TO 2011

LULC	2000	2011
Dense Forest	39,914.34	14,285.86
Medium Forest	15,855.55	16,030.52
Sparse Forest	17,227.38	26,651.58
Agriculture	10,332.44	14,506.57
Shrubs	19,781.16	24,525.11
Open Area	15,005.58	22,116.82
Forest land	72,997.26	56,967.96
Non Forest land	45,119.19	61,148.49
Deforestation (ha)	16,029.31	
Deforestation (ha/year)	1,457.21	
Annual Deforestation Rate (%)	1.996	

TABLE G4-5. CUMULATIVE CARBON STOCK UNDER THE BASELINE SCENARIO

Project Year	Forest Area (ha)	Baseline Carbon Stock (tonnes C)	Project Year	Forest Area (ha)	Baseline Carbon Stock (tonnes C)
0	2,516	327,326			
1	2,466	320,813	16	1,824	237,305
2	2,417	314,428	17	1,788	232,583
3	2,369	308,171	18	1,752	227,954
4	2,322	302,039	19	1,717	223,418
5	2,276	296,028	20	1,683	218,972
6	2,230	290,137	21	1,650	214,615
7	2,186	284,363	22	1,617	210,344
8	2,142	278,705	23	1,585	206,158
9	2,100	273,158	24	1,553	202,055
10	2,058	267,722	25	1,522	198,034
11	2,017	262,395	26	1,492	194,094
12	1,977	257,173	27	1,462	190,231
13	1,938	252,055	28	1,433	186,445
14	1,899	247,039	29	1,405	182,735
15	1,861	242,123	30	1,377	179,099
		Total Loss in 30 Years		**1,139**	**148,228**
		Per Annum Loss		**38**	**4,941**

G6 Ecosystem service benefits

Project Scenario

- **Allowable Timber Harvesting**

In HD Rio Kemunyang, 50m^3 trees with DBH of 30cm in dense forest are equal to 160 tonnes of carbon. Based on the tree density data from the biomass sample plots, 59 trees (with DBH of 30cm or more) in HD Rio Kemunyang are equivalent to one hectare of forest. Thus, the 50m^3 allowable timber harvesting is equal to 35 trees allowable quota and is equivalent to 0.6 ha of forest. The potential emissions from allowable timber harvesting have been accounted in the project scenario calculations.

- **Potential Emissions Reduction**

The project scenario for HD Rio Kemunyang is protection of natural forest. Based on the community planning and consultations, it is estimated that as much as 75% of carbon stock in natural forest can be protected in 30 years or 0.5% forest carbon will be lost each year. This is a realistic and conservative estimate as the project area is designated as protection zone with no land clearing, and the availability of lands for food security outside this protection zone. Thus, as much as 350 ha of forest is predicted to be loss in 30 years (11.66 ha per annum) or 75,813 tonnes of carbon (2,527 tonnes per annum) are predicted to be lost under the project scenario (Table).

TABLE G6-1. CUMULATIVE CARBON STOCK UNDER THE PROJECT SCENARIO

Project	Forest Area	Project Scenario	Project	Forest Area	Project Scenario

Year	(ha)	Carbon (tonnes C)	Year	(ha)	Carbon (tonnes C)
0	2,516	545,544			
1	2,504	542,830	16	2,323	503,702
2	2,491	540,129	17	2,312	501,196
3	2,479	537,442	18	2,300	498,702
4	2,466	534,768	19	2,289	496,221
5	2,454	532,108	20	2,277	493,753
6	2,442	529,461	21	2,266	491,296
7	2,430	526,826	22	2,255	488,852
8	2,418	524,206	23	2,243	486,420
9	2,406	521,598	24	2,232	484,000
10	2,394	519,003	25	2,221	481,592
11	2,382	516,421	26	2,210	479,196
12	2,370	513,851	27	2,199	476,812
13	2,358	511,295	28	2,188	474,440
14	2,346	508,751	29	2,177	472,080
15	2,335	506,220	30	2,167	469,731
	Total Loss in 30 Years			**350**	**75,813**
	Per Annum Loss			**11.66**	**2,527**

Project Benefit

FIGURE G6. BASELINE EMISSIONS AGAINST THE 'WITH PROJECT' SCENARIO EMISSIONS IN HD RIO KEMUNYANG

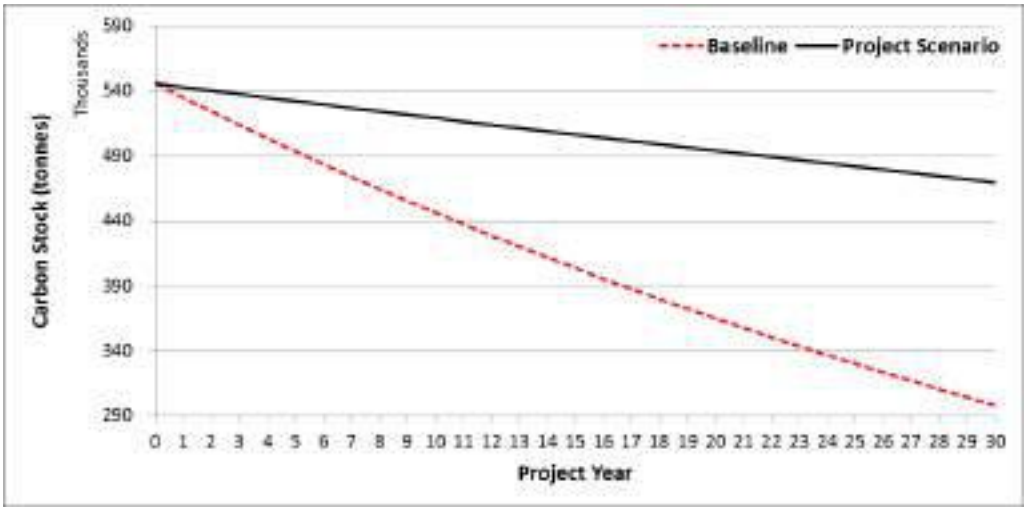


TABLE G6-2. ESTIMATED EMISSIONS REDUCTION (ER) AS PROJECT BENEFIT IN HD RIO KEMUNYANG

Project Year	Estimated ERs (tonnes CO2e)	Estimated ERs After 20% Buffer Deduction (tonnes CO2e)
0		
1	13,358	10,686.47
2	12,932	10,345.53
3	12,515	10,011.97
4	12,107	9,685.64
5	11,708	9,366.39
6	11,318	9,054.08
7	10,936	8,748.56
8	10,562	8,449.69
9	10,197	8,157.35
10	9,839	7,871.40
11	9,490	7,591.70
12	9,148	7,318.14
13	8,813	7,050.59
14	8,486	6,788.92
15	8,166	6,533.01
16	7,853	6,282.75
17	7,548	6,038.02
18	7,248	5,798.71
19	6,956	5,564.71
20	6,670	5,335.91
21	6,390	5,112.21
22	6,117	4,893.49
23	5,850	4,679.67
24	5,588	4,470.63
25	5,333	4,266.28
26	5,083	4,066.52
27	4,839	3,871.27
28	4,601	3,680.42
29	4,367	3,493.89
30	4,139	3,311.59
EMISSIONS REDUCTION IN:	**30 years**	**198,525.49**
	Per annum	**6,617.52**

G7 Leakage & Uncertainty

By definition, leakage is any unintended GHG emissions that occur outside the project boundaries as a direct result of project activities and is not included in the calculation of carbon benefits (Plan Vivo, 2009). Leakage exists if improving forest protection within project areas has a knock-on effect increasing deforestation elsewhere (Plan Vivo, 2013). Leakage, when it cannot be identified and quantified, is a major obstacle in the development of avoided deforestation projects (Schlamadinger, et al., 2005). Several approaches have been undertaken in identifying all possible leakage agents, drivers, and also the underlying causes. The management, mitigation, and accounting the risk of leakage is essential. Following one of the VCS methods on leakage (VCS, 2012d), we identified the leakage components on project area as described below.

Risk of Leakage

Population growth, enforcement of laws and regulations, change in commodity prices, and expansion of infrastructure are variables (underlying causes) that drive deforestation and degradation in the project and adjacent landscape.

Leakage is defined as such when forest encroachment/forest conversion is shifted outside the project area due to project interventions and deforestation rates outside the project area increase, without significant changes to underlying causes (population, spatial plans, economic context). Leakage risks might come from upland rice field and cash crop activities by the community that lives close to the HD Rio Kemunyang and that has management rights of the nearby areas.

In this case, leakage will be deemed significant if the rate of forest clearing surrounding the protection zone is higher than estimated baseline deforestation rates. Focus Group Discussions (FGD) with communities reveal that communities have no plans to further open the area that puts the land-clearing rate at less than the current baseline deforestation rate. Thus, the ex-ante leakage risk is zero. However, an 'ex-post' (every 5 years) leakage monitoring will be conducted to measure the leakage quantity.

Baseline deforestation rate will also be re-quantified every 5 years (VCS, 2012d). Other leakage agents in HD Rio Kemunyang may include in-migrant farmers, from neighboring districts and provinces clearing forest for coffee gardens. Efforts will be made in the broader landscape to involve neighbouring communities and share skills relative to patrolling regimes, sustainable forest management, better agricultural practices and economic diversification.

Part H: Risk Management

H1 Identification of risk areas

Project benefit is calculated by subtracting baseline emissions from project scenario, and deducted with risk buffer. It is important to include the risk buffer because the greenhouse gas emission reductions are linked to the project activities. Using the VCS Non-Permanence Risk Tool v.3 (2012), three risk factors to quantify the risk buffer have been identified within the project scenario:

1. Internal risk, includes the project management capacity, mitigation plans, adaptive management plans, and project longevity.
2. External risk, stems from the community and external factor. This factor mainly deals with the land and resource tenure and community engagement issues, and also the political context such as government policies and the country's international governance ratings.

3. Natural risk, is the potential risk to the project from natural disasters, such as drought, fire, pest and disease outbreaks, geological events, etc.

Leakage Zone

Leakage is calculated by monitoring forested areas surrounding the project that have at least the same carbon stock density (tonnes C/ha) as the project area, and other forested areas that are susceptible to leakage from project activities (VCS, 2012d). It is proposed that such areas - the leakage zone - had to have the same land status (Production Forest, Convertible Production Forest, Other Land Use, etc.), similar biophysical and socio-economic conditions, and has to be outside of the project area.

In HD Rio Kemunyang, the leakage zone is the land outside the project area (protection zone) but within the Durian Rambun village administrative boundary that is owned or managed by the community members managing the HD Rio Kemunyang. Thus, following those criteria, the leakage zone in HD Rio Kemunyang is the rehabilitation zone (the area outside the project area but within the HD boundary) and the area within village administrative boundary. This finding is also confirmed by the FGD results, where the community only intends to expand their farming on their fallow areas inside their village boundary but outside their project area.

Minimizing risk of leakage

It is assumed that GHG emission reductions associated with aquaculture intensification, agricultural intensification, fodder production, or other measures to enhance cropland and/or grazing land areas, are conservatively excluded in the leakage mitigation.

To reduce the risk of leakage, the identified deforestation agents are involved in the leakage mitigation actions. Naturally, it is hoped that leakage will not affect the project significantly, but it is still necessary to be proactive in preventing it now or into future. The project activities and the supporting activities are designed to minimize possible leakage risks and when possible create positive leakage through agroforestry activity on areas with low carbon stock.

The risk of leakage will be minimized as follows:

1) Regular inter-village meetings (Durian Rambun with adjacent villages such as Lubuk Bira and Lubuk Biringin) ensure village authorities can share information about present and future encroachment threats, how to coordinate efforts to resolve potential conflicts and how to liaise with local authorities to resist these threats in the broader landscape including on the border between village forests and the Kerinci Seblat National Park buffer zone. Knowledge from awareness-raising and patrolling activities can also be shared more broadly amongst neighbouring communities. Durian Rambun villagers will communicate with FFI field staff and with local authorities directly if a threat of leakage is identified.

2) Training on sustainable NTFP collection and agriculture intensification reduce the pressure to opening new farmland

3) Tree planting and agroforestry create positive leakage by enhancing carbon stocks particularly in the rehabilitation zone. Tree planting and agroforestry activities are in fact mandatory based on the HD regulation (P.49/Mehut-II/2008), supporting the Ministry of Forestry programme (P.20/Mehut-II/2009), and participating in the President of Republic Indonesia decree on National Tree Planting Programme (Presidential Decree No 24-2008)

By implementing the above activities, we are confident the project will succeed in minimizing the risk of leakage and possibly in creating positive leakage.

H2 Risk buffer

A 20% of non-permanence risk has been estimated in HD Rio Kemunyang. This risk buffer proportion has been built into the project benefit calculations.

Figure G6. Baseline emissions against the 'with project' scenario emissions in HD Rio Kemunyang

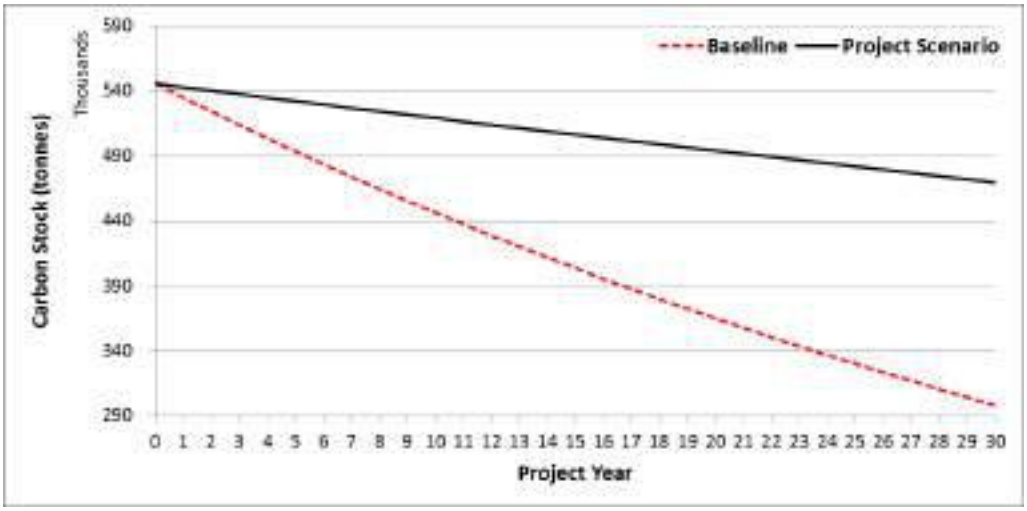


Table G6-2, Figure G6). Thus, as much as 770,910 tonnes of CO_2 emissions in 30 years or 25,697 per annum can be avoided by implementing project activities in HD Rio Kemunyang.

Part I: Project Coordination & Management

I1 Project Organisational Structure

The HD area and management licences are granted by the government to the village forest management insitution (LDPHD). The LPHD is responsible for conducting forest management activities to ensure complicance with laws and regulations pertaining to the HD licence. The LPHD will function as the legally recognised community forest management group for the purposes of the Plan Vivo project.

FFI will act as focal point for project coordination, representing and providing the linkage with the Plan Vivo Foundation. A number of additional organisations will be involved as project implementing partners, including the Plantation & Forestry Department of Ketapang district (local government); and local NGO partner Lembaga Tiga Beradik, experienced in community facilitation and forest protection). RMI provided technical services to the project, supporting in-depth socialisation of REDD+ and the Plan Vivo System, participatory project design and PDD development. None of the partners have a commercial interest in the project.

FFI champions the conservation of biodiversity, to secure a healthy future for our planet where people, wildlife and wild places coexist. Lasting local partnerships have been at the heart of the organisation's conservation activities for more than one hundred years, and its work now spans the globe with more than 140 projects in over 40 countries. The FFI Indonesia Programme was established in 1996. Today the programme works to conserve a diverse range of threatened species and ecosystems throughout the archipelago. The project team has developed substantial expertise in climate change and the development of REDD+ activities. In order to adapt to the local context of existing partner relationships and distribution of skills and expertise, certain project co-ordinator responsibilities will be led or co-implemented by the partners above.

I2 Relationships to national organisations

The HD tenure arrangement was introduced as a formal community forestry scheme in Indonesia by the issuance of Ministry of Forestry decree P. 49/2008 on HD. The purpose of HD is to give access to local communities, through village institutions, to legally recognised, sustainable utilisation of forest resources. Improving local community well-being and sustainable management of the forest estate are the main objectives. The two main steps to establishing HD are obtaining 1) a MoF licence for the forest area and 2) a provincial governor license for forest management. Both steps involve stringent formal verifications.

The HD license is non-transferable, valid for 35 years, renewable, and monitored by the government at least once every five years. The LPHD is responsible for HD boundary demarcation, formulation of the HD management plan, forest protection, rehabilitation, and restoration/enrichment. There is a timber harvest quota for non-commercial purposes (housing and infrastructure construction in the village) of 50 m3 per annum. A framework for legal timber certification exists, but guidelines for commercial timber utilisation from community-managed state forests are still in the formulation stage. Commercial non-wood products

utilisation (up to 20 tonnes per annum) and environmental service payment schemes, including payments for carbon sink and sequestration, are allowed, but require separate government approvals.

I3 Legal compliance

The project will facilitate target communities to secure the necessary permit/approvals for carbon sequestration project and carbon trading. The project will comply with all relevant national regulations. Frameworks for carbon sink and sequestration project are already promulgated. MoF decrees P.36/2009 and, most recently, P.12/2012 regulate forest carbon/REDD+ projects. Entities (government, private sector, local community) with forest management rights must register their projects with the MoF. In forest zones with no competing license, REDD+ project proponents need to apply for a carbon sink and sequestration business permit. International systems and standards for project development and marketing (CCBA, VCS, Carbon Fix, and Plan Vivo) are recognised in P.36/2009. The decree also stipulates vertical distribution/sharing of revenue from the sale of carbon credits, which is currently subject to inter-ministerial review. A clause in P.12/2012 states that to meet the national emissions reduction commitment, foreign country buyers will be permitted to purchase a maximum of 49% of the carbon emission reductions. Government regulation No. 12/2014 sets tarrif for non-tax state revenues from forestry sector, including from the sale of carbon credits.

The MoF has developed national standards for land cover classification (SNI 7645:2010), carbon stock measurement and accounting (SNI 7724:2011), formulation of allometric equations (SNI 7725:2011), and REDD+ demonstration activities (SNI 7848:2013).

I4 Project management

Following UNFCCC COP in 2007 in Bali, in 2008 FFI started its REDD+ works in West Kalimantan. The 'community carbon pool project' (CCP), REDD+ in community forest areas, was then commenced in 2009. Due to biodiversity richness and high level of threats (forest conversion into oil palm plantation), Ketapang and Kapuas Hulu district were selected as priority districts. Since then, the work has focused on securing tenure and REDD+ project designing. Initially, a post-2012 Kyoto protocal compliance market was highly anticipated. In its absence, the orientation has changed toward pre-compliance and voluntary market. Table I4 present timeline of community forest REDD+ project establishment.

TABLE I4. TIMELINE FOR PROJECT ESTABLISHMENT

	Activity	Time frame
1	Secure HD approval and permit	2009 onward
2	Project designing:	
2.1	Community consultation	2009-2014
2.2	Carbon survey/accounting	2011-2013
2.3	PDD development	2012-2014
2.4	Registration & validation	2013-2014
2.5	Plan Vivo certificate issuance	2015 onward
2.6	Project implementation, monitoring, & replication	2014 onward
2.7	Fund raising/marketing	2013 onward

Facing direct threat from unplanned forest conversion to coffee plantations, Durian Rambun was selected as the first PES REDD+ project in Sumatra. Project replication to other village forest areas (prime candidate is Tanjung Dalam village) is expected to start after registration and validation followed with the issuance of the Plan Vivo certificates and performance-based payment of Durian Rambun in 2015.

As part of the project record keeping system, FFI will develop the project data base system. Electronic and hard copies of project files and documentations such as village forest zoning map, records of community consultation, results of survey and monitoring, photos, reports of project activity, PES agreement, and financial disbursement records, and records on grievance handling will be stored at LPHD office and FFI field office. Additionally, the electronic files will also be stored at FFI Jakarta office. The data base system will be checked updated on monthly and/or quarterly basis.

I5 Project financial management

FIGURE 2: CONTRACTING STRUCTURE

Under Indonesian law, International NGOs (INGO) operating in Indonesia are not allowed to conduct profit-based activities. As a carbon sale agreement is regarded as a commercial activity, FFI cannot receive direct payments for carbon credits. FFI has therefore set up two potential payment models.

In the first model (Figure 2), the Lembaga Pengelolaan Hutan Desa (LDPHD) (or Village Forest Management Body Rio Kemunyang) would sign ERPAs directly with buyers, while communities and FFI would enter a performance-based service agreement. Although FFI would not be a signatory in the ERPA, there are various safeguards included in the text of the ERPA, to ensure that FFI provide project coordination support and to ensure adherence to the requirements of the Plan Vivo Standard.

Under Indonesian Law, the LDPHD is recognized as a legal entity that is able to enter into sale agreements. LDPHD has set up a bank account with Mandiri Bank in Bangko under the name of LPHD Rio Kemunyang. In this model, a 'performance-based service agreement' is signed by FFI and the community. This includes all the key components that would have been in the PES agreement with the only exception that there is no transition of carbon rights to FFI and sales of carbon credits are not made directly by FFI. Communities then sign an ERPA with a buyer. It is purely a transaction, and FFI is not a signatory. However, there are various safeguards included in the text of the ERPA, such as the requirement that FFI provide project coordination support to the project, to ensure adherence to the requirements and recommendations of the Plan Vivo Standard[1]. Both the performance-based service agreement and the ERPA should be legal documents.

The performance-based service agreement must provide assurance that the requirements and recommendations of the Plan Vivo Standard are met. Examples of key elements that should be included are as follows (not an exhaustive list):

- Roles and responsibilities of the two parties:
    - Agreed community activities under the Plan Vivo and expected outcomes
    - Agreed technical and administrative support activities by FFI
- Performance monitoring targets, procedures, and timetable
- Payment schedule
- Details of link between performance thresholds (100% target met; 50% target met, etc) and payment thresholds

What will make this document different from a 'traditional' PES agreement is that it will include:

- Commitment by FFI to market the project and facilitate negotiation of ERPAs directly between buyers/funders and communities;
- Commitment by FFI to guarantee a minimum payment to communities from grant funds ('*minimum payment*'), in the case that a buyer is not found - this would be a grant to the community with donor funds and it should be made clear in the contract that there is no link to carbon credits. It should be clarified to PV how the level of the '*minimum payment'* has been set to ensure that it is sufficiently meaningful to the communities. At a minimum, this payment will need to cover all forest patrolling costs.
- If an ERPA is signed between the community and a buyer that is of greater value than the FFI 'minimum payment', then this will replace the 'minimum payment' for the duration of the ERPA.

    - If a 'minimum payment' using grant funds is paid by FFI, but an ERPA is signed shortly after (in the same reporting year), the grant funds should be returned into the FFI managed PES Fund once the larger ERPA payment has been received to avoid over payments in a single year. This will also enable the stock of grants funds to be replenished to provide guarantee in future years. The two streams of finance (minimum grant payment and actual income from a buyer) will be treated separately.

    As the carbon benefits achieved are not transferred to FFI in the proposed model, Plan Vivo cannot issue PVCs into an account owned by FFI. As discussed, this could be easily resolved by a) issuing into an account owned by the participant or by b) including a waiver in the performance-based service agreement where FFI waive any claim to the PVCs. Option b will still be viewed by the Indonesian Government as FFI holding rights over the carbon. In addition, only communities are likely to be able to open Markit accounts as village forest license and PES license holders. Therefore FFI will adopt option a.

[1] Note that under this model, it would be preferable if communities could sign an ERPA with a SINGLE buyer. This would be a lot less complex to administer than the community entering multiple ERPAs for different amounts and timeframes. Therefore, the aim should be to find buyers that are large enough to absorb credit total annual credit generation capacity of one/more communities for duration of the ERPA.

FFI is responsible for overseeing project MRV and reporting to the Plan Vivo Foundation, and needs to retain its role in ensuring that certificates are only issued upon performance targets being met. For this reason, the request for certificate issuance will not be made by communities, and PV will in practice be issuing into community Markit accounts on the instruction of FFI. FFI can demonstrate permission to make this request by writing a clause into its performance-based service agreement with the communities. FFI will also include a short letter of confirmation (or other form or declaration) that the request is being made on behalf of the communities in the annual reports.

It is definitely understood that buyers may want to transfer one or more years of payments upfront, and also prefer not to make transfers to two different entities; i.e. community (min 60%) and FFI (max 40%). FFI proposes that funds are paid into an Escrow account, managed by a third-party Escrow service, and money is held there until targets are met, monitored and reported on and the time has come for payments to be made.

It is also understood that being very clear about performance thresholds and payments levels in the ERPA may make risk of non-delivery more obvious to potential buyers. However, this risk will exist with any project and probably it is better to look for buyers that understand that. Definitely all ERPAs should be very carefully examined to ensure buyers do not try to introduce clauses that put communities at risk in situations of non-delivery.

The language in the ERPA could refer to FFI providing project coordination services in support of the community. The text of the ERPA would need to make clear this support contributes to FFI's core conservation mission and contributes to meeting direct costs of project support at zero profit to FFI. Any income to FFI from this type of agreement would be defined as 'primary purpose' (i.e. contributes to FFI's core mission), and would not be subject to income tax in the UK. At the time of writing, FFI is still discussing the finer details of this contracting structure with the Plan Vivo Foundation and it is understood that some revisions to this proposed model are likely to occur.

The project is expected to expand to include an additional 6 (six) village forests. Table I5 presents a conservative estimate of the annual budget for development and expan as well as potential revenues from sales of Plan Vivo certificates.

TABLE I5. ANNUAL PROJECT BUDGET AND FINANCIAL PLAN (IN USD)

No	Description	Unit	Total
1	Project areas:		
1.1	No. of village/community forests (CF)	CF	6
1.2	Area (2000 ha per CF)	Ha	12.000
1.3	ER's (CO2-e) for sale (3000 tone per CF)	Tone	18.000
2	Project costs:		
2.1	Project development (USD 51,000 per CF)	USD	102.000
2.2	Project replication/expansion (US 24,000 per CF)	USD	96.000
2.3	Project monitoring (USD 6800 per CF)	USD	40.800
2.4	Project management/coordination (USD 1600 per CF)	USD	9.600
	Sub-total	USD	248.400
3	Project revenues:		
3.2	PES Fund - contribution from donor/aid agencies (USD 5 per tone CO2-e)	USD	45.000
3.2	PES Fund - from carbon credit sale (USD 10 per tone CO2-e)	USD	90.000
4	Income for project participants:		
4.2	All project participants (6 communities/villages)	USD	99.000
4.3	Per project participant (community/village)	USD	16.500

I6 Marketing

FFI will help with marketing the Plan Vivo certificates domestically in Indonesia and internationally. FFI offices in Indonesia, UK, US, Singapore,and Australia will actively engage with aid agencies, foundations, corporations, and carbon credit buyers/re-sellers. Plan Vivo certificates will be issued after funders and/or buyers have been identified and secured.

I7 Technical Support

The section below highlights the expected division of key responsibilities of supporting NGOs in the Plan Vivo project.

Administrative:
- Registration and recording of community land-use management plans (Plan Vivos) and sale agreements (FFI);
- Managing the use of project finance in the Plan Vivo and making payments to producers (FFI));
- Coordinating and recording monitoring (FFI and local NGO partners);
- Negotiating sales of Plan Vivo Certificates (FFI);
- Reporting to the Plan Vivo Foundation (FFI);
- Contracting project validation and verification (FFI);
- Managing project data (FFI and local partners).

Technical:
- Providing technical support and training to producers in planning and implementing project activities (All partners plus additional external technical support on a needs basis);
- Developing, reviewing and updating forestry and agroforestry systems – the technical specifications (FFI and local partners);
- Evaluating the quality of community *Plan Vivos* (FFI and local partners);
- Monitoring implementation and impact of *Plan Vivos* (FFI and local partners).

Social

- Conducting preliminary discussions and on-going workshops with communities (FFI, LTB);
- Gathering socio-economic information for project registration and reporting purposes (FFI, in collaboration with LTB);
- Helping groups/individuals to demonstrate land tenure (FFI and local partners);
- Advising on issues such as community mobilisation, setting up bank accounts, dispute resolution etc. (FFI and local partners).

Part J: Benefit sharing

J1 PES agreements

PES agreement signing will take place after the completion of the following steps have been achieved:

1) Formal tenure/management right (e.g. *Dutan Desa* approval/license) has been approved by the government or progressing toward finalisation;
2) Zoning and delineation of boundaries of project area (*Plan Vivo*) completed;
3) Project participants are aware of REDD+ and PES agreement, and gave their consent (FPIC);
4) Calculation of estimated net emissions reductions finalised and communicated project participants;
5) Completed project designing phase (drivers and project activities identified; benefit sharing, monitoring, and governance structure developed).

Intensive facilitation will be provided to ensure LPHD members are able to perform community-level coordination functions. These include planning, implementation, and reporting of project activities. Specific attention will be given for the LPHD to be able to assess and report project performance againts target indicators that will trigger payment. This includes undertaking corrective actions as necessary. In the case of failure of meeting performance targets, the duration of PES agreement will be extended to allow corrective actions.

To mitigate risks pertaining to market uncertantly, due to the difficulty in finding buyer of carbon credits, initial grant funding has been secured for the first 3 years. Another possible risk is the internal conflict within the community on financial benefit sharing distribution. To cope with this, assistance for the LPHD will be provided by the project coordinator to organise community consulation meetings and to ensure that the grievance mechanism is put in place.

J2 Payments & Benefit Sharing

Result of a series of community consulations presented in Table J2 shows indicators that directly link perfomance and payments of incentives. Annually LPHD will coordinate the submission of reports of project activities and results of monitoring againts indicators. The project coordinator field staff will verify the report and organise submission of reports to the Plan Vivo Foundation for aproval. Payments will be made trough bank transfers from CFES to the LPHD bank account.

TABLE J2. PERFORMANCE INDICATORS AND PAYMENT

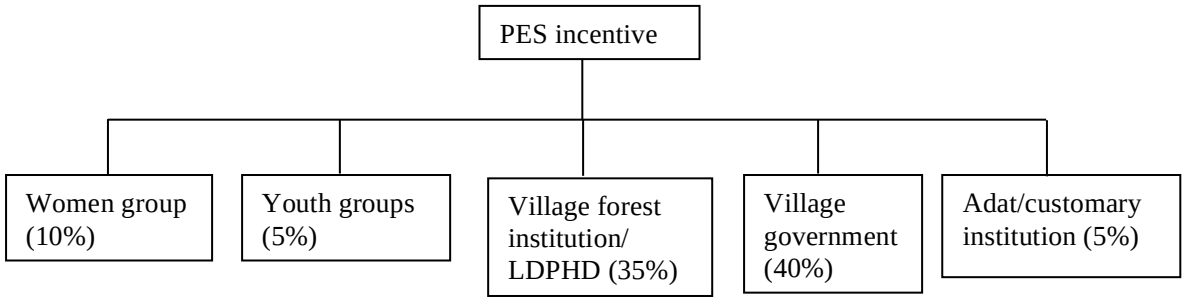
Payment	Deforestation (ha)
Full payment (100%)	<16.75

Partial payment (50%)	<33.50
No Payment (0%)	>33.50

Incorporated in the deforestation indicator is degradation (timber felling). Timber quota per year is 50 m3 per year and equals to 35 trees (30 cm diameter and 20 m height). Additional felling of 70 trees equals to 1 ha deforestation.

From intensive community consultations, the agreed benefit sharing distribution for PES incentives is outlined in Figure J2. Activity groups submit proposals to LPHD for review and approval. LPHD treasurer will transer the fund to the activity groups' treasurers. The activity groups submit activity and financial report to LPHD. To ensure transparent and equitable benefit sharing disribution, regular community consultation meetings will be organised to discuss issues as they emerge. Any individuals in the community is also encoureged to raise questions, complaints and/or suggestions trough the agreed grievance mechanism.

FIGURE J2. BENEFIT SHARING DISTRIBUTION



Note:

- Women group (10%) will focus on developing entrerprises such as coffee processing.
- Youth group (5%), for sports (e.g. soccer, volley ball, takraw, table tennis)
- Village forest intitution/LDPHD will manage the fund for forest conservation activities (20%) (e.g. patrol, boundary marking) and forest-related economic developement activities (25%) such as tree nursery and tree planting/enrichment.
- Village government is to provide supervision and support to LDPHD. Village government plans include: social benefits (15%) (elders, disable, orphan children, female-headed households), infrastructure maintenance (15%) (road, micro-hydro, running water), and economic development (5%) e.g. tree nursery, cash crops cultivation, pest control.
- Adat/customary instutions (5%) to organise adat/customary meeting to discuss matters related to the *Hutan Desa*. Also to provide support for custormary events.

Part K: Monitoring

K1 Ecosystem services benefits

Project monitoring will be carried out monthly and annually through a community based and participatory monitoring approach. The monitoring activities will not only be conducted in the project area (protection zone), but also in the leakage zone (rehabilitation zone) to minimise the risk of leakage, and to ensure forest protection goals are achieved.

Two periodic monitoring activities will be performed, specifically the monthly monitoring and the annual monitoring. The monthly monitoring will be conducted by the communities that form the forest patrol teams. Forest cover and presence/absence of trees will be the related monitoring indicators, with deforestation measured by area of forest cleared, and degradation measured by the numbers of trees felled.

The monthly monitoring carried out by the aforementioned community forest patrols will mark the location of cleared forest and trees. The patrols will record perimetre coordinates for cleared forest areas and the location of felled trees using handheld GPS. The patrol teams will collate, summarise, and report the monitoring data to the community forest institution (LDPHD) on a bimonthly basis. The head of the LDPHD will share a quarterly result with the project coordinator. The project coordinator will then aggregate quarterly monitoring reports and submit an annual report to the Plan Vivo Foundation for certification.

The annual monitoring will be carried in conjunction with the FFI team, who will visit the Permanent Sampling Plot (PSPs).The annual monitoring will resurvey 20% of all PSPs so that, within five years, the whole PSPs will be monitored entirely. At least three PSPs will be

monitored annually. PSPs will be randomly selected. The use of remote sensing analysis to monitor land cover changes will also be conducted annually with Landsat 8 satellite image (30m spatial resolution), and every 2 1/2 years with SPOT 5 satellite image (<10m spatial resolution). Field monitoring will be used to validate remote sensing analysis in the project areas.

Along with the satellite images, habitat photos will also be analysed. Habitat photos are taken on fix points that capture the PSPs conditions. Photos are taken and compared every year. This technique is called the Fix Photo Points (FPFs).

K2 Socio-economic impacts

A participatory well-being assessment (PWA) will be completed in the 1st year of the crediting period. PWA will be repeated every 5 years. The result of the assessment is locally defined well-being categories and indicators (Table K2-2). The number of households belonging to each well-being categories was subsequently assessed. The monitoring will focus on the change in number of households falling into the most vulnerable category (poor). The project is expected to improve community well-being by contributing to reduction in the number of poor households. The results of the monitoring will be used to inform improvement of project design (e.g. project activities, benefit sharing, grievance mechanism).

Household surveys conducted at the beginning of the project will be repeated every 5 years. These surveys assess household assets, income, and spending and are followed by an assessment on how change is affecting and affected by project activities. The result of household surveys will complement the results of PWA to inform overall project design improvement.

TABLE K2-1. SOCIO-ECONOMIC MONITORING PLAN

Type of monitoring	Indicator	Methods	Indicator unit	Frequency	Intensity	Responsibilities
Socio-economic	Women's enterprise viability	Data is recorded periodically	Kilos of coffee processed / Number of IDR earned (profits earned are divided equally)	3 months	The women's activity group	Head of the women's enterprise group
Social	Strengthening of village level forest management institution (LDPHD)/law enforcement	Keeping a record of village meeting attendance and minutes in which forest management is discussed	Number of problems encountered and number of problems solved	Annual	Community-wide	Chairman of the LDPHD
Social	Increased access for poor and marginalised community members to healthcare and social services	A log of people receiving healthcare and social services is kept	Number of women-headed and poorest households receiving healthcare and social services as a proportion of all recipients	Annual	Community-wide	Head of Human Resources
Socio-economic	PES funds spent on or by the poorest quartile of the community as agreed in management plan and PES agreement	Book keeping and financial reporting	Number of Indonesian rupiah (IDR) spent on poorest quartile of community (as a proportion of the total)	Annual	Focus on the marginalised groups	LDPHD

Socio-economic	Household survey	Questionnaire survey	Assets, income and expenditure and participation in activity groups	Every 3 to 5 years	Across the whole community	Project coordinator
Socio-economic	Well-being assessment	Participatory approach	Based on criteria identified by the communities themselves	Every 3 to 5 years	Across the whole community	Project coordinator
Leakage mitigation	Awareness raising and capacity building activities	Training and awareness raising events	Number of participants with attention to representation from all activity groups and when possible members from adjacent communities and local authorities	On-going	Community-wide and when possible including neighbouring communities	Project coordinator, local partners and local authorities

TABLE K2-2. EXAMPLES OF WELL-BEING INDICATORS THAT MAY BE USED AS PART OF THE SOCIO-ECONOMIC MONITORING PLAN)

Criteria	Poor	Medium	Rich
House	Bamboo or board/wooden plank walls, roof leaves, floor board/plank, average size of building 4x6. Comprises kitchen, living room, bedroom.	Metal or tile roof, plank/board walls, plank/board floor. Building dimension 6x9. Comprises kitchen, living room, 2-3 bedrooms.	Metal roof, cement walls, ceramic floor. Building dimension 6x12. Comprises kitchen, living room, dining room, 3-4 bedrooms. 1-2 floors.
Electricity	Rent/link with electricity supply of neighbour; use oil lamp when power cut.	450w electricity supply to house. Use candles when power cut.	900w electricity supply to house. Can provide electricity to neighbours. Own generator (for when power cut)
Electronics & Vehicles	Radio; bicycle	TV, bicycle, motorbike	Fridge, TV, bicycle, motorbike, car
Land ownership	Max. 5ha / household head	5-10 ha/ household head	10+ha
Agroforestry gardens	Max 2ha fruit trees and rubber	2-7ha fruit trees and rubber	7+ha fruit trees, rubber and gaharu (resin trees)
Work	Unskilled labourer, farmer, stone miner, hunter/poacher	Daily or permanent labourer/employee, teacher / civil servant, oil palm labour)	Permanently employed worker; businessman
Income	Less than IDR 1.2 million / month	IDR 1.2 – 5 million / month	IDR 5+ million / month
Sanitation facilities	No toilet in the home	Toilet in the home, with board/plank walls	Toilet with ceramic floor

K3 Environmental and biodiversity impacts

Monthly biodiversity monitoring carried out by community forest patrol teams will mark the location and number of encounters with high conservation value (HCV) species and threats to biodiversity (e.g. cleared forest and trees, poaching, fire). The patrols will record perimetre coordinates for the location using handheld GPS. These monitoring indicators are presence-absence of HCV species and incidence of threats.

Monitoring will be undertaken for water. The indicator for stability of water supply is the height of water surface (water-table) on 1) the researvoir sourcing drinking water chanelled with pipes to the villagers and 2) stream sourcing water for micro-hydro in the village. The monthly monitoring carried out by community forest patrol teams will collect the measurement data.

The patrol teams will collate, summarise, and report the monitoring data to LDPHD on a bimonthly basis. The LDPHD will share a quarterly result to the project coordinator. The project coordinator will aggregate quarterly monitoring reports into the annual report.

Sumatran tigers, the project's flagship species, will be monitored by using camera traps every year. Camera traps will be set on likely tiger paths using 4km size grid cells. This monitoring will be solely conducted by FFI due to the types of analyses required to model tiger distribution and population size. A comprehensive list of forest/carbon, water and biodiversity indicators are listed in Table K2-3 below.

Table K2-3: Environmental and biodiversity monitoring plan

Monitoring type	**Indicator**	**Methods**	**Indicator unit**	**Frequency**	**Intensity**	**Responsibilities**
Forest	Forest cover change	SMART patrols	Number of hectares of cleared/burnt forest	Monthly	10km long patrol route, usually lasting at least 3 days every month	KPHD
	Forest condition (degradation)	SMART patrols	Number of felled trees	Monthly	10km long patrol route, usually lasting at least 3 days every month	KPHD
	Leakage monitoring	SMART patrols	Number of hectares of burnt and cleared trees in leakage zone	Monthly	10km long patrol route, usually lasting at least 3 days every month	KPHD
	Carbon stock monitoring	Re-measurement of permanent sample plots (PSPs)	Number of hectares of cleared forest and number of felled trees	Annual	20% of PSPs	Community patrols with FFI team
		Landsat 8 satellite image analysis following FFI procedural document – good practice remote sensing methods for detecting deforestation	Number of hectares of forest by forest strata/classes	Annual	Protection zone	FFI remote sensing expert
		Plot conditions as documented by fix-point photography	Extent of cleared areas/intact	Annual	20% of PSPs	LDPHD and FFI

		(PSP).	areas			
Forest	Forest condition (degradation)	SPOT satellite image classification	Hectares of degraded forest	Every 5 years	Protection zone	FFI remote sensing expert
Forest	Leakage mitigation	Data is recorded periodically	Number of community members involved in livelihood and rehabilitation activities	Every 5 years	Village-wide	FFI
Biodiversity	Local Sumatran tiger population	Camera traps	Number of recorded individuals	Annual	Protection zone	FFI
Biodiversity	Reduced threats (encroachment, poaching, illegal, logging, human wildlife conflict, fire)	SMART patrols	Incidence of	Monthly	10km long patrol route, usually lasting at least 3 days every month	KPHD
Biodiversity	Encounter rates of high conservation value species – HCV (see list in biodiversity section of this document)	SMART patrols	Frequency of sightings per HCV species	Monthly	10km long patrol route, usually lasting at least 3 days every month	KPHD
Water	Water availability	Check how many times the water pump breaks because of lack of water	Number of times the micro-hydro station stops working because of limited water supply	Annual	Micro-hydro station	LPHD

K4 Other monitoring

Monitoring on project governance will focus on community participation in project decision making and activities. Data will be collected from records of commuity meetings and reports of project activities to indicate number of community members, particularly women, participating in project activities and decision-making meetings. From records of grievances and responses, satisfactory complaints handling will also be used as indicators. The LDPHD will share a quarterly result with the project coordinator. The project coordinator will aggregate quarterly monitoring reports into the annual report.

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Annexes

Annex 1. List of key people involved with contact information

Name	Role	Expertise
Dorothea Pio dorothea.pio@fauna-flora.org	Environmental Markets	Project development and marketing
Ibnu Andrian dung_gbc@yahoo.co.id	Project Lead, Merangin District	CBNRM, community facilitation, government & partner liaison, project management, NTFPs, conflict resolution
Lambok Panjaitan	Field Officer, Merangin District	Community facilitation, participatory methodologies, livelihoods/NTFPs
Abdul Hadison hadison_abdul@yahoo.com	Field Officer, Merangin District	Community facilitation, participatory methodologies, livelihoods/NTFPs
Hariyo T Wibisono beebach66@yahoo.com	Wildlife & Biodiversity Advisor	Conservation biology – surveying, monitoring, species & ecosystem conservation, High Conservation Value Forest (HCVF) assessment
Joseph Hutabarat joseph.htbrt@gmail.com	Biodiversity & Forest Carbon Specialist	Forest carbon assessment & avoided emissions modelling, remote sensing techniques
Sugeng Raharjo sraharjo2010@gmail.com	Governance & Land Use Advisor	Spatial planning, landscape-level forest governance, social baseline assessment & monitoring
A. Kusworo a.kusworo@hotmail.com	Community Forest, Climate and Livelihoods Advisor	Community-based natural resource management (CBNRM) & governance, national REDD+ regulations, land-use conflict

Annex 2. Information about funding sources

Community forest REDD+ initiative undertaken by FFI in Jambi is possible thanks to generous support provided from various funding sources. These include CLUA, Darwin, ICAP and MA Cargill. Currently, PES funds secured for Plan Vivo projects in Jambi for 2014-2015 are provided by grant funding from ICCO and Disney.

Annex 3. Producer/group agreement template

PES Agreement
Between LKHD Rio Kemunyang & CFES

1. Background

Forests provide a variety of ecosystem services useful for human survival. The benefits of forest ecosystem services include the provision of clean air, water regulation and soil fertility, habitat for fauna and flora, forest products, and maintenance of culture. Forest ecosystem benefits include climate, watershed, and biodiversity protection.

PES (Payment for Ecosystem Services) is the provision of incentives to actors responsible for forest management for succeeding in their efforts to protect and preserve their forest. The success of forest protection and management can be measured in changes of forest cover and the presence of trees in it.

CFES (Community Forest Ecosystem Services) is a facility that holds and disburses funds for payment for ecosystem services of forests managed by local/ indigenous communities. LKHD Rio Kemunyang is a village institution that has been granted area approval as village forest area by the Minister of Forestry Decree No. SK... / Menhut II / 2013 with a total area of 3616 hectares located in the village of Durian Rambun in Merangin district, Jambi province.

On the basis of goodwill and mutual trust, CFES and LKHD Rio Kemunyang voluntarily enter an agreement payment for forest ecosystem services as part of efforts to achieve sustainable forest management and the improvement of people's wellbeing. The benefit recipients are activity groups that consist of members of the village community.

2. Legal basis and rules

a) Implementation of this agreement refers to the Indonesian laws and regulations on forestry, biodiversity conservation, environment, and reduction of greenhouse gas emissions (GHG).
b) The provision of incentives/funds for community managed forest and the monitoring of forest ecosystem services benefits in this agreement follow the Plan Vivo Foundation requirements.

3. Role and responsibilities

CFES (Community Forest Ecosystem Services)
a) Channel funds from payment for forest ecosystem services to LDPHD Rio Kemunyang in a phased approach based on reporting of the results of forest monitoring in reference to the target indicators set out in Appendix 1.
b) Together with partner agencies and LKHD Rio Kemunyang, coordinate planning and implementation of a monitoring of forests, biodiversity, and socio-economic.
c) Together with partner agencies, prepare and submit regular reports to the Plan Vivo Foundation.

LKHD
a) Manage the activities to protect and sustainably manage forests Manjau village, which produces the benefits / services of the forest ecosystem.
b) In collaboration with partner agencies to ensure the monitoring of forest activities set out in Appendix 2 are carried out.
c) Implement the distribution of forest ecosystem service payments to activity groups (Appendix 3) and monitoring the use of funds, referring to the agreement between LKHD and activity group.
d) If necessary, LKHD and CFES can agree, implement, monitor corrective actions, including changes in the content of this agreement.

Activity groups

a) The activity groups implement protection activities and sustainable forest management. Activity groups are beneficiaries of payment for forest ecosystem services.
b) The portion of the funds received by each group to carry out the activities set out in Appendix 3.
c) Activity groups propose plan of activities, receive funds, and report on the use of funds to LKHD.

Partner institutions

a) FFI-IP Ketapang and L-TB as a partner institutions provide technical supports in the implementation of this agreement.
b) Partner organizations prepare and submit a report to the relevant government agencies.

4) Monitoring and payment

The monitoring procedure is described in Appendix 2. The monitoring indicators mainly include:
a) Forest clearing
b) Cutting of trees

The amount of payment depends on the achievement of success based on the results of monitoring. Indicators for achievement of success and payment values is listed in Appendix 1.

5) Source and use of fund

a) The Fund's compensation comes from Disney and other sources
b) Fund distributed to activity groups, referring to benefit distribution set out in Appendix 3.

6) Change

a) CFES and LKHD Rio Kemunyang can propose changes to the content of this agreement, through deliberation to reach a consensus on the necessary improvement.
b) If an agreement is not reached, CFES and LKHD Rio Kemunyang may appoint third parties to mediate agreement / consensus.

7) Duration

a) The agreement is valid for 3 (three) year from 1 April 2014 until 1 April 2017
b) In the event that the funds are not paid in a certain time period, CFES and LKHD can extend the contract period and agree on corrective actions.

The parties are agreed with the contents of this agreement.

LKHD Rio Kemunyang	CFES
... Head of LKHD Date:	... Coordinator/representative

Witness:

Village government	BPD	Village Custormary Institution
... Village head Date:	.... Head of BPD Date:	..... Customary chief Date

FFI Merangin Project	District Government
Ibnu Adrian Project leader Date:	..... Head of district Date:

Target indicators and payment

	Full payment (100%)	Partial payment (50%)	No payment (0%)
Forest clearing)	≤ 9,50 ha	≤ 18,99	≥ 18,99 ha

Hutan desa area: 3616 ha

Protection zone: 2516 ha

Dana PES per tahun: Rp ...

Schedule of monitoring reporting and payment*

Date	Full payment (100%)	Partial payment (50%)	No payment (0%)
1 April 2015			
1 April 2016			
1 April 2017			
Total			

* In the event that the funds are not paid in a certain time period, CFES and LKHD can extend the contract period and agree on corrective actions.

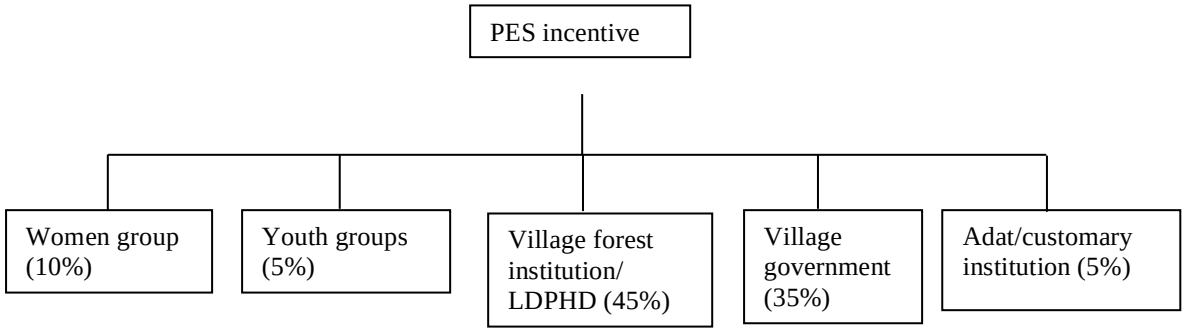
Monitoring procedure

1) The results of monitoring of changes in forest cover and the presence of trees in it is the basis for measuring the success of efforts to prevent deforestation and forest degradation.
2) Deforestation is measured by the extent of forest clearing (hectares)
3) Degradation is measured by the number of trees felled (35 of trees with diamater > 30 cm and >20 m high is equal to 1 hectare of forest clearing.)
4) Payments are made based on achievement of the target indicators listed in Appendix 1.

Patrol and monitoring group members:

1) Perform monitoring and patrol activities regularly (at least once per month) to record the location of forest clearing and / or felling trees.
2) Record any other information related to threats to the sustainability of forest ecosystems.
3) Perform data collection using GPS points at locations surrounding forest clearings and on the stumps of felled trees.
4) Collect additional information (perpetrators / owners, type of equipment used, type of crops planted, etc.). Take photos.
5) Prepares a quarterly report containing a summary of the data, observations, and photos to be submitted to LDPHD.
6) Monitoring reports will be verified by the partner institutions and subsequently submitted to the CFES.
7) Monitoring reports are the basis for payments; the specific amount is based on the achievement of target indicators listed in Appendix 1.

Benefit sharing distribution



Benefit Sharing and Use of PES Funds Agreement Between LKHD Rio Kemunyang and Activity Groups

1. Introduction

This agreement guide the distribution and use of PES funds between LKHD Rio Kemunyang with activity group. LKHD Rio Kemunyang a village institution that has been granted village forest area designation area apporval by the Minister of Forestry of the Republic of Indonesia by Decree No. ... / Menhut-II / ..., with a total area of 3,616 hectares located in D urian Rambun village in Merangin district, Jambi province. PES indicators and payment is provided in Annex 1.

This agreement contains the terms and conditions in the distribution of funds for the implementation of action plans as part of the agreement between the Forest Ecosystem Services Return CFES (Community Forest Ecosystem Services) and LKHD Rio Kemunyang. Portions of PES funds allocated by LDPHD to activity groups of listed in Annex 1.

2) Benefit sharing distribution

This agreement is valid for 3 (three) years, beginning April 1, 2015 to April, 2017.

LKHD agreed:
1) Manage village forest protection and management activities.
2) On behalf of village communities and activity groups receiving PES funds form CFES.
3) To encourage as many villagers to play an active role in the groups activities. Ensuring the poor and women receive the benefits of ecosystem services fund returns.
4) Ask for / receiving submissions of plans and reports of activities and use of funds from form groups and citizens.
5) To appoint a treasury team that records all revenues and expenditures of PES funds in LKHD special bank account. Treasury team record all transactions and keep evidence of purchase of goods and payments.
6) Make payment of PES funds to activity groups, after examining the report of activities and use of funds provided previously.
7) Ensure no -misuse of PES funds. Prevent any parties taking advantage over PES funds.
8) Regularly, once every 6 months, to prepare report on the implementation of activities and use of PES funds to be submitted to partner institutions and CFES.

The **activity grou**ps agreed:
1) Comply with the benefit sharing distribution of PES funds listed in Annex 1.
2) Submit plan of activities and budget to LKHD, based on village forest management plan, and to receive and use PES funds. The proposal contains a description of activities, timeframe. The use of PES funds are directly related to the implementation of action plans.
3) Carry out activities according to the plan approved / agreed.
4) Ask the treasury of the activity groups for every 3 months prepare and submit financial report situation to all members of the group and LKHD.
5) Encourage as many people actively participate in group activities. Involving all members of the group in decision making. Ensuring the poor and women benefit from PES funds.
6) Ensure no mis-use of PES funds. Prevent anyone taking personal advantage over PES funds.

3) Activity groups

At the time this agreement was signed, there are 5 (five) activity groups of that play an active role in the

protection and management of village forest. Afterwards, a new activity group may be formed based on the results of consultation between LKHD, activity groups, and village community. Allocation of PES for activity groups is listed in Annex 2.

Activity groups:
1) LKHD
2) Women enterprise group
3) Village youth group
4) Customary insitution
5) Village government

Parties signing this agreement:

LKHD	Women group	Youth group
[....]	[...]	[....]
Head of LKHD	Head of group	Coordinator
Date	Date	Date

Village government	Customary insitution
[...]	[...]
Village head	Chief

Patrol Authorisation Form

PATROL NUMBER :

Patrol start date :

Patrol end date :

Name of team :

Patrol mode:

☐ On foot ☐ Motorbike ☐ Boat Other: .....

Patrol purpose:

☐ Routine Patrol & Monitoring ☐ Fire fighting ☐ Wildlife conflict ☐ Other: .....

List of patrol team

Name	Address	Tasks
Total number of people :		

Head of Patrol Team Authorised by

....

Patrol and Monitoring Form

Location & Patrol number _____ Day # _____ of _____ patrol days

Date: _____ GPS user : _____ GPS ID:

No.	No. GPS	X	Y	Time	Observation	Type of observation	Types	Number/ volume/size	Behaviour	ID Foto

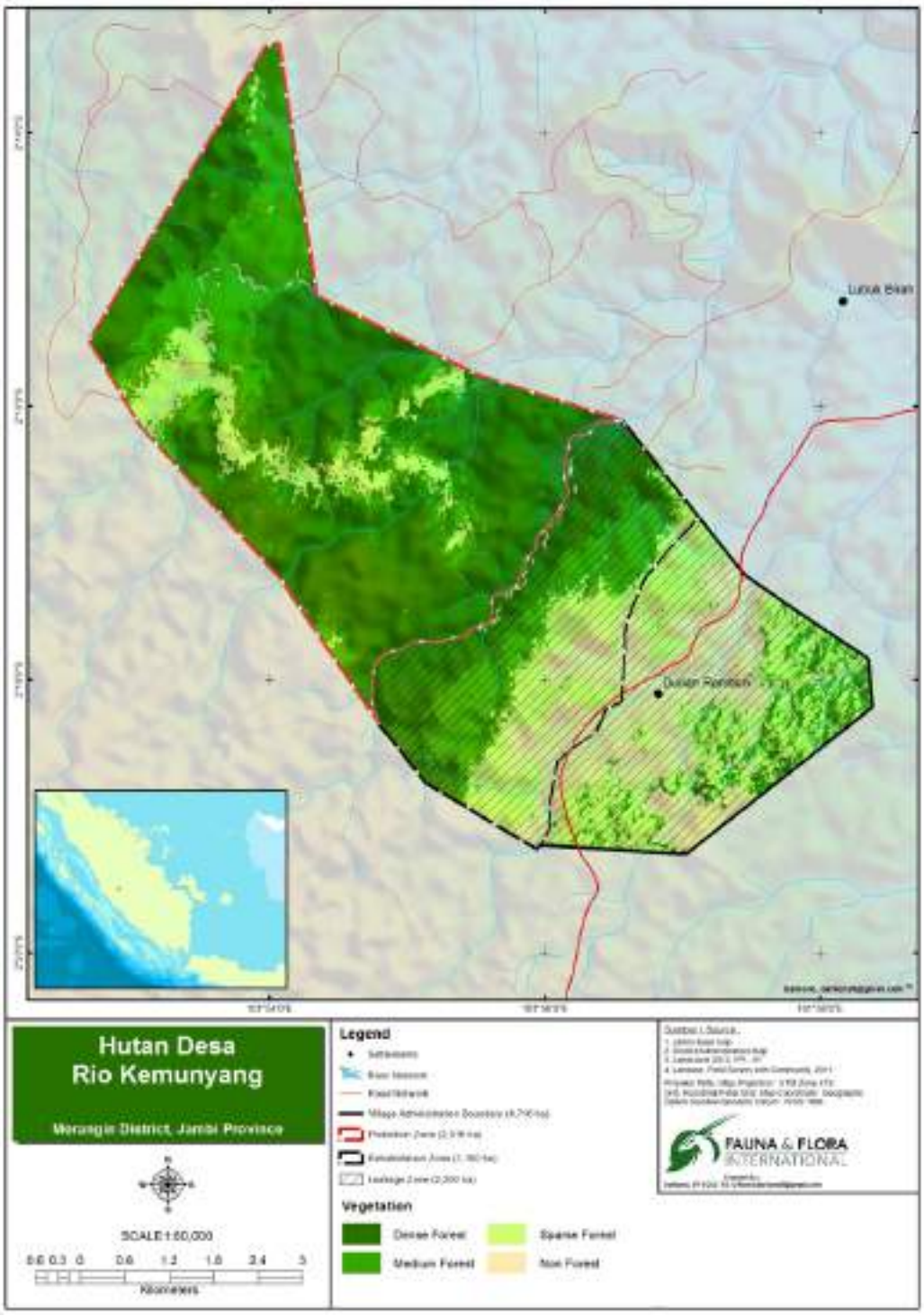
Watertable Monitoring Form

Name :
Date :
Location :

No.	Date	Location	Watertable	Remarks

Annex 4. Example forest management plans/plan vivos

Zoning of Rio Kemunyang village forest: protection zone and rehabilitation/food security zone.



Annex 5. Permits and legal documentation

Provincial governor handing to the district head (*bupati*) HD approval from Minister of Forestry (2013).

Head of village forest instution receiveng MoF's HD area approval, handed by head of district (*bupati)* in 2013.

Annex 6. Evidence of community participation

Community meeting on REDD+ faciltated by RMI team in 2011.

Village community workshop on forest management plan (i.e project activities) in 2013.