Rimbak Pakai Pengidup

Forest for Life

Sustainable Forest and Biodiversity Management in Nanga Lauk Village, Kapuas Hulu, West Kalimantan, Indonesia

Project Design Document

Submitted to the Plan Vivo Foundation by PRCF Indonesia

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Acronyms

AA-CFREDD	Approved Approach for Estimation of Climate Benefits from REDD in Community Managed Forest
ADB	Asian Development Bank
AR	Annual Report
BPD	Village Consultative Body (*Badan Permusyawaratan Desa*)
DESCA	Republic of Indonesia, Ministry of Environment and Forestry, Directorate of Ecosystem Services on Conservation Areas
FMU	Forest Management Unit
FPIC	Free, Prior and Informed Consent
GIS	Geographic Information System
GPS	Geographic Positioning System
HCV	High Conservation Value
LPHD	Village Forest Management Institution (*Lembaga Pengelola Hutan Desa*)
LPM	Community Empowerment Institution (*Lembaga Pemberdayaan Masyarakat*)
MoEF	Ministry of Environment and Forestry
NDC	Nationally Determined Contribution
NLHPT	Nanga Lauk Production Forest
NLVF	Nanga Lauk Village Forest
NTFP	Non-Timber Forest Product
PDD	Project Design Document
PRCF-Indonesia	Yayasan People Resources and Conservation Foundation – Indonesia
REDD	Reducing Emissions from Deforestation and forest Degradation
RSPO	Round Table on Sustainable Palm Oil
SMART	Spatial Monitoring and Reporting Tool
UNFCCC	United Nations Framework Convention on Climate Change

Contents

Executive Summary

The *Rimbak Pakai Penghidup* (Forest for Life) project will enable the Nanga Lauk community to protect forest within their village forest, and a surrounding area currently classified as production forest, from deforestation and forest degradation that is expected if the activities of timber concessions, and unsustainable practices by the local community, are not prevented.

The Nanga Lauk Village Forest (NLVF) covers a total area of 1,430 ha, 58% of which is covered by peat swamp forest and riparian forest (the rest being occupied by lakes). Nanga Lauk village land also includes 8,618 ha of peat swamp and riparian forest that is currently classified as *Hutan Produksi Terbatas* or Limited Production Forest (Nanga Lauk Limited Production Forest; NLHPT). NLVF and NLHPT support the livelihoods of the 197 households in Nanga Lauk Village, and provide habitat for a diverse assemblage of plant and animal species. The management rights for NLVF have been assigned to the Nanga Lauk Community by establishment of a Village Forest (*Hutan* Desa). The Nanga Lauk community wish to extend these rights to include NLHPT, part of which will be managed as a conservation zone and included along with the NLVF as a Plan Vivo project area. There is a current application for the concession license for NLHPT, which the Nanga Lauk Community aim to prevent and are instead applying to have the area included in their village forest.

In Kapuas Hulu District between 2005 and 2016, around 3% of the forest types present in NLVF and NLHPT were deforested and around 1.5% were degraded. If they are not effectively protected, a similar proportion of deforestation and degradation is expected in Nanga Lauk forest, as it is exposed to the drivers of deforestation and degradation that have affected similar forest types in the District of Kapuas Hulu over the last 10 years. Under this baseline scenario, emissions from loss of above- and below-ground biomass in the next 5 years are estimated at 8,844 tonnes of CO_2 for NLVF and 82,403 tonnes of CO_2 for NLHPT.

Over the last two years, the Nanga Lauk Community have worked with PRCF-Indonesia to develop a suite of activities that will enable them to address the drivers of deforestation expected to affect the NLVF and NLHPT and prevent deforestation and forest degradation. Key to the success of these activities in NLHPT is formal recognition of the area as village forest, and the Nanga Lauk community have started the process required for its recognition as *Hutan Desa*. The community will continue to pursue this recognition, and the development of management plans for NLHPT, with support from PRCF-Indonesia and the Plan Vivo project.

While the process for legal recognition of management rights to NLHPT is underway, the community will proceed with the development of village regulations to ensure sustainable management of the forest in NLVF and NLHPT and initiate a programme of forest patrol and monitoring to enable them to identify and respond to threats to the forest and biodiversity.

The Nanga Lauk community depend on the forest for their livelihood activities, and through the project they will continue to develop and diversify these activities by improving processing and marketing of rattan, bamboo and forest honey, planting species used as timber and non-timber forest productions and exploring potential for ecotourism. These activities, supported by the Plan Vivo project, will help to ensure the Nanga Lauk community can maximise the benefits they receive from forest protection, and develop a foundation for long-term management after the end of the Plan Vivo project.

If the project activities achieve their objective, carbon dioxide emissions from deforestation and forest degradation will be reduced; habitat for a diverse range of plant and animal species, many of which are threatened or endangered, will be protected; and the livelihoods and wellbeing of the Nanga Lauk community will improve. To estimate the emission reductions the project will achieve in its first 5-year project period, it is conservatively assumed that project activities will prevent 90% of the emissions expected from loss of above- and below-ground biomass (see Section G.5).

The main causes of the expected deforestation and forest degradation in the absence of project activities are the activities of commercial timber concessions. Unsustainable timber use by the Nanga Lauk community could also contribute to emissions from deforestation and forest degradation. In the District of Kapuas Hulu, all land designated for logging has been allocated. Avoidance of logging within the NLVF and NLHPT is therefore not expected to result in an increase in these activities outside the project area, so no significant leakage is expected. A conservative estimate of potential leakage of 5% of the expected emission reductions is adopted for the first project period (see Section G.6).

The Nanga Lauk community hope to safeguard their forests so that they can continue to benefit from the natural resources and ecosystem services they provide. The Plan Vivo project will be used to increase income from sustainable forest management activities, and any income from the sale of Plan Vivo certificates that exceeds project implementation and management costs will contribute to a fund to be used to finance long-term forest protection and village development activities. The emission reductions achieved during the project period are therefore expected to be maintained well beyond the life of the Plan Vivo project, and the risk of reversals is low. It is acknowledged that unexpected events could affect the project area and effectiveness of project activities however, and 13.5% of the Plan Vivo certificates issued for NLVF and 25.5% of certificates issued for NLHPT during the first

project period will be held as a risk buffer against under-delivery during the project period and reversals after the end of the project (see Section H).

After accounting for the expected effectiveness of project activities, potential for leakage, and the risk buffer; during the first 5-year project period, **production of saleable Plan Vivo certificates, for 1,308 tonnes of CO_2 emission reductions per year are expected from NLVF.** Management plans for NLHPT will be finalised during the first year of the project and expected climate benefits will be estimated according to the area of each forest type included in the Plan Vivo project area. Expected production of saleable Plan Vivo certificates from the forest types present within NLHPT range from 0.6 to 7.5 tonnes of CO_2 per hectare per year. Since much of the Nanga Lauk forest is on peatland, and emissions from peat drying are not included in climate benefit estimates, actual emission reductions achieved should be considerably greater than those for which certificates are claimed.

Achievement of these emission reductions, and the associated benefits to biodiversity and livelihoods, will be tracked during the project period with activity-based indicators designed to demonstrate that project activities are being carried out as described in the management plan (see Section K.1.1), and that progress towards legal recognition and development of new livelihood activities is being made. Information on biodiversity, threats to biodiversity, and drivers of deforestation and forest degradation will be gathered by forest patrol and monitoring teams (see Sections K.3 and K.4); and socio-economic impacts of the project will be assessed with an annual participatory wellbeing assessment (see Section K.2). All monitoring data collected during the project period will be reviewed by PRCF-Indonesia every three months and used for adaptive management to revise project activities as appropriate. Emission reductions achieved will be verified at the end of the project period with an analysis of remote sensing data to determine the amount of deforestation and forest degradation that occurred within the project area, relative to deforestation and degradation of areas of the same forest type in Kapuas Hulu District (see Section K.1).

By helping the Nanga Lauk community to prevent the activities of timber companies, and implement sustainable forest management activities, the Plan Vivo project has potential to generate significant emission reductions, prevent degradation and loss of habitat for a diverse and internationally significant assemblage of tropical forest species, and help improve and secure the livelihoods of the Nanga Lauk community. It is hoped that this project will provide a model that can also be followed in other village forests throughout the region.

A. Aims and objectives

A.1 Description of project's aims and objectives

A.1.1 Problem the project will address

The Nanga Lauk Village Forest (NLVF) covers 1,430 ha of peat swamp forest, marshland and lakes. NLVF supports a diverse assemblage of plants and animals that in turn support the livelihoods of the Nanga Lauk Village community who use the area for fishing and honey cultivation. Forest in the NLVF also plays an essential role in maintenance of a water supply for the village. The biodiversity and ecosystem services supported by NLVF are potentially threatened by unsustainable fishing practices and Non-Timber Forest Product (NTFP) collection, and conflict with wildlife that can attack bee hives. Without effective protection of biodiversity and sustainable management of the NLVF, the fish stocks, honey yields and water supply that the Nanga Lauk community depend on are under threat. External threats of encroachment from agricultural expansion, forest and peatland fires, and logging concessions also threaten the area if it not effectively protected.

In addition, the Nanga Lauk village land includes 8,618 ha of peat swamp and riparian forest that is classified as Limited Production Forest. There is a currently a proposal to reactivate logging concessions in this area. Previously PT Bumi Raya Wood Industries held a logging concession license for this area, but the area has not been logged since 2003, and the Ministry of Environment and Forestry (MoEF) revoked the licence on 7 April 2016. An application for a new licence for the concession was filed by a different company, but in view of the willingness of the Nanga Lauk community to manage the forests on their village land, the MoEF has shown the intention to not grant a new logging licence but instead to discuss a management agreement with the community for the concession area.

Logging operations threaten carbon stocks through deforestation and forest degradation, and endanger livelihoods, water quality, fish stocks and biodiversity in the area by displacing wildlife, disrupting waterways and destroying fishing nets with floating logs. The Nanga Lauk community also make use of this forest to collect timber used to construct artificial bee nest structures ('*tikung*') that are used for honey production within the Village Forest. Without sustainable management, this important resource is also under threat as specific timber species are required, which are already becoming scarce.

A.1.2 Aim and objectives

The project aims to prevent loss of carbon stocks and biodiversity, and degradation of ecosystem services supported by the NLVF and production forest within Nanga Lauk village land (NLHPT).

To achieve this, the project will support the Nanga Lauk community to:

- Negotiate with MoEF to grant management rights to NLHPT and permits for carbon and ecosystems services for NLVF and NLHPT to the community;
- Develop village regulations on forest resource use;
- Mark the boundaries of the village forest and carry out patrols to deter and detect unsanctioned use;
- Implement sustainable forest management plans for the NLVF and NLHPT;
- Plant nectar producing trees to encourage honey production, and trees that can provide timber and NTFPs within NLVF and NLHPT; and
- Increase income from activities that contribute to forest protection including through natural resource-based livelihood activities (including sale of honey and rattan and bamboo products), Payments for Ecosystem Services (PES), and sale of greenhouse gas emission reductions certified by Plan Vivo.

B. Site Information

B.1 Project location and boundaries

B.1.1 Location

The project will be carried out in Nanga Lauk Village, which is located at Embaloh Hilir Sub-district, Kapuas Hulu District, West Kalimantan Province of Indonesia (see Figure 1). The administrative extent of Nanga Lauk is 12,800 hectares (see Figure 2), within which there are two project areas – Nanga Lauk Village Forest (NLVF; 1,430 ha) and Nanga Lauk Production Forest (NLHPT; 9,169 ha).

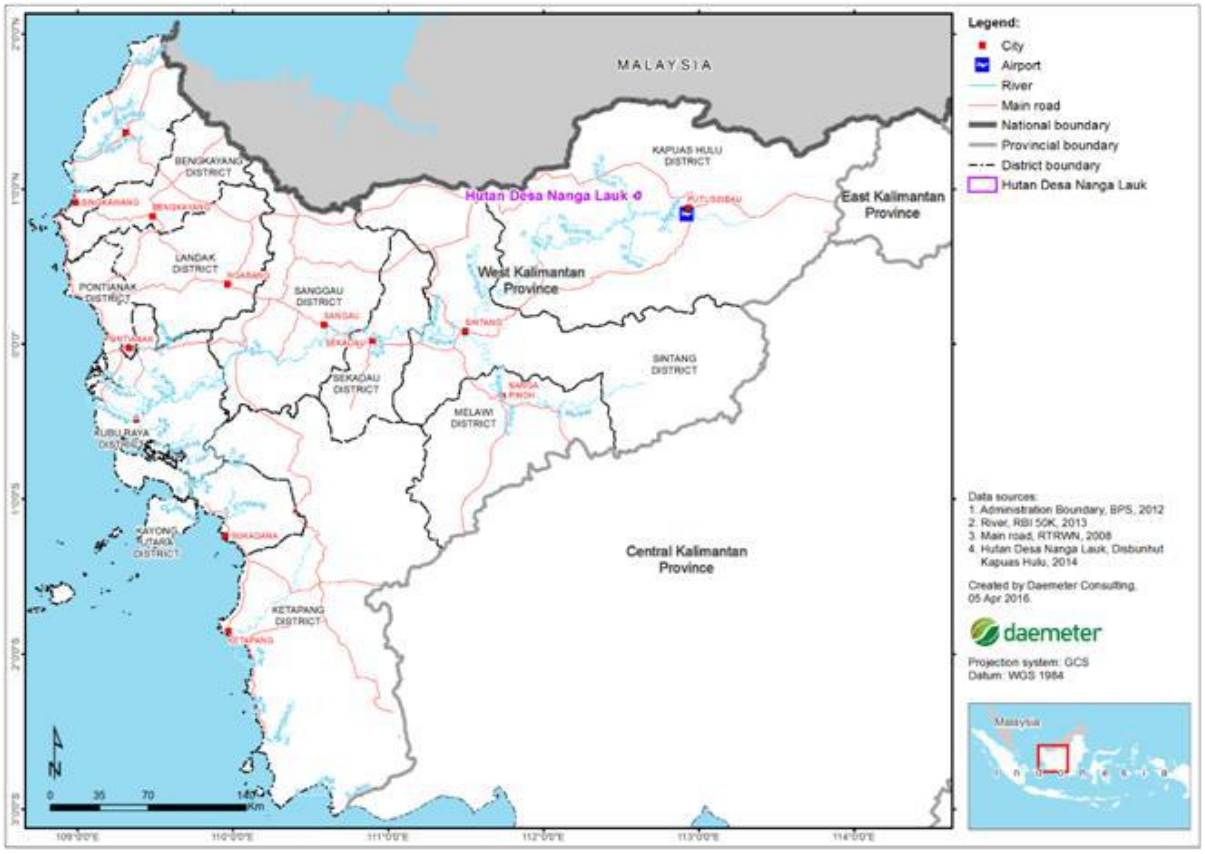

Figure 1 Location of Nanga Lauk Village Forest (*Hutan Desa Nanga Lauk*) within West Kalimantan Province

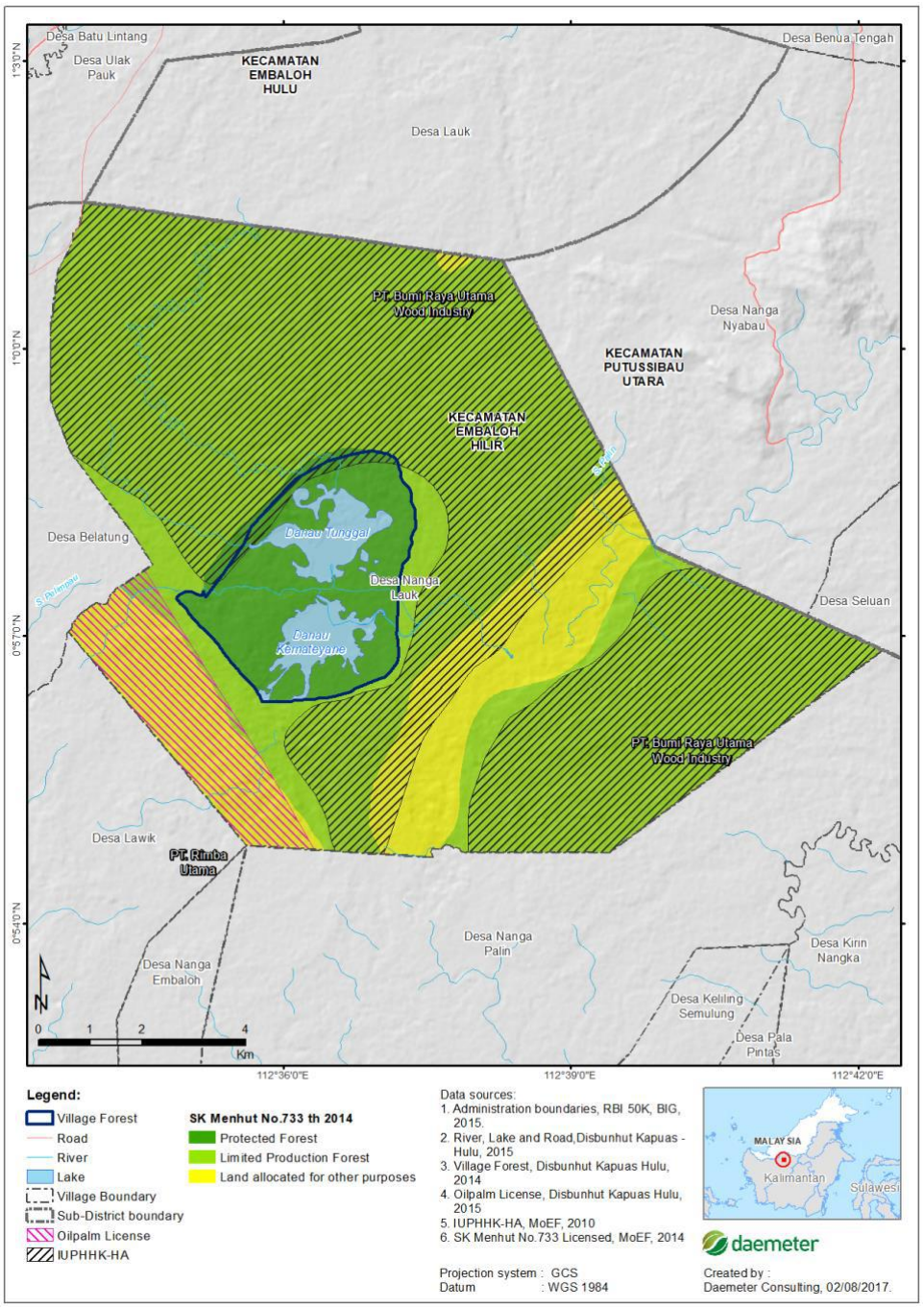

Figure 2 Location of the Village Forest (NLVF), and Limited Production Forest (NLHPT) within Nanga Lauk Village land and location of logging concessions (IUPHHK-HA) and Oil Palm licenses.

According to the legal designations in the 2014 MoEF Spatial Plan[1], Nanga Lauk Village area consists of 12% State Protection Forest (*Hutan Lindung*), 71% State Limited Production Forest (*Hutan Produksi Terbatas*), and 17% Other Use Area (*Areal Penggunaan Lain*).

[1] Ministry of Environment and Forestry (MoEF) 2014 Minister of Environment and Forestry Decree No. 733, 2014

The extent of the State Protection Forest in Nanga Lauk Village is 1,505 ha of which 1,430 ha is within a Village Forest (*Hutan Desa*). The Village Forest was allocated in Nanga Lauk by the Minister of Forestry in January 2014. Following submission of a management plan for the village forest, the Minister of Environment and Forestry issued a decree on Nanga Lauk Management Rights (No. SK 685/MNLHK-PSKL/PKPS/PSL.0/2/2017) on February 28, 2017.

Subsequent to this issuance of ministerial decree, the village has requested the MoEF to allow the community to manage the remaining peat swamp and riparian forests within the boundary of Nanga Lauk Village, which is classified as State Limited Production Forest. The area requested is 9,169 ha of which 8,618 ha is peat swamp and riparian forests, with the remaining area covered with shrubland and wetlands. The main reason for this request is to prevent the forest from use by logging concessions that will have negative impacts on ecosystem services and community livelihoods.

A full plan for the management of NLHPT will be developed during the first year of the project and will include forest conservation zones - where no agricultural activities or timber extraction will be allowed; sustainable use zones – where limited timber extraction will be allowed; and agricultural use zones within 2km of waterways that the community will continue to use for production of food crops and rubber gardens. Only the forest conservation zones will be included in the initial Plan Vivo project area and expected climate benefits will be estimated according to the area of each forest type present within the conservation zones. The project may develop further technical specifications to estimate the climate benefits from improved forest management in sustainable use zones, and if these are added to the project area, the PDD will be updated to reflect this.

B.2 Description of the project area

B.2.1 Geophysical description

Nanga Lauk Village is located in a lowland area with relatively flat topography. Elevation of the village area ranges from 10 to 100 m above mean sea level (masl). Slope ranges from 0 to 30%, but 83% of the village and area is flat (0-8% slope; SRTM 30 m; USGS, 2014).

Based on an analysis of satellite imagery (see Annex 1), 4% of NLVF is peat swamp forest, and 54% is riparian forest; and NLHPT is comprised of 78% peat swamp forest, and 16% riparian forest (see Figure 3).

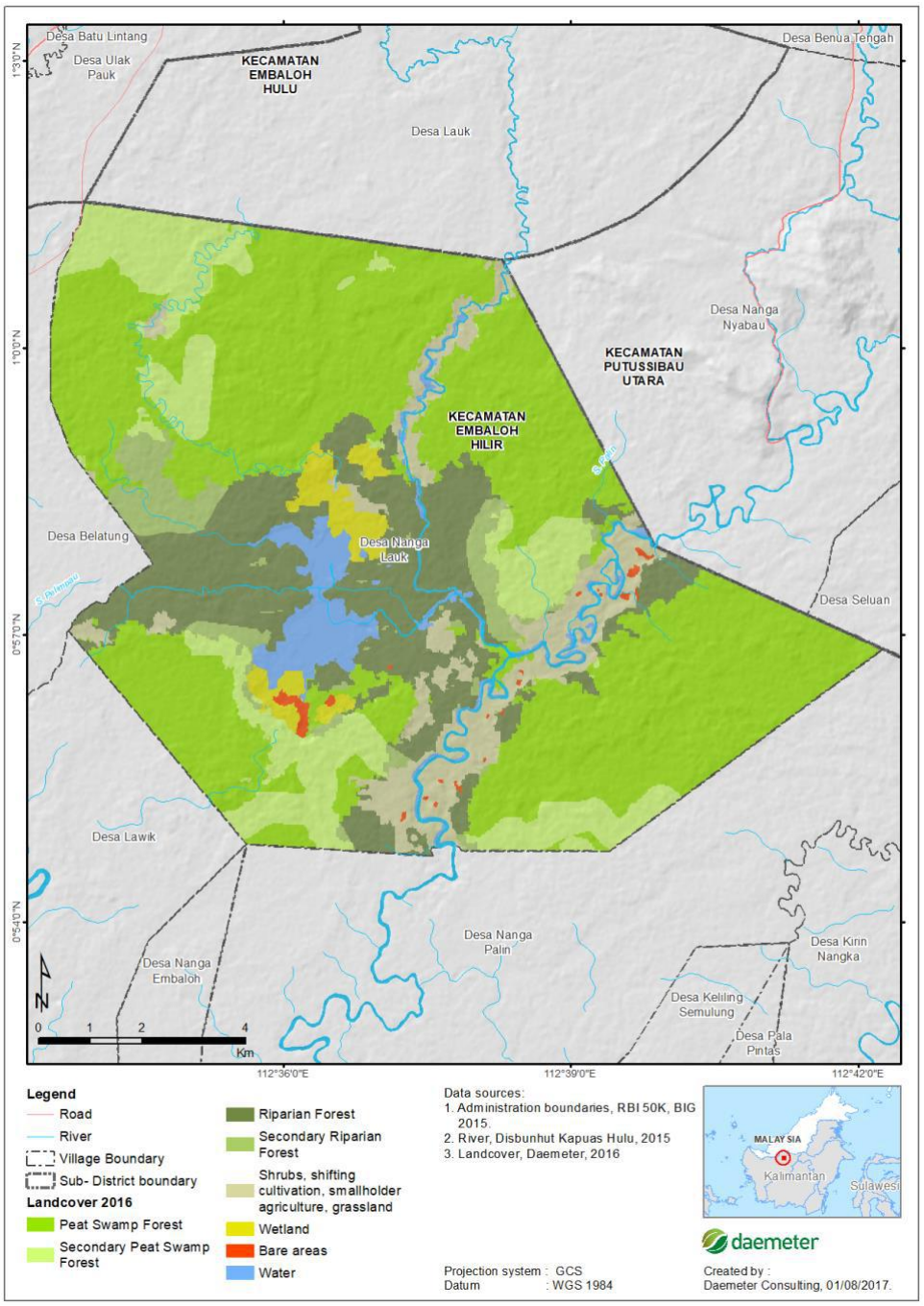

Figure 3 Land cover in Nanga Lauk Village, 2016. Source: Land Cover Change Analysis (2016)

B.2.2 Endangered species and habitats

The presence of plant and wildlife species of conservation interest within the NLVF and NLHPT, and the occurrence of features with High Conservation Value were assessed through

a household survey[2] and participatory biodiversity assessment[3]. The results are summarised below.

Plant and wildlife species

Forest within the NLVF and NLHPT supports a diverse assemblage of plants and wildlife species that are important not only for local community livelihoods but also for the global community. Four tree species that occur within NLVF and NLHPT are listed as vulnerable by the IUCN – Borneo Ironwood (*Eusideroxylon zwageri*), Light Red Meranti (*Shorea macrophylla*), Agarwood (*Aquilaria malaccensis*), and Ramin (*Gonystylus bancanus*), and a further 5 tree species are categorised as Lower Risk/Least Concern.

Of the wildlife species that were reported to make use of the NLVF and NLHPT, 114 are listed in the IUCN Red List of Threatened Species[4] (see

Table 1). Of these 5 are critically endangered – Helmeted Hornbill (*Buceros vigil*), Spoon-billed Sandpiper (*Eurynorhynchus pygmaeus*), Sunda Pangolin (*Manis javanica*), Bornean Orangutan (*Pongo pygmeus*), and Bornean Banded Langur (*Presbytis chrysomelas*); and 8 are endangered - Storm's Stork (*Ciconia stormi*), White-rumped Woodpecker (*Meiglyptes tristis*), Agile Gibbon (*Hylobates agilis*), Müller's Bornean Gibbon (*Hylobates muelleri*), Hairy-nosed Otter (*Lutra sumatrana*), Proboscis Monkey (*Nasalis larvatus*), Flat-headed Cat (*Prionailurus planiceps*), and Smoky Flying Squirrel (*Pteromyscus pulverulentus*).

Table 1 Summary of threatened wildlife species reported as making use of the NLVF and NLHPT.

	IUCN Red List Status*				
	CR	**EN**	**VU**	**NT**	**LC**
Plants			4		5
Birds	2	2	4	16	48
Mammals	3	6	15	5	11
Reptiles					2

CR = Critically Endangered, EN = Endangered, VU= Vulnerable, NT = Near Threatened, LC = Least Concern

Source: Participatory Biodiversity Assessment 2016.

[2] Damayanti, E. K. and Berry, N.J. 2016 Livelihood and Socioeconomic Survey, Nanga Lauk Village. Sustainable Forest and Biodiversity Management in Borneo Project Report.

[3] Damayanti, E.K., Hanjoyo, and Berry, N.J. 2016. Participatory Biodiversity Assessment: Nanga Lauk Village. Sustainable Forest and Biodiversity Management in Borneo Project Report.

[4] The IUCN Red List of Threatened Species. Version 2016-3. Retrieved from www.iucnredlist.org on December 25, 2016.

High Conservation Values

High Conservation Values (HCV)[5] associated with the NLVF and NLHPT that were identified by Nanga Lauk community members are summarised in Table 2.

Table 2 High Conservation Values (HCV) associated with the forest in Nanga Lauk Village.

HCV Category	Details
HCV 1 - Biodiversity	At least four vulnerable tree species, and 114 threatened wildlife species (see previous section)
HCV 2 – Landscape-level ecosystems and mosaics	The peat swamp forest in NLVF and NLHPT is contiguous and relatively intact (see Section B.2.1)
HCV 3 – Rare, threatened or endangered ecosystems	Lakes within the NLVF and some riparian areas with deep and narrow riverbeds are rich fishing grounds which are an important focus for conservation efforts.
HCV 5 – Provision of basic needs	Palin and Lauk Rivers are the sources of water for Nanga Lauk community. Fish from the rivers are an important source of livelihoods, as is honey produced within NLVF. Forests in NLVF and NLHPT provide food, wood/timber for housing and boat making, water, medicine, and NTFPs including rattan, medicinal plants, and fruits.

Source: Livelihoods and Socioeconomic Survey 2016.

B.3 Recent changes in land use and environmental conditions

B.3.1 Current land use

To describe current land use within NLVF and NLHPT it is important to consider the legal designations in the MoEF Spatial Plan[6], which describes NLVF as State Protection Forest (*Hutan Lindung*), and NLHPT as State Limited Production Forest (*Hutan Produksi Terbatas*; see Figure 2). These legal designations determine how forest can be used, and most of the NLHPT is covered by a logging concession (see Figure 2).

It is also important to consider how land within the project areas is currently used by the Nanga Lauk community. A participatory land use mapping exercise[7] was therefore conducted to provide information about land use activities carried out inside Nanga Lauk Village land.

[5] Brown, E., N. Dudley, A. Lindhe, D.R. Muhtaman, C. Stewart, and T. Synnott (eds.). 2013. *Common guidance for the identification of High Conservation Values*. HCV Resource Network.
[6] Ministry of Environment and Forestry (MoEF) 2014 Minister of Environment and Forestry Decree No. 733, 2014
[7] Suryadi, I et. al. 2017. Participatory Land Use Mapping: Nanga Lauk Village. Sustainable Forest and Biodiversity Management Project Report.

The main activities described are summarised in Table 3 and Figure 4, and the consequences of these activities are summarised in Section B.3.2.

Table 3 Land use and land cover classes in Nanga Lauk village as described by Nanga Lauk Community

Key*	Land cover	Land use
Ladang, Kebun, dan Pemuda	Open fields, Rubber gardens, Fallow land, Shrubland	Areas close to rivers and streams used for food production, rubber plantations, timber harvesting and NTFP collection
Hutan Rawa	Forest	Accessible areas used for honey production (*tikung*) and harvesting (*lalau*). Harvesting timber for *tikung* production, and rattan.
Hutan Sekunder	Degraded forest	Previously logged by timber company, now used for timber harvesting for local use, and rattan harvesting
Keringu	Small Lake (Kerinan)	Fishing
Danau	Lake	Fishing and honey production (*tikung*) in submerged trees
Total		

* See Figure 4. Source: Participatory Land Use Mapping, 2017

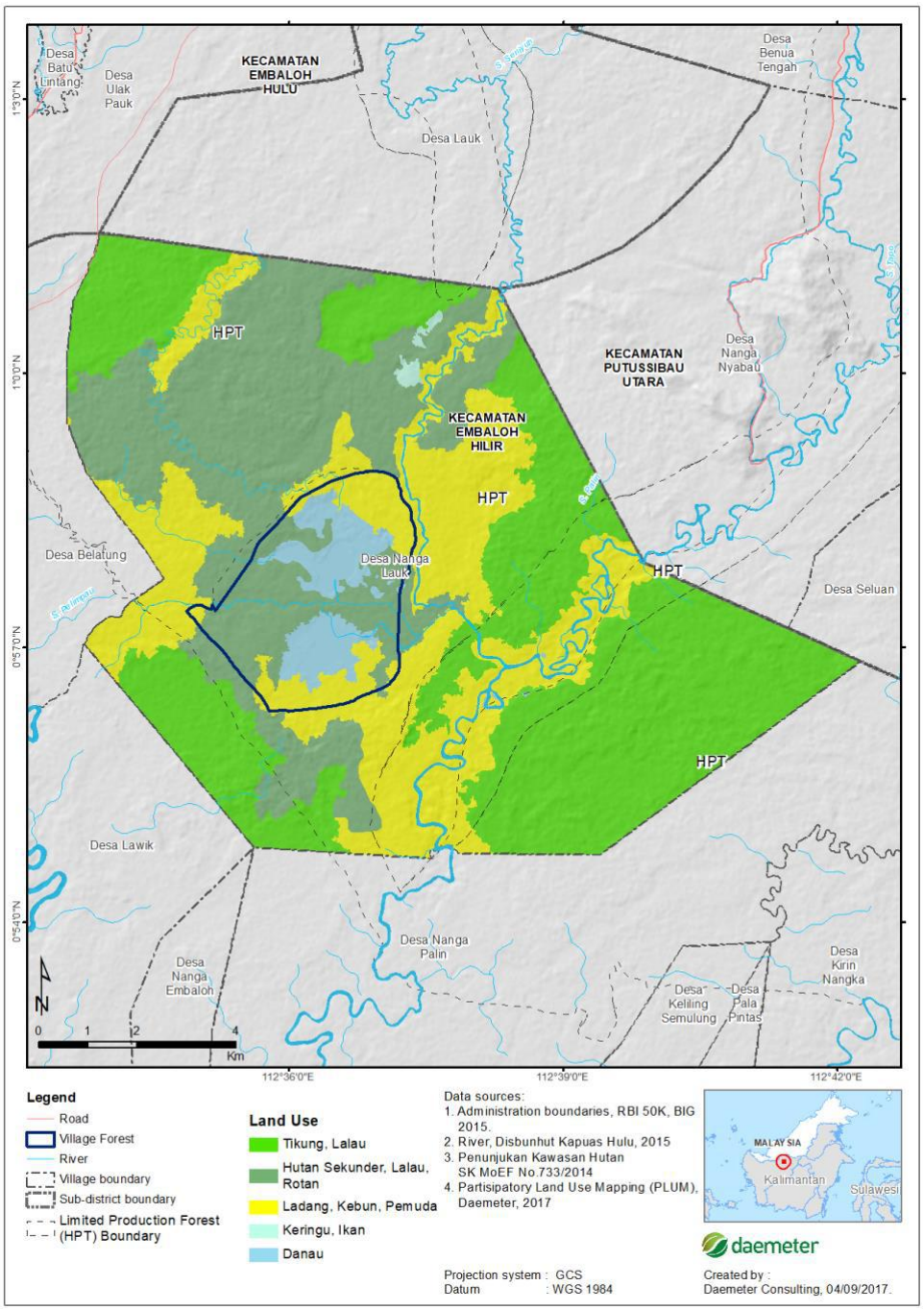

Figure 4 Participatory land use map produced by members of Nanga Lauk Community. For a description of the land use types see Table 3

B.3.2 Consequences of current land use

Current land use practices by the Nanga Lauk community have the potential to cause a small amount of deforestation if agricultural areas are expanded into areas that are currently forested. This expansion is limited to areas close to main rivers, some of which are currently classified as Limited Production Forest. The Nanga Lauk community believe that these areas

should be classified as Other Use Areas, however, and have applied for a reconsideration of the designation.

Timber harvesting for *tikung* construction, building materials for construction of housing within the village, and for sale to neighbouring villages, a local sawmill, and other outsiders has potential to cause degradation of Limited Production Forest, if sustainable harvesting practices are not carried out.

The major drivers of deforestation and ecosystem degradation that are expected to cause the majority baseline emissions described in Section G.4 are related to expansion and encroachment of commercial logging operations and encroachment of oil palm plantations into NLVF and NLHPT if these areas are not effectively protected, as described in Section B.4.

B.4 Drivers of degradation

B.4.1 Causes of land and ecosystem degradation

The two potential project areas, NLVF and NLHPT, are exposed to different drivers of deforestation, forest degradation, and degradation of biodiversity and ecosystem services, as summarised below.

The legal classification of NLVF as Protection Forest is likely to go some way to reducing the risk of deforestation and forest degradation in this area. There are logging concessions and oil palm concessions adjacent to the NLVF however, so some potential remains for encroachment by these operations into the area if it is not effectively protected. The activities of the Nanga Lauk community could also have a negative impact on biodiversity and ecosystem services within the NLVF if plans for sustainable management are not put into action.

The main drivers of degradation within the NLVF are[8]:

- Uncontrolled NTFP collection;
- Human-wildlife conflict with wildlife that can attack bee hives;
- Forest and peatland fires; and
- Encroachment from logging concessions and oil palm plantations.

Since most of the NLHPT is under licence as a logging concession, the main risks of deforestation and forest degradation come from commercial logging activities. Without

[8] Damayanti, E. K. and Berry, N.J. 2016 Problem Tree Analysis for Nanga Lauk Village. Sustainable Forest and Biodiversity Management in Borneo Project Report.

effective protection, the area is also at risk from illegal logging activities, and if plans for sustainable use of timber by the community are not developed then supplies of locally valuable timber species could also be jeopardised.

The main drivers of degradation within the NLHPT are therefore[6]:

- Commercial logging operations; and
- Unsustainable timber harvesting for local use by Nanga Lauk community.

C. Community and Livelihoods Information

C.1 Participating communities/groups

C.1.1 Demographics

There are 197 households in Nanga Lauk. The village has a population of 706 people. Age distribution in the community, based on a sample of 35 households[9], is described in Table 4.

Table 4 Population of Nanga Lauk Village by age*

Age	Male	Female	Total
0-10	7%	11%	18%
11-20	14%	14%	28%
21-30	8%	8%	16%
31-40	6%	8%	14%
41-50	10%	8%	18%
51-60	4%	1%	6%
>60	1%	1%	1%
Total	**49%**	**51%**	**100%**

*From 35 Households surveyed.
Source: Livelihoods and Socioeconomic Survey, 2016.

Nanga Lauk community members consider themselves a medium class community, who can fulfil their needs. They can send their children to school, have no or small debt, and have continuous income from natural resource-based livelihood activities: fishing, rubber tapping, and honey production. All households have houses and the community has education, health, and religious facilities in the village. Nevertheless, at least 79 households are registered as very poor or poor according to the Government standard and receive basic support from the Government.

[9] Damayanti, E. K. and Berry, N.J. 2016 Livelihood and Socioeconomic Survey, Nanga Lauk Village. Sustainable Forest and Biodiversity Management in Borneo Project Report.

C.1.2 Organisational capacity

Nanga Lauk Village governance consists of Village Government and Village Consultative Body (*Badan Permusyawaratan Desa*/BPD). These institutions have different roles in village governance. The Village Government facilitates village development, and empowerment of village communities, including planning, implementation, and reporting activities and budgets.

Village Government consists of a village head, supported by a secretary; a treasurer; three village officials dealing with governance, development, and public affairs; three section heads; and two heads of sub-villages (*kepala dusun*) and heads of settlement/hamlet (*Ketua* RW & RT). BPD approves the plans submitted by Village Government, receives feedback from the community, conveys the feedback to the Village Government, and monitors and evaluates the Village Government activities and reports. Members of BPD are representatives of the villagers and are elected democratically. Village head and BPD members' tenure is six years and they can be re-elected a maximum of three times consecutively or non-consecutively[10].

In addition to these two institutions, there is a customary institution (*Lembaga Adat*) and a Community Empowerment Institution (*Lembaga Pemberdayaan Masyarakat*; LPM). These two institutions are village community institutions (*Lembaga Kemasyarakatan Desa*) - partners to the Village Government. The Customary Institution provides guidance and advice to the Village Government and to all community members regarding the customary functions. Meanwhile, LPM is a partner of the Village Government in empowering the community, planning and implementing the village activities and improving community services. All members of the village community have the right to elect, be elected, and/or appointed as village head, village official, member of BPD and member of village community institutions[11]. The complete structure of Village Governance is presented in Figure 5.

In Nanga Lauk village, there are 27 individuals that hold a position in one or more village institutions. There are no section heads. It was noted in focus group discussions with the Nanga Lauk community that members of village institutions would benefit from capacity building, but that all institutions are currently functioning well. All individuals in the positions understand their tasks and actively work together with the Village Head to develop the village. Women are also represented in the village institutions.

[10] Article 55 & 56 of Village Act (UU No. 6/2014 Pasal 55 & 56)
[11] Article 68 (1d) of Village Act (UU No. 6/2014 Pasal 68 (1d))

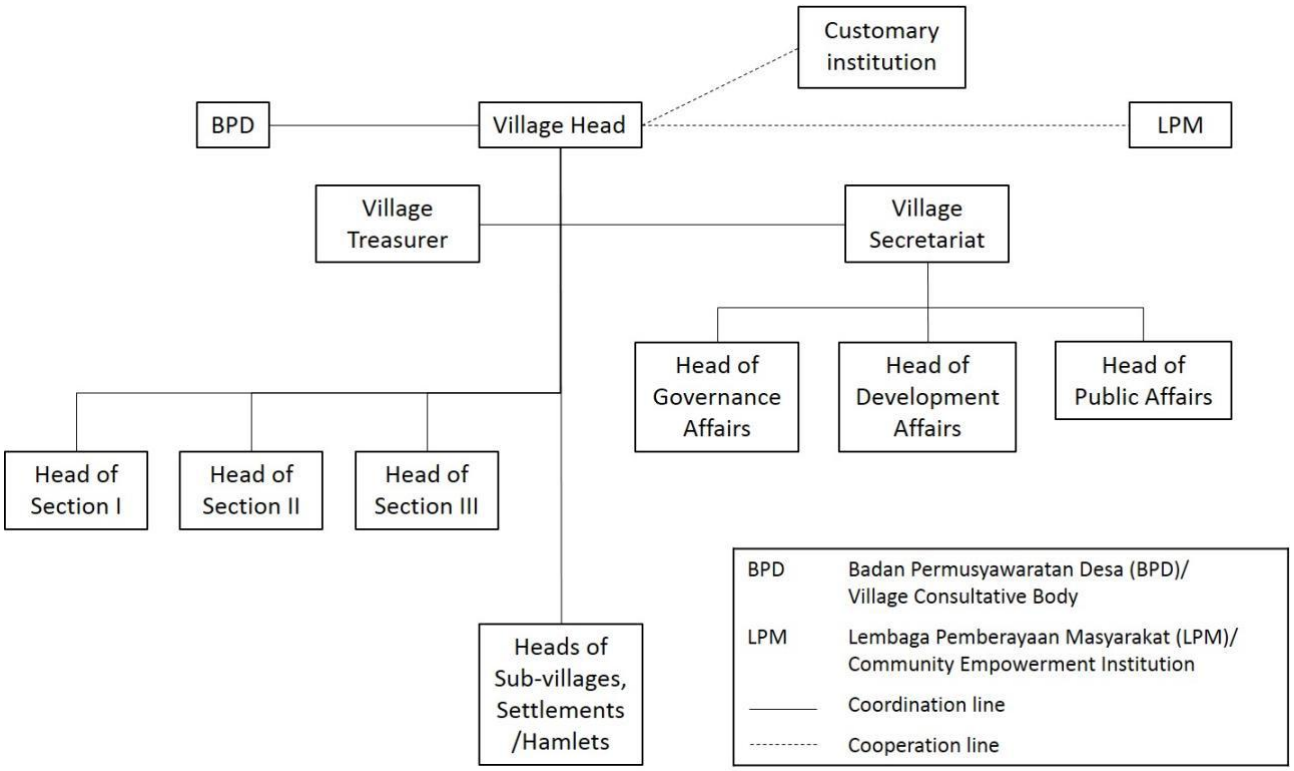

Figure 5 Village Organization Structure (Based on Minister of Home Affairs Regulation No. 84, 2015; modified)

An institution to manage the Nanga Lauk Village Forest was established through a village regulation in 2015, after the protection forest area inside the Nanga Lauk Village was allocated as a village forest by the Ministry of Forestry in 2014. This village regulation was renewed in December 2016 in the process of obtaining the Village Forest Management Rights from the Ministry of Environment and Forestry, prior to obtaining the management rights through MoEF decree in February 2017. All members of Nanga Lauk community can become members of this institution. The management committee members are selected from the community members based on their individual interest to serve as committee members.

The regional and district level organisations with responsibility for land management in Nanga Lauk are:

- Kapuas Hulu Utara Forest Management Unit (*KPH Kapuas Hulu Utara*)
- Kapuas Hulu District Development Planning Agency (*Bappeda KKH*)
- West Kalimantan Provincial Forestry Service (*Dishut Provinsi Kalbar*)

C.2 Socio-economic context

C.2.1 Livelihood activities and income

Nanga Lauk Village is comprised of 197 households. Information on cash income sources in the village was derived from a survey of 35 households selected at random[12]. Based on this survey, the main livelihood activities in Nanga Lauk are fishing, honey production, and rubber cultivation. All households have multiple income sources and are normally engaged in more than one of the main livelihood activities. Of the 35 households surveyed 83% go fishing, 60% produce honey, and 60% cultivate rubber. Fishing has the highest total income but households with income from businesses (e.g. grocery shops) received more from these activities than from fishing (see Table 5). Some of the villagers are gold miners, working in a group to mine gold traditionally from rivers outside the Nanga Lauk Village. Honey was the fourth most important source of household income, but the range of income per honey producing household varies considerably. Other sources of income include selling surplus vegetables and crops (if any), honey business (middleman), selling chickens and fish raised in pens '*keramba*', selling NTFPs, and labour.

The Nanga Lauk Village community is a typical Indonesian village community who fulfil their needs by utilizing natural resources surrounding the village, including wildlife, NTFPs and food crops. The range of annual non-cash income for the 21 households that were able to provide this information ranged from IDR 30,000[13] to 11,700,000, with a total of IDR 54,943,000. On average, the non-cash income per household was IDR 2,616,333 per year or IDR 218,284 per month, although this figure considerably underestimates the total value, because many resources and commodities that are utilized by community could not be valued, as they are not typically sold.

[12] Damayanti, E. K. and Berry, N.J. 2016 Livelihood and Socioeconomic Survey, Nanga Lauk Village. Sustainable Forest and Biodiversity Management in Borneo Project Report.
[13] This value is likely to be an outlier for this community, since it came from a household were both husband and wife are teachers and receive a government salary. Their only source of non-cash income was from occasional fishing.

Table 5 Annual Income of households surveyed Nanga Lauk Village community by sources of income

No	Group of sources of income of the HH head	No. of HH	Source of income type	Range of annual cash income (IDR)* per HH	Total annual cash income (IDR)* of all HHs	Average annual cash income (IDR)* per HH
1	Agriculture					
	a. Rubber	21	Selling latex tapped from owned-rubber trees	1,200,000 – 32,000,000	213,110,000	10,148,095
	b. Other crops	4	Selling other crops, e.g. mung bean, long bean, corn, chilli pepper, cassava, cucumber, vegetables, etc.	100,000 – 3,375,000	3,925,000	981,250
2	Business					
	a. Grocery shop	5	Selling groceries	2,400,000 – 57,600,000	141,600,000	28,320,000
	b. Middleman (rubber)	3	Buying latex from community and sell to bigger middleman	250,000 – 18,000,000	30,250,000	10,083,333
	c. Middleman (fish)	2	Buying fish from community and sell to bigger middleman or market	400,000 –11,400,000	11,800,000	5,900,000
	d. Middleman (honey)	1	Buying honey from community and sell to bigger middleman or market	10,000,000	10,000,000	10,000,000
3	Fishery	29	Selling various kinds of fish (fresh, salty-dried, or smoked)	490,000 – 37,800,000	304,138,000	10,487,517
4	Livestock	6	Raising fish in river cage (*keramba*[a]), chicken	800,000 – 17,226,000	39,526,000	6,587,667
5	Monthly salary	12	Village officials, government employees (teachers, nurses, midwives, army, etc.)	4,800,000 – 38,400,000	216,600,000	18,050,000
	Additional salary	3	Salary from temporary governmental works	3,600,000 – 4,500,000	12,600,000	4,200,000
6	NTFP					
	a. Honey	21	Selling honey (*Tikung* and *lalau* honey[b])	2,000,000 – 45,000,000	272,940,000	12,997,143
	b. Other than honey	3	*Tengkawang*[c] fruit, labi-labi (tortoise)	1,400,000 – 11,500,000	18,400,000	6,133,333
7	Others					
	a. Honey collection labour	3	Labour for collecting honey from *tikung* or *lalau*.	700,000 – 1,000,000	2,700,000	900,000
	b. Construction labour	3		3,120,000 – 12,000,000	21,120,000	7,040,000
	c. Gold miner	2	Traditional gold mining	500,000 – 30,000,000	30,500,000	15,250,000
8	Household members' income	11	Income of HH members: salary as teacher, Village Treasurer, midwife, grocery store staff, and nurse; selling products from fishing, gold mining, farming, and homemade snacks	3,000,000 – 38,400,000	192,600,000	17,509,090
Total annual cash income* (IDR) per household (No.1~7 + 8)				4,500,000 – 127,680,000	1,521,809,000	43,480,257
					Average cash income* (IDR) per household per month	3,623,355

Note: HH = household, total HH=35, a HH has more than one income source, * Income for 2015-2016, 1USD = IDR 13,000, [a]*keramba* = fish cage place in the river for raising fish, [b]*lalau* honey = wild honey collected from *Sialang* trees, [c]*tengkawang* = dipterocarp trees with fruits processed as essential oil; Source: Village Survey, 2016

C.2.2 Cultural and religious context

Nanga Lauk community members belong to one of 6 ethnic groups: Chinese, Dayak, Dayak Ahe, Dayak Embaloh, Dayak Kantuk, and Melayu. All villagers are Moslem, including those whose ethnicity is usually not Moslem (see Table 6).

Table 6 Population of Nanga Lauk Village by ethnicity*.

Ethnicity	Male	Female
Chinese	1%	0%
Dayak	1%	0%
Dayak Ahe	1%	0%
Dayak Embaloh	0%	1%
Dayak Kantuk	1%	0%
Melayu	47%	49%

*From 35 Households surveyed.
Source: Livelihoods and Socioeconomic Survey 2016 (Damayanti and Berry 2016).

C.2.3 Assets and poverty status

As a river-community, Nanga Lauk Villagers build their houses above the ground, on the banks of the Palin River. Houses are made from timber with tin roofing. Timber or ceramic tiles, are used as flooring. Most households own their own houses, although some reside with parents or are present in the village as government employees and stay in houses provided by the government. The size of houses varies from 4 x 6 m^2 up to 9 x 21 m^2.

Figure 6 shows the condition of the village during the dry season. In rainy season, the river is usually flooded, and the water reaches the level of the houses. Only 31% of the houses surveyed[14] were equipped with bathroom and toilet. Other households build bathing and toilet facilities floating on the river (*lanting*). Nanga Lauk Villagers use Palin river water for all their needs: drinking, cooking, washing, bathing, and toilet. Through Village Funds, water and sanitation facilities were built in late 2016 and early 2017. A water pipeline facility with a generator specially used for channelling water was built to provide clean fresh water from Lauk River to houses using pipes. There is no treatment given to the water, other than boiling the water for drinking. Sanitation facilities in the form of communal septic tanks (1

[14] Damayanti, E. K. and Berry, N.J. 2016 Livelihood and Socioeconomic Survey, Nanga Lauk Village. Sustainable Forest and Biodiversity Management in Borneo Project Report.

septic tank for 4-6 houses) were also built in late 2016. After the facilities were built, more houses are equipped with bathroom and toilet.

Household assets demonstrate the most needed equipment and tools for village livelihoods and provide an indicator of household prosperity. Of the 35 households surveyed, 97% had a boat with an engine (1-15 horse power), 91% had a television set, 91% had a mobile phone, 63% had an individual electricity generator; and 34% had a motorbike.

The village does not have coverage for mobile phone signal, although at some spots, mobile phone signal is sometimes "passing through". Nevertheless, most of the household have a mobile phone with basic features. Individual electricity generators owned by the households have been maintained since before the communal electricity generator was introduced to the village. Motorbikes are bought as a means of transportation from the nearest road in the neighbouring village (Nanga Nyabau) to the capital city of the district, Putussibau. Motorbikes are therefore kept in Nanga Nyabau, entrusted to the villagers there, or in Putussibau for the children who go to school there. Other assets owned by some households include: electric fan (20%), freezer (~17%), chainsaw (~17%), iron (~14%), loud speaker (~14%), radio (11%), rice cooker (~9%), water pump (~9%), solar panel (~9%), water tank (6%), bicycle (~3%), and DVD player (~3%).

Figure 6 Nanga Lauk village (Photos by Hanjoyo and Wachyuni)

Very few households keep livestock. Fifteen of the households surveyed kept chickens, but only one household sold them for income. Six households raised fish in cages placed in the river (*keramba*), but only four of them generated cash income from this in the last year.

Most households surveyed have rubber trees (94%), as rubber has traditionally been their main livelihood activity. Other trees owned by the surveyed households include *tengkawang* (31%), durian (14%), *keranji* (11%), agarwood (*Aquilaria malaccensis*), mango (*Mangifera* spp.), puri (*Mitragyna speciosa*), and rambutan (*Nephelium lappaceum*).

Twenty-five of the surveyed households have savings in the form of money in the bank, Credit Union (CU), jewellery, and farmland. Those who save money in the bank or through a CU mentioned that the purpose of saving is for their children's education. Saving money in a Credit Union was described as being easier for the community, because the CU staff come to the village every month, so they do not have to go to the nearest sub-district capital city for depositing their money to the bank. The Credit Union also offers soft-loans to the community and a kind of insurance. The community seem to realize the importance of savings for their future life.

As described in Section C.2.1 all households in the Nanga Lauk community have similar housing conditions and income status. They are rubber farmers, fishers, and honey producers with additional income from non-rubber farming, business, and traditional gold mining.

Households seem to have a similar level of prosperity, and most identify themselves as being at a medium level of prosperity as described in Table 7.

Table 7 Poverty/Wealth Class definitions by surveyed-households in Nanga Lauk community

Class	Characteristics	% of households surveyed
Very poor	Receiving basic needs support from the Government, e.g. rice, healthcare, children primary education, etc.	11%
Poor	Not owning a house or speed boat, have debt, receiving support from the Government	20%
Medium	Owning a house in the village, a speed boat, needs fulfilled, children go to school, no or small debt, continuous income although sometimes small sometimes big.	69%
Rich		0%
Very rich		0%

Source: Livelihoods and Socioeconomic Survey (SFBMB 2016)

C.3 Land tenure and ownership of carbon rights

C.3.1 Land tenure

The existing laws and regulations enacted in Indonesia require land certification to demonstrate ownership rights. Although none of the households in Nanga Lauk hold land certificates for their farmland, the Nanga Lauk community considers the farmlands they manage as under their ownership. Most households manage at least one patch of farmland between 0.06 and 16 hectares depending on the capacity of the owner when opening the land or the area purchased or inherited from their parents. Some households manage as many as twelve patches. Farmland types include rubber gardens, upland fields (*ladang*), agroforestry/mixed-gardens, and fallow/bare-land (*tanah kosong/pemuda*). The Nanga Lauk community practices shifting cultivation. The first person who opens the forest is considered the owner of that patch of land. This land can then be passed-down along family lines. Land can also be sold to anyone who wants to buy, including those from other communities, although no title is issued, and no farmland tax applies. Each household remembers the location and size of each of their land areas, even though only some of the areas, such as rubber gardens, are frequently visited. Non-rubber garden areas have often been left to transform into secondary forests (*tanah kosong/pemuda*) and the areas are only recognised by the presence of planted trees, such as Tengkawang (*Shorea* spp.), Empakan (a kind of durian tree), and Gaharu (agarwood). Land owners will visit these areas occasionally, to demonstrate their ownership.

All of NLVF and NLHPT is under state ownership. On 25 October 2016, the Minister of Environment and Forestry issued a new regulation on Social Forestry[15]. This Regulation explains the rights of communities to manage forests under Social Forestry programs including Village Forests (*Hutan Desa*). The Central Government (through the MoEF) has allocated 12.7 million hectares of State Forest Areas to be included in Social Forestry Programs. This Regulation includes procedures to be taken by communities within and surrounding allocated State Forest Areas to obtain one of the Social Forestry management rights over forest areas in their village jurisdiction. There is therefore a clear mechanism to recognise the rights of the community to manage the NLVF and utilise its resources, and the Nanga Lauk community have re-obtained this recognition, as described in Section B1.1. This recognition must be renewed every 35 years.

Land within NLHPT is not currently registered under any Social Forestry programmes[16]. The process for registration will therefore be included as an activity under the Plan Vivo project, which will aim to obtain formal recognition of the community's right to manage and utilise the forest, and to prevent its use for commercial logging, for example, by recognition as *Hutan Desa*.

C.3.2 Carbon rights

The Government of Indonesia has developed legislation that discusses carbon rights and is developing legislation that will describe rights to ecosystem services. Details of who holds the rights to carbon and ecosystem services remain unresolved, however. It is assumed that legal rights to carbon benefits from within the NLVF will be transferred to the Nanga Lauk community, although the project will closely monitor the development of relevant policy, and lobby for the transfer of all rights to communities as necessary. The same mechanism would apply to NLHPT if management rights are secured by the community.

[15] P. 83/MENLHK/SETJEN/KUM.1/10/2016
[16] Pelayanan Online/Daring Perhutanan Sosial Kementerian Lingkungan Hidup dan Kehutanan (http://pskl.menlhk.go.id/akps/index.php/piaps/peta)

D. Project Interventions & Activities

D.1 Summary of project intervention

D.1.1 Project intervention

The Nanga Lauk community is committed to protection and sustainable management of NLVF and NLHPT to maintain the biodiversity and ecosystem services that their livelihoods depend upon. They are also committed to preventing commercial logging and agricultural encroachment into NLVF and NLHPT, to protecting their waterways and preventing over-exploitation of valuable timber and NTFP resources.

The proposed intervention in both project areas is therefore **prevention of deforestation and forest degradation.**

D.2 Summary of project activities

D.2.1 Project activities

The project activities that will be carried out to prevent deforestation and forest degradation are the same for both project areas NLVF and NLHPT. A summary of these activities is provided in Table 8 (modified from Table D2 in the PDD template). The activities have been designed so that they work in combination to address the specific threats of deforestation and forest degradation described in Section B.4, and they are therefore all considered to contribute to emission reductions eligible for Plan Vivo certification. Further details of activities are provided in Section G1.3 and complete management plan for NLVF (in Bahasa Indonesia) is provided in Annex 2.

Table 8 Summary of project activities in NLVF and NLHPT

Project activity	Key tasks	Target group
Securing rights and strengthening the village forest management institution (*Lembaga Pengelola Hutan Desa*; LPHD)	• Obtain management rights (for NLHPT) • Obtain permits and licenses for forest utilization and business operations • Elaborate management plans • Equip LPHD office and learning centre • Train LPHD members on business management • Monitor and evaluate LPHD functioning	LPHD members, village officials, community representatives
Forest protection and monitoring	• Develop village regulations • Protected forest boundary marking • Training in forest patrol and monitoring • Forest patrol and monitoring activities	LPHD members, forest patrol team, forest boundary marking team
Development of income sources from sustainable forest management	• General business skills training • Training in rattan and bamboo management, processing and marketing • Training in forest honey marketing and business management • Marketing of products from forest honey, rattan and bamboo, and rubber • Training in development of tree nursery and planting • Training and exchange visits to facilitate ecotourism business development	Rattan and bamboo groups, forest honey farmers, forest rehabilitation group, rubber group, LPHD members, village officials, community representatives

D.3 Effects of activities on biodiversity and the environment

D.3.1 Biodiversity benefits

As described in Sections B.2.1 and B.2.2, NLVF and NLHPT are relatively intact expanses of swamp and riparian forest that support diverse assemblages of plant and animal species many of which are endangered or threatened. The project aims to protect this forest and prevent deforestation and forest degradation that would reduce the quantity and quality of forest habitat, reducing the availability of plants and animals for local use and driving threatened species closer to extinction. The biodiversity benefits of the project are therefore expected to be significant at both a local and international level, and the occurrence of priority and keystone species will be tracked throughout the project as described in Section K.3.

D.3.2 Ecosystem service benefits

Forest within NLVF and NLHPT provides a broad range of ecosystem services that support the livelihoods the local community and that benefit regional and global communities. Among these are the provisioning, regulating listed below:

- Provisioning services – forests are the main, and for many households the only, source of livelihoods providing food, fuel, water, medicine, and building materials;
- Regulating services – including climate regulation, local cooling effects, flood prevention, and maintenance of water supplies.

All of these services depend on the maintenance of relatively intact areas of forest. By preventing deforestation and forest degradation the project will therefore help to safeguard the ecosystem services that local and international populations depend upon.

E. Community Participation

E.1 Participatory project design

E.1.1 Participatory planning process

The project has been developed with the Nanga Lauk community, starting from the use of participatory approaches to gather information and understand local drivers of deforestation and forest degradation, progressing through the development and design of activities and management plans to address those drivers, and finally in the development of benefit sharing mechanisms, monitoring plans and Plan Vivo agreements that will govern the disbursement finance generated through the sale of Plan Vivo certificates. Throughout the two-year development process there has been regular contact between the project coordinator and the Nanga Lauk community, as summarised below. Evidence of community involvement in these activities is provided in the activity reports and Annex 3.

Scoping

The scoping phase of the project involved three visits to the proposed project site, by the project coordinator and technical partners. During these visits, the following activities were carried out:

- Identification of project site – Prior to the decision to begin scoping work for a Plan Vivo project, a number of candidate sites were visited to identify areas where the community was interested in exploring approaches to support sustainable management of forest areas under their management. Nanga Lauk was selected on the basis of strong local commitment to forest protection and the considerable threats to the forest in their village land.
- Problem tree analysis[17] – A problem tree analysis was conducted with a representative group of participants from Nanga Lauk community to identify the causes and consequences of deforestation and degradation expected in the NLVF and NLHPT. The resulting problem trees were discussed and refined in an open village meeting.

[17] Damayanti, E. K. and Berry, N.J. 2016 Problem Tree Analysis for Nanga Lauk Village. Sustainable Forest and Biodiversity Management in Borneo Project Report

- Village survey[18] – Since recent information on socioeconomic conditions and livelihoods in Nanga Lauk was not available, a village survey was conducted using household surveys, focus group discussions and key informant interviews. The results of the village survey were presented and discussed in an open village meeting.
- Project activity scoping – Using the information from the problem tree analysis and village survey, a community consultation was carried out to identify specific activities that the community members wished to implement to address specific drivers of deforestation and forest degradation. The outcomes from this activity were used to develop the Project Idea Note[19].

Project development

During the project development phase, the project coordinator and technical partners made frequent visits to Nanga Lauk to work with the community on the following activities:

- Participatory land-use mapping[20] – Using remote sensing images as a base map, representative groups of community members produced detailed maps describing current land use within the Nanga Lauk village land.
- Project activity planning – Over a period of several months, the project coordinator worked with the Nanga Lauk community to develop detailed management plans describing activities that are required to prevent deforestation and degradation. Details of resource requirements were also discussed and developed into full financial plans for the project. The management plan for NLVF is provided in Annex 2.
- Monitoring plan development – The project coordinator worked with the Nanga Lauk community to develop activity-based monitoring plans that can be used to assess whether activities in the management plan are being carried out, and approaches for assessing socio-economic impacts of the project, and tracking biodiversity and drivers of deforestation and forest degradation. The monitoring plan is described in Section K.
- Development of a draft Plan Vivo agreement – The management plans, financial plans and monitoring plans developed in the previous activities were incorporated into a draft Plan Vivo Agreement describing the requirements for receiving support from the sale of Plan Vivo certificates, and a proposed benefit distribution mechanism

[18] Damayanti, E. K. and Berry, N.J. 2016 Livelihood and Socioeconomic Survey, Nanga Lauk Village. Sustainable Forest and Biodiversity Management in Borneo Project Report.
[19] Plan Vivo Project Idea Note. Forest Conservation in Nanga Lauk. 2016.
[20] Suryadi, I et. al. 2017. Participatory Land Use Mapping: Nanga Lauk Village. Sustainable Forest and Biodiversity Management Project Report.

that supports the financial plan. This draft agreement was discussed and refined with input from community members (see Annex 3).

Capacity building

To enable the Nanga Lauk community to develop a full understanding of the concepts involved in a Plan Vivo project and enter into Plan Vivo agreements under conditions required for Free, Prior and Informed Consent (FPIC), the project coordinator conducted the following capacity building activities with community members. The training curricula for these activities are provided in Annex 5.

- An overview of payments for ecosystem services and carbon markets, and how Plan Vivo project activities can enable communities to access these
- An introduction to the Plan Vivo System and how it can be applied to access payments for ecosystem services
- The requirements for validation of the project design and registering as a Plan Vivo project
- Annual reporting requirements required for Plan Vivo certificates to be issued
- Requirements for periodic verification of the project design and benefits achieved

E.1.2 Governance of community groups

To plan and implement project activities three sections under the Nanga Lauk Village Forest Management Institution LPHD were formed through Nanga Lauk Village Regulation as described in Section C.1.2. Six activity groups will be formed from members of Nanga Lauk community who are interested in participating in implementing activities in each group. This includes all adult men and women in the community (above 17 years old). A summary of the governance structure for these groups is provided in Figure 7.

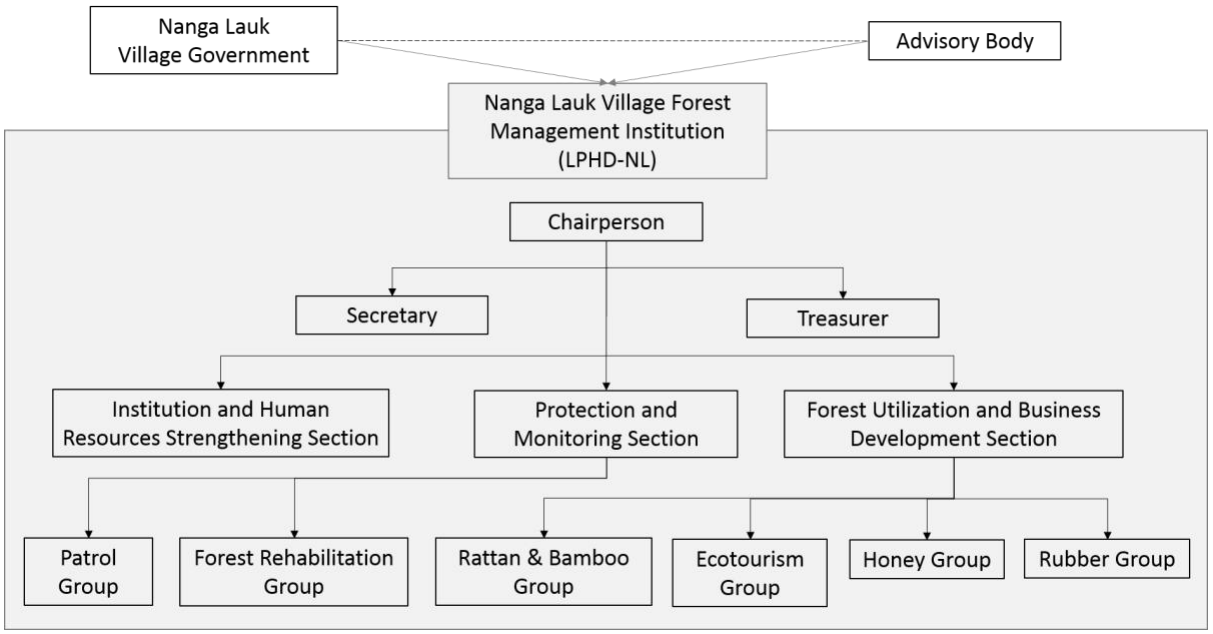

Figure 7 Organisational structure for Nanga Lauk Village Forest Management Institution

E.2 Community-led implementation

E.2.1 Development of management plans

As described in Section E1.1, the development of management plans was led by the Nanga Lauk community and facilitated by the project coordinator. Throughout this process, forest management experts from the technical support organisations LTS International and Daemeter Consulting were involved to review plans and provide suggestions to improve effectiveness and efficiency. The development of management plans therefore followed an iterative process and the final plans were agreed by all parties involved (see Annex 2).

E.2.2 Storage of management plans

Paper copies of management plans are held by the LPHD chairperson, and in the office of the project coordinator. Digital copies, and GIS versions of all maps (see Annex 6), are stored on hard drives of project computers in the village, and the project coordinator's office. Online copies are also stored and backed up using a secure cloud-based server.

E.3 Community-level project governance

E.3.1 Community involvement

Decisions regarding day-to-day operations of activity groups will be made using the governance structures described in Section E.1.2. Issues relating to project finance,

monitoring and reporting will be discussed in a monthly and quarterly meeting involving village officials, representatives of all activity groups, and the project coordinator. In the quarterly meeting, a representative of Kapuas Hulu Utara Forest Management Unit (FMU) will be invited to monitor the progress of Village Forest program. During this meeting monitoring results will be submitted to project coordinator and any issues arising will be discussed. Any decisions required as a result of this meeting will be made using the village governance structures described in Section C.1.2.

E.3.2 Grievance mechanism

Grievances arising within activity groups will be discussed and reported to the project coordinator during quarterly meetings. To record any grievances from the broader community two grievance books will be maintained by nominated members of the community (one male, one female) with good literacy. Individuals with responsibility for maintaining the grievance books will be made known to the village community and will agree to record any grievances brought to them by individuals in the grievance book, while maintaining the anonymity of those individuals if requested.

Both grievance books will be passed on to the project coordinator during the monthly meeting, and any issues arising will be discussed. All grievances raised, and actions taken to address them, will be recorded by the project coordinator in the project database and described in annual reports to the Plan Vivo Foundation. Grievances that cannot be settled directly will be referred to the village head and addressed through existing methods for conflict resolution within the village. All grievances will be detailed in an annual report to Plan Vivo, along with actions taken to settle the grievance.

Conflicts and grievances arising with parties outside the implementing community, for example with neighbouring communities or companies with concessions inside the NLHPT, that cannot be settled directly with the community, will be lodged with the District Authorities or the Forest Management Unit (FMU). PRCF will maintain contact with these authorities to ensure they are aware of any conflicts or grievances that arise and will engage with any required conflict resolution processes deemed necessary by the district or FMU authorities.

F. Ecosystem Services & Other Project Benefits

F.1 Climate benefits

F.1.1 Expected climate benefits

The methodology and parameters used to estimate the baseline scenario emissions, project scenario emissions and expected losses from leakage are described in Sections G4, G5 and G6 respectively. The justification for the risk buffer percentage applied is provided in Section H. These estimates are summarised in Table 9 (modified from PDD template Table F1) for NLVF which describes the net climate benefit expected, and therefore the number of Plan Vivo certificates the project will be eligible to receive if all monitoring targets are met, for each year of the project period.

Table 9 Summary of expected climate benefits from each year of the project period

Intervention type	1	2	3	4	1 – (2 +3+4)
	Baseline scenario emissions (t CO_2e/yr)	**Project scenario emissions (t CO_2e/yr)**	**Expected losses from leakage (t CO_2e/yr)**	**Risk buffer (t CO_2e/yr)**	**Net climate benefit (t CO_2e/yr)**
Prevention of deforestation and forest degradation in NLVF	1,769	177	80	204	1,308

Since the area of NLHPT to be protected will be determined during the first year of the project, the climate benefits that result from prevention of deforestation and forest degradation in this area will depend on the area of each forest type protected. Table 10 summarises the climate benefits per hectare for each of the forest types present within the NLHPT; this table can therefore be used to estimate expected climate benefits once the area to be protected is finalised.

Table 10 Summary of expected climate benefits from each year of the project period, from prevention of deforestation and forest degradation in each hectare of NLHPT in the project area. Note that the units differ from Table 9 as values are per hectare of forest.

Forest type	1	2	3	4	1 – (2 +3+4)
	Baseline scenario emissions (t CO_2e/ha/yr)	Project scenario emissions (t CO_2e/ha/yr)	Expected losses from leakage (t CO_2e/ha/yr)	Risk buffer* (t CO_2e/ha/yr)	Net climate benefit* (t CO_2e/ha/yr)
Peat Swamp Forest	0.80	0.08	0.04	0.17 (0.09)	0.51 (0.59)
Secondary Peat Swamp Forest	1.09	0.11	0.05	0.24 (0.13)	0.70 (0.81)
Riparian Forest	8.77	0.88	0.39	1.91 (1.01)	5.59 (6.49)
Secondary Riparian Forest	2.76	0.28	0.12	0.60 (0.32)	1.76 (2.04)

* Once management rights to NLHPT are recognised, the risk buffer will be reduced from 25.5% to 13.5%, the lower risk buffer is indicated in parenthesis.

F.2 Livelihoods benefits

F.2.1 Expected livelihood benefits

The benefits to the livelihoods of members of Nanga Lauk community that are expected to result from project activities are summarised in Table 11.

Table 11 Expected benefits to the livelihoods of members of Nanga Lauk community

	Initial situation	Expected benefit
Food and agricultural production	Food is obtained from fishing and collection of NTFPs within NLVF and NLHPT.	Continued availability of fishing and NTFPs.
Financial assets and incomes	Many households derive cash income from the sale of fish, latex, and honey harvested from within NLVF and NLHPT. Some households also have a household member that receives salaried income.	Individuals participating in forest patrol activities will receive payments for their activities. Individuals in rattan and bamboo, honey production, forest rehabilitation, rubber cultivation, and ecotourism groups will also receive additional income from these activities.
Environmental services (water, soil, etc.)	Relatively intact forest provides a broad range of ecosystem services that the community depend on for their livelihoods (see Section D.3.2)	Supply of provisioning and regulatory services provided by relatively intact forest is maintained.
Energy	Fuel wood is collected from within NLHPT and rubber garden.	Supply of fuel wood is maintained.
Timber & non-timber forest products (incl. forest food)	Timber for building materials, and *tikung* construction is harvested from NLHPT, a broad range of NTFPs are harvested from NLVF and NLHPT	A sustainable supply of NTFPs, and wood for building materials and *tikung* construction is maintained.
Land and tenure security	Management rights to NLVF have been assigned to Nanga Lauk community for a renewable period of 35 years. There is no formal recognition of Nanga Lauk community's rights to manage NLHPT, although potential for granting these rights has been acknowledged by MoEF.	Nanga Lauk community will maintain management rights to NLVF and obtain the rights to NLHPT.
Use-rights to natural resources	Licences governing the exploitation of natural resources and ecosystem services have not been granted for NLVF or NLHPT	Nanga Lauk community will receive licenses to utilize ecosystem services derived from NLVF and NLHPT for a renewable period of 35 years.
Social and cultural assets	Social and cultural heritage of Nanga Lauk community is not strongly linked to NLVF or NLHPT	The project is not expected to significantly benefit the social and cultural assets of Nanga Lauk community

F.2.2 Potential negative impacts

Many positive impacts on livelihoods of Nanga Lauk community are expected as a result of the project, as described in Table 11. Since some of the project activities involve introducing controls on the utilisation of forest resources to ensure their exploitation is sustainable and does not contribute to deforestation and forest degradation, and project activities could

require financial investment and time away from other livelihood activities, some negative impacts are also possible. The potential negative impacts, and mitigation measures the project will put in place to address them, are summarised in Table 12.

Table 12 Potential negative impacts on the livelihoods of Nanga Lauk community

	Potential negative impact	Mitigation measures
Food and agricultural production	Expansion of agricultural areas within NLHPT will be prevented limiting potential to increase agricultural productivity by clearing new areas of forest.	Nanga Lauk community members will be encouraged to diversify and intensify production within existing agricultural areas outside NLHPT that are currently designated for agricultural production, so productivity can be increased without expanding the agricultural zone.
Financial assets and incomes	Village and individual funds could be invested in equipment and infrastructure, or devote time away from other livelihood activities, to carry out project activities required to access finance from the sale of Plan Vivo certificates. These investments could be at risk if expected certificate sales are not realised.	Plan Vivo agreements will only be signed for periods for which required finance has been secured. The first year of project activities will be supported with donor finance unlinked to the sale of Plan Vivo certificates and in subsequent years activities will be supported from the sale of ex-post certificates issued for emission reductions achieved in previous years.
Environmental services (water, soil, etc.)	None – environmental services are expected to benefit from project activities.	NA
Energy	None – supply of fuelwood is not expected to be reduced.	NA
Timber & non-timber forest products (incl. forest food)	Controls of timber for building materials and *tikung* construction to ensure these are maintained at sustainable levels, could reduce the short-term availability of these materials.	Nanga Lauk community will be encouraged to plant and maintain trees required for *tikung* construction within NLHPT so that demand for materials can be maintained without exceeding levels for sustainable extraction. Requirements for building materials that exceed those which can be provided within sustainable extraction levels will be met by procuring timber from sustainable sources outside NLHPT.
Land & tenure security	None	NA
Use-rights to natural resources	None	NA
Social and cultural assets	None	NA

F.3 Ecosystem & biodiversity benefits

F.3.1 Expected benefits to biodiversity and ecosystem services

The expected benefits to the biodiversity and ecosystem services in Nanga Lauk (in addition to the climate benefits described in Section F.1) are summarised in Table 13.

Table 13 Expected benefits to biodiversity and ecosystem services

	Initial situation	Expected benefit
Biodiversity	NLVF and NLHPT support a diverse assemblage of plant and animal species (see Section B.2.2).	Biodiversity value is maintained to the benefit of local and global communities.
Water/Watersheds	Forest in NLVF and NLHPT provides a clean source of water for Nanga Lauk and other downstream communities.	Quality and quantity of water supply is maintained.
Soil productivity/conservation	Forest in NLHPT prevents soil erosion and helps maintain productivity in agricultural areas.	Soil erosion is prevented, and agricultural productivity is maintained or improved.
Other ecosystem services	Forest in NLVF and NLHPT provides a broad range of ecosystem services (see Section D.3.2).	Supply of ecosystem services is maintained.

F.3.2 Potential negative impacts on biodiversity and ecosystem services

Many positive impacts on biodiversity and ecosystem services are expected as a result of the project, as described in Table 13. Since the project aims to prevent deforestation and degradation of the forest ecosystem that supports this biodiversity and provides the ecosystem services, and project activities have been developed that will also enhance rather than diminish these values.

If project activities displace deforestation or forest degradation to areas outside the project area, this could have a negative impact on biodiversity and ecosystem services in those areas. The risk of this type of displacement, and the activities in place to mitigate this risk, are discussed in Section G.6.1.

G. Technical Specification

G.1 Project intervention and activities

G.1.1 Project intervention

This technical specification describes the expected climate benefits from **prevention of deforestation and forest degradation** in two project areas – NLVF and NLHPT. These areas are described in Section B.

G.1.2 Applicability conditions

This technical specification is only applicable to the specified project areas – NLVF and NLHPT. Expansion of the project beyond these areas will require development of additional technical specifications and project design documents.

G.1.3 Project activities

The project activities that will be carried out to achieve the expected climate benefits are summarised below. A full management plan for NLVF including details of all activities are provided in Annex 2.

Securing rights and strengthening forest management institutions

The aim of this activity is to address external threats to NLVF and NLHPT from activities of oil palm and logging concessions, and to provide an incentive to members of Nanga Lauk community to sustainably manage the forest resources. To achieve this, formal recognition of management rights for NLHPT and licences for ecosystem services derived from both forest areas will be sought from the relevant authorities. The capacity of the existing village forest management institution (*Lembaga Pengelola Hutan Desa*; LPHD) will also be developed so that it is in a position to effectively manage NLVF and NLHPT. The main tasks required to achieve this are described below.

Obtain management rights (for NLHPT)

Nanga Lauk village administration has entered into dialogue with MoEF, requesting that applications to allocation of NLHPT to logging companies are rejected. This request will be followed up with requests to obtain management rights for the NLHPT area, and initiation of a formal process for recognition of those rights.

Obtain permits and licences for forest utilization and business operations

The permits/licenses required for Nanga Lauk community to benefit from utilizing NLVF will be sought from Ministry Environment and Forestry (MoEF), including permits to utilize ecosystem services (IUPJL), and implement forest carbon management. Once the management rights to NLHPT are obtained, the same permits and licences will be sought for NLHPT. Further permits and licences required for LPHD to legally operate as a business will also be sought including obtaining an institution tax subscriber's number (NPWP-Badan) and relevant business licences (e.g. SIUP-SITU, etc.).

Elaborate management plans

To obtain management rights to NLVF, LPHD was required to submit a 35-year plan to the MoEF. To operationalise this plan, additional details will be added, and 10-year and annual plans will be produced for NLVF and NLHPT. The initial 10-year plan and annual plan will be developed in the first year of the project and will be reviewed by the MoEF and Kapuas Hulu Utara FMU in the 5th year and last year of each period. The management rights can be cancelled if LPHD is evaluated by the MoEF and FMU as "failed" in implementing the management plan. Plans for the following 10-year and next year periods will be developed after the review of the plan from the previous period. A community meeting facilitated by project coordinator will be held for development of plans for each respective period.

Equip LPHD office and learning centre

Prior to the project, an office space was constructed using village funds for the BPD and will be shared with LPHD. The project will provide furniture and equipment for this office space to support the LPHD activities and the management of NLVF and NLHPT. A reading room will also be added, containing books and reading materials related with forest, biodiversity, agriculture, nature conservation, culture, special skills, and children books, as well as regulations from national to village level. The LPHD office will therefore provide a public service as well as a source of information relevant to the management of NLVF and NLHPT.

Train LPHD members on business management

To strengthen the capacity of LPHD members to effectively manage NLVF and NLHPT, the following training will be provided to LPHD members in: i) group management; ii) photography; and iii) report writing.

Monitor and evaluate LPHD functioning

Monitoring and evaluation meetings on the implementation of planned-activities will be conducted with representatives of Nanga Lauk community and LPHD, facilitated by the project coordinator on a monthly and quarterly basis. Upon completion of the monitoring and evaluation meetings, monthly, quarterly and annual reports will be produced.

Forest protection and monitoring

To prevent unintended encroachment into NLVF and NLHPT and discourage the unsanctioned or unsustainable exploitation of forest resources, village regulations to ensure sustainable resource use will be developed, boundaries will be clearly marked, and forest patrol and monitoring teams will be mobilised to detect and discourage encroachment and unsanctioned use, and to monitor forest condition and biodiversity. The main tasks required to achieve this are described below.

Develop village regulations

Village regulations will be developed for the management of NLVF and NLHPT, including the use of forest and natural resources within NLVF and NLHPT, e.g. fish, forest honey, NTFP, etc. The process will be facilitated by the project coordinator with support from Kapuas Hulu District Legal Division staff.

Protected forest boundary marking

The boundaries of NLVF and NLHPT will be clearly marked to prevent accidental encroachment, and information boards will be placed to indicate the existence of restrictions on forest resource use.

Training in forest patrol and monitoring

Standard operating procedures will be developed for forest patrol and monitoring teams, and team members will be trained in the skills needed to complete effective patrols and monitoring activities, including: i) Basic knowledge on forest protection and monitoring; ii) Identification of endangered and protected flora and fauna; iii) Use of Spatial Monitoring and Reporting Tool (SMART) for recording forest patrol and monitoring data; iv) Use of GPS; and v) Data collection and reporting. A study visit will also be conducted to an established Plan Vivo project in Ketapang District for information sharing.

Forest patrol and monitoring activities

Purchase of equipment for supporting the forest patrol and monitoring activities will be facilitated by the project coordinator. Forest patrol and monitoring will be implemented by a patrol team consisting of 20 persons. Boundary patrols, including all forest patrol and monitoring team members will be carried out twice a year, in April and October. Regular, 1-day patrols will be carried out in NLVF once per month. Longer, 3-day patrols will be carried out in NLHPT every two months. After completion of each patrol, teams will submit the data collected to a dedicated data manager who will compile results for presentation at quarterly meetings with the project coordinator.

Environmental education activities

Conduct an annual environmental and conservation awareness raising event in Nanga Lauk Village.

Development of income sources from sustainable forest management

To reduce the likelihood that controls on forest resource use will displace activities to areas outside NLVF and NLHPT, and to lay the foundation for long-term financing of forest protection activities from additional income raised from sustainable forest management activities, project activities will be carried out to increase income from existing forest resource use activities, and to establish new sources of income. The tasks that will be carried out to achieve this are described below.

General business skills training

To strengthen the capacity of LPHD members related with business management, training will be provided for: i) Business management, motivation and planning; and ii) business accounting, promotion, and marketing.

Training in rattan and bamboo management, processing and marketing

A survey of rattan and bamboo potential within NLVF and NLHPT will be conducted, and rattan and bamboo activity groups will receive training on: i) the management of rattan and bamboo; ii) establishment of rattan and bamboo nurseries; and iii) conservation of rattan and bamboo resources in the wild. Standard operation procedures will be developed for: i) rattan and bamboo management; and ii) collection and processing of rattan and bamboo. Promotion and marketing of rattan and bamboo products will be implemented in coordination with other villages in the Kapuas Hulu Districts, for example by participating in promotion and marketing events, and exhibitions.

Training in forest honey marketing and business management

Standard operating procedures will be developed for forest honey business management, and honey groups will be established to purchase honey from members and provide packing. Training will be provided in promotion and marketing of honey, and transaction accounting.

Training and exchange visits to facilitate ecotourism business development

Ecotourism groups will receive training on the development and management of ecotourism enterprises. Exchange visits will be made to community based-ecotourism initiatives in Tanjung Puting National Park and surrounding communities. The project coordinator will facilitate the development of ecotourism facilities in partnership with third parties identified during exchange visits and other outreach activities. Ecotourism in Nanga Lauk will be promoted though production of promotional materials and participation in exhibitions.

Training on and development of tree nursery and implementation of tree planting

Forest rehabilitation group will receive training on tree nursery as well as the nursery equipment and seedlings. Maintenance materials for tree nursery will be provided

throughout the period of the project and planting will be implemented in degraded NLHPT area in scheduled time.

Facilitation of rattan and bamboo, honey, fish products and rubber products marketing
After receiving training on general business skills, LPHD will facilitate the marketing of rattan and bamboo, honey, fish products and rubber with the respective groups.

G.2 Additionality and environmental Integrity

G.2.1 Regulatory surplus

As described in Section B.3.1, NLVF and NLHPT have different legal designations:

- NLHPT is Limited production forest (*Hutan Produksi Terbatas*); and
- NLVF is Protection forest (*Hutan Lindung*).

Although designation as *Hutan Lindung* confers a regulatory requirement for forest protection, it is demonstrated by the analysis presented in Section G.4.3, that this legal designation alone is not sufficient to prevent all deforestation and forest degradation.

Limited production forest is typically used for limited-timber extraction and does not have any regulatory requirement for forest protection.

To take account of any potential impact of legal designation, baseline rates of deforestation and forest degradation in Kapuas Hulu district are stratified according to the legal classification as well as vegetation type (see Section G.4.3). Using these stratified rates to estimate the climate benefits of the project should therefore help ensure that the estimated climate benefits are additional to those that would be achieved from forest governed under comparable regulatory conditions.

G.2.2 Barrier analysis

Despite a strong commitment to protecting forest in their village area, the Nanga Lauk community face significant political, financial, technical, institutional, social, and cultural barriers to developing and implementing effective forest management plans. A summary of these barriers, and how project activities will enable the community to overcome them, is provided in Table 14.

Table 14 Barrier analysis

Type of barrier	Description	Project activities to overcome the barrier
Political	Lack of Government support to for social forestry e.g. budget for social forestry for the West Kalimantan Province, of which Kapuas Hulu is one of 13 Districts, is just IDR 28 million (around USD 2000) per year.	The project will provide financial support, capacity building, and facilitation of LPHD to pursue legal processes required and develop and implement activities needed for protection and sustainable management of NLVF and NLHPT.
Financial	Nanga Lauk community lacks the financial means to invest in the equipment needed to conduct effective forest patrol and monitoring activities, or to provide the capital needed to improve existing livelihood activities. Community members are also exposed to an opportunity cost for involvement in forest patrol and monitoring activities, since the time required will prevent them from pursuing their usual livelihood activities.	The project will support the purchase of forest patrol and monitoring equipment and provide compensation for loss of income incurred by patrol team members. Project finances will also help provide capital to improve access to markets for forest products including rattan and bamboo handicrafts and honey.
Technical	Nanga Lauk community members lack the capacity to conduct effective forest patrol and monitoring activities. Forest resource user groups lack business development capacity and knowledge of processes that could be used to add value to their products. The community members also lack knowledge of the processes for establishing and managing tree nurseries for the species they wish to plant.	Forest patrol and monitoring groups will be equipped and trained and provided with compensation for their activities. The project will also support rattan and bamboo, forest honey, and ecotourism groups to develop business plans and provide training in approaches to add value to their products. Seedlings and training in nursery establishment will be provided to the forest restoration group.
Institutional	The LPHD lacks the capacity to develop and enforce village regulations on use of forest resources and has little knowledge of the legal processes needed to obtain forest management rights and permits.	The project will provide equipment for the LPHD office, and PRCF-Indonesia will work with the LPHD members to build their capacity and facilitate the process of obtaining management rights and permits, and developing village regulations and forest management plans.
Social	The older generations in Nanga Lauk have typically received little formal education, and lack knowledge of sustainable resource management practices. They also have limited access to information regarding regulations on natural resource use.	The project will provide training, facilitation and exposure to sustainable forest use practices and provide opportunities for all members of the community to be involved in a range of activities that aim to promote sustainable use of forest resources.
Cultural	The Nanga Lauk community has no customary rules that govern the use of forest resources.	The project will work to strengthen the LPHD and facilitate the development

Type of barrier	Description	Project activities to overcome the barrier
		and implementation of village regulations on forest resource use.

G.2.3 Environmental integrity

Since the project aims to prevent emissions from deforestation and forest degradation, there is no potential that the community could have made alterations to the project area prior to the start of the project for the purpose of increasing climate benefits of the project.

G.2.4 Avoidance of double counting

Three potential sources of double counting have been considered in the design of the project: i) within the project – if finance raised for biodiversity conservation or other types of ecosystem service payments were used to fund protection of the same area for which Plan Vivo certificates had been sold; ii) with other carbon projects – if the community, or other parties, entered into agreements for the sale of emission reduction credits as part of a project or jurisdictional programme that covered the Plan Vivo project area; and iii) if Plan Vivo certificates are used to offset emissions from parties outside Indonesia, and the Government of Indonesia use those same emissions reductions to meet their Nationally Determined Contributions to the Paris Agreement under the United Nations Framework Convention on Climate Change (UNFCCC). Measures the project will take to avoid double counting from these sources are summarised below.

Within the project

In addition to the sale of Plan Vivo certificates to parties that require a certified emission reduction, the project will also be marketed to funders whose primary interest is biodiversity conservation, or forest protection (see Section I.6). If not properly managed, this could undermine the additionality of certified emission reductions, if finance to protect the same area of forest is raised from different sources. To avoid this, each Plan Vivo certificate issued will also be assigned a value for 'hectares of habitat protected' and 'hectares of deforestation/degradation prevented'. Any funding raised for habitat protection or to offset deforestation or degradation will therefore have a corresponding number of Plan Vivo certificates assigned to the funder on the Markit Environmental registry[21], to avoid potential for 'double-selling' of the project.

Other carbon projects

[21] http://www.markit.com/product/registry

When the community groups enter into Plan Vivo agreements they are required to relinquish all rights to emission reductions resulting from prevention of deforestation and forest degradation within the project area to the project coordinator, effectively preventing them from developing other carbon projects that deliver the same benefits with other parties or standards. Once all rights are secured, the community will also have the power to prevent government or private sector interest developing carbon projects within their project areas.

While the community is in the process of securing all relevant rights, permits and licences, the project coordinator will maintain a dialogue with the Provincial Forestry Service and Kapuas Hulu Utara Forest Management Unit to ensure they are made aware of, and can lobby against any initiatives that could conflict with the project. If such conflicts do arise, issuance of Plan Vivo certificates will be suspended until a resolution that ensures there is no potential for double-counting of emission reductions has been found.

Nationally Determined Contribution (NDC)

The Government of Indonesia's Nationally Determined Contribution (NDC) includes emissions from forestry and agriculture. To prevent double counting, emission reduction certificates sold to out of state parties for use as carbon offsets should therefore be excluded from the NDC. Mechanisms for addressing this are under development in Indonesia and other countries with NDCs that include forests in their scope. A potential outcome is that the Government of Indonesia could decide to prevent or limit the sale of carbon offsets from forestry projects to out of state parties. If this occurred, Plan Vivo certificates could only be marketed to those willing to make a voluntary commitment to helping Indonesia meet its NDC, but that would not make use of the certificates to offset their own emissions, which would need to be reflected in the way that certificates are recorded in Markit Environmental registry.

A range of other outcomes are also possible, and the project coordinator will monitor the development of relevant national and international legislation and maintain a dialogue with the Plan Vivo Foundation, to ensure that any changes required to way that certificates are registered are implemented, to ensure that the project remains in compliance with all relevant legislation put in place to prevent this type of double counting.

G.3 Project period

The project period and quantification period are defined according to the requirements of the Plan Vivo Standard, and the Approved Approach for Estimation of climate benefits from REDD in community managed forest (AA-CFREDD; Annex 7), as summarised below.

G.3.1Start date

The project coordinator has been working on the development of a Plan Vivo project in Nanga Lauk since the site was selected for inclusion as an SFBMB project site in 2016.

For the purpose of estimating the climate benefits from project activities. The project start date is considered to be date when trained forest patrol and monitoring teams have started their patrol cycle, which is expected by 1 Jan 2018. The project will operate in 5-year project periods, during which Plan Vivo agreements will be entered into and monitoring and reporting will be carried out.

The first project period will therefore run from 1 Jan 2018 to 31 Dec 2022.

G.3.2Quantification period

Annual climate benefits, for each year of the 5-year project period, will be estimated at the start the project period and verified at the end of the project period.

Alignment of the quantification period with the project period helps to ensure that the quantification period does not exceed the period over which participants can make a meaningful commitment to the project intervention, since it is the same period over which Plan Vivo agreements will be entered into if sufficient funds are available.

Estimates of baseline and project scenario emissions will be revised at the end of each project period, so a five-year quantification period that is renewable provides the potential to generate a more accurate estimate of the long-term impacts of forest protection than would be possible with a longer quantification period.

Since forest protection activities are not expected to be affected by cyclical management activity e.g. harvesting or naturally occurring cycles, it was not necessary to define a quantification period that accounted for cyclical fluctuations.

G.4 Baseline scenario

The baseline scenario is defined according to the requirements of the Plan Vivo Standard, and the Approved Approach for Estimation of climate benefits from REDD in community managed forest (AA-CFREDD; Annex 7), as summarised below.

G.4.1Defining the baseline scenario

The baseline scenario is a continuation of land use activities occurring within the project area immediately prior to the project start date. The consequences of these activities are described in Section B.3.2. As well as degradation and deforestation as a result of current

unsustainable land use practices, this scenario also includes the drivers of degradation described in Section B.4.1.

When defining the baseline scenario, the following potential scenarios were considered:

i) Effective protection of the project area by the community
ii) A continuation of current land use activities within the project area

During discussions with stakeholders in the project village, and district government offices, no other potential future land use scenarios were identified.

Scenario i) was excluded on the basis of a barrier analysis conducted by following the Approved Approach for demonstrating Additionality[22]. The results of the barrier analysis are summarised in Section G2.2.

G.4.2Carbon pools and emission sources

The carbon pools that are expected to make the most significant contribution to the climate benefits of project activities are above- and below-ground woody biomass, since these are expected to be reduced under the baseline scenario, and project activities are expected to prevent emissions associated with the decline.

Carbon stocks in non-tree biomass, litter, dead wood, and soil are also expected to decline under the baseline scenario, and the decline is expected to be reduced under the project scenario. These carbon pools are either considered unlikely to generate significant emission reductions (non-tree biomass, litter, dead wood), or too costly to quantify (soil) so are conservatively excluded. Emissions from peat soils are expected to be significant under the baseline scenario and this technical specification may be revised in the future to quantify the emission reductions from peat soils.

GHG emissions from biomass burning (other than CO_2 emissions from loss of above- and below-ground biomass) are also conservatively excluded on the basis that they are expected to be higher in the baseline scenario than project scenario.

Emissions from fossil fuel combustion and fertiliser application are not expected to be significantly impacted by project activities, and not accounted for.

[22] http://planvivo.org/docs/Approved-Approach-Additionality.pdf

G.4.3 Baseline emissions methodology

The methodology for estimating baseline emissions is described in AA-CFREDD Section 3.1.1 (Annex 7). The data and parameters used are summarised below.

Forest strata

The forest strata present within the project area are classified according to forest type, legal classification and topographic class as summarised in Table 15.

Table 15 Classes used for classification of forest strata

Type	Values	Source	Justification
Forest type (i)	• Peat swamp forest • Secondary peat swamp forest • Riparian forest • Secondary riparian forest	LCCA* see Figure 8	Forest type classifications in national land cover maps reflect the main differences between the types of forest present within the project area.
Legal classification (j)	• Protection Forest (*Hutan Lindung*) • Limited Production Forest (*Hutan Produksi Terbatas*)	MoEF (2014) Forestry Spatial Plan. See Figure 8.	Ministry of Environment and Forestry land use designations identify the types of activity that can be legally carried out, and are likely to be a major influence on the drivers of deforestation and forest degradation
Topographic class (k)	• Lowland (<300 m.a.s.l.)	LCCA* see Figure 8	Topographic classes are determined according to elevation, which is likely to affect drivers of deforestation and forest degradation.

* LCCA = Land Cover Change Assessment, 2016 (Annex 1)

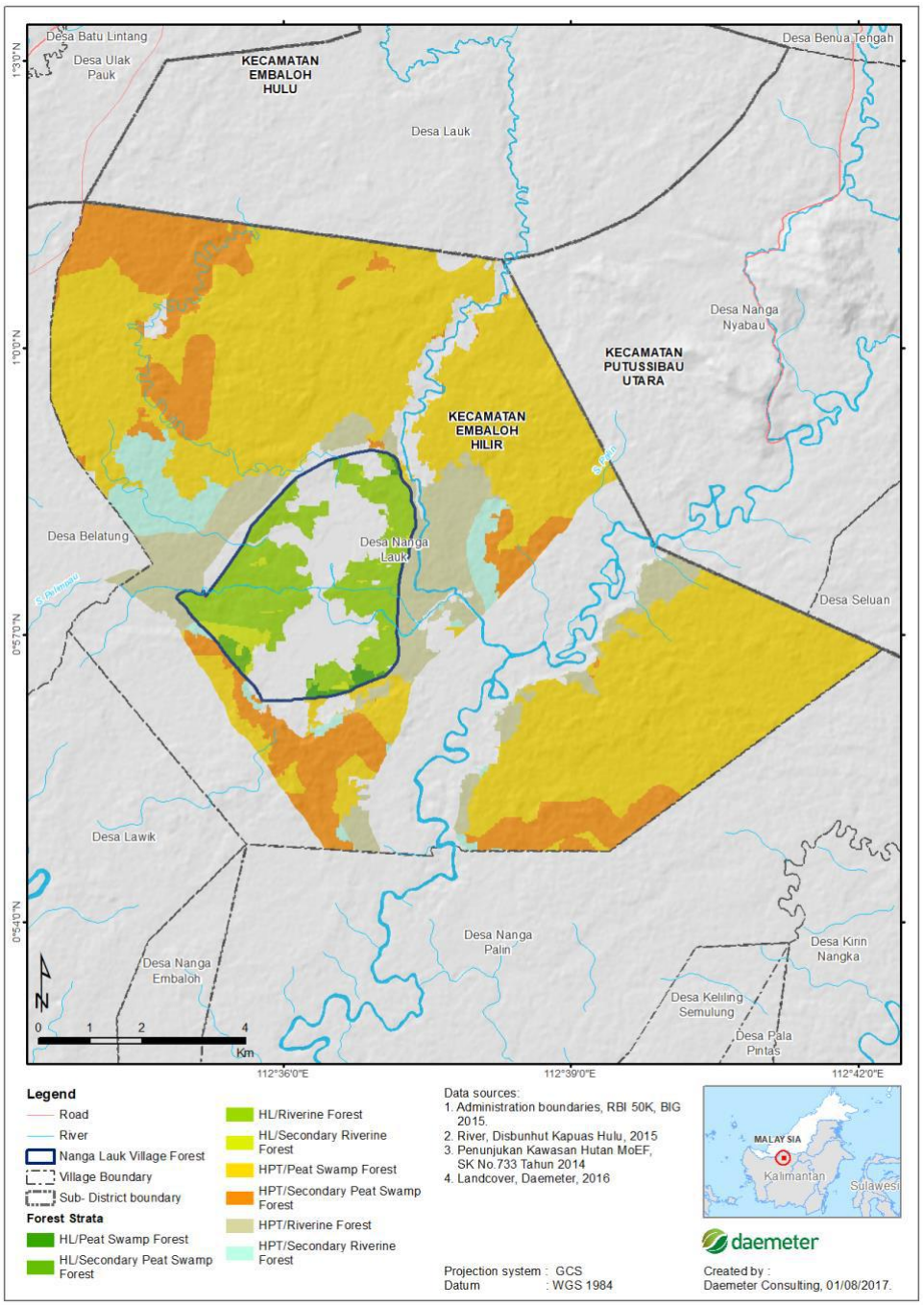

Figure 8 Forest strata in the project area in 2016. Source: Land Cover Change Assessment, 2016 (see Annex 1)

Reference region

The reference region is defined by the boundary of Kapuas Hulu District. The project area itself is excluded from the reference region, however. The reference region includes forest strata that have the same characteristics and are therefore expected to be exposed to similar drivers of deforestation and forest degradation, as forest within the project area (see Figure 9).

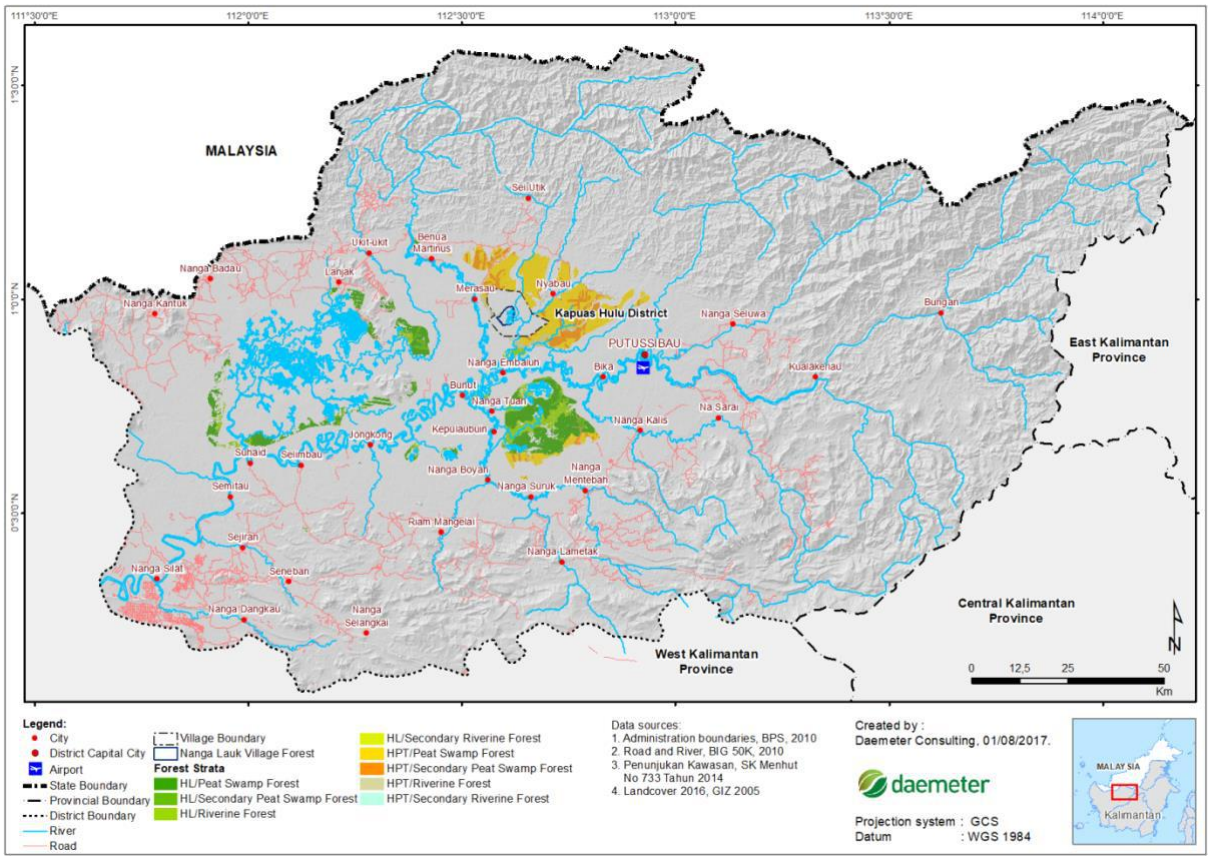

Figure 9 Forest strata in the reference region in 2005. Source: Land Cover Change Assessment, 2016 (Annex 7)

Project periods

Parameters related to project periods are summarised in Table 16.

Table 16 Project period parameters

Parameter	Value	Source	Justification
Length of the reference period (T_{RP})	11 years	The reference period (RP) is from 2005 to 2016	The reference period was selected based on the availability of suitable remote sensing data, and so that the end year was within 2 years of the project start date. An 11-year period was also considered to be a period over which patterns of deforestation and degradation that have occurred would be likely to continue during the project period
Length of the project period (T_{PP})	5 years	The first project period will run from Jan 2018 to Dec 2022 (see Section G.3.1)	see Section G.3.1

Land cover change

Land cover change parameters and values are summarised in Table 17 and Table 18.

Table 17 Land cover change parameters

Parameter	Values	Source	Justification
Area of forest type *i*, legal classification *j* and topography class *k* present in the project area at the start of the project period ($A_{PA_{i,j,k}}$)	See Table 18	LCCA* (Figure 8)	The land cover change assessment provides an estimate of forest strata present within the project area for 2016 which is within 2 years of the start of the project period
Area of forest type *i*, legal classification *j* and topography class *k* present within the reference region at the start of the reference period ($A_{RR_{i,j,k}}$)	See Table 18	LCCA* (Figure 9)	The land cover change assessment provides an estimate of forest strata present within the reference region in 2005, which is the start of the reference period
Area of forest type *i*, legal classification *j* and topography class *k* in the reference region converted to non-forest during the reference period ($A_{Def_{i,j,k}}$)	See Table 18	LCCA* (See Figure 9)	The land cover change assessment provides an estimate of forest strata present at the start and end of the reference period (2005 and 2016), from which areas deforested can be calculated.
Area of forest type *i*, legal classification *j* and topography class *k* in the reference region converted to degraded forest during the reference period ($A_{Deg_{i,j,k}}$)	See Table 18	LCCA* (See Figure 9)	The land cover change assessment provides an estimate of forest strata present at the start and end of the reference period (2005 and 2016), from which areas deforested can be calculated.

* LCCA = Land Cover Change Assessment, 2016 (Annex 1)

Table 18 Area of forest strata present at in the project area at the start of the project period (A_{PA}), and in reference area at the start of the reference period (A_{RR}); and amount of deforestation (A_{Def}) and degradation (A_{Deg}) of forest strata occurring in the reference region during the reference period.

Legal designation	Forest type and topographic class	Project area (ha)	Reference region(ha)		
		2016	2005	2005 - 2016	
j	i,k	A_{PA}	A_{RR}	A_{Def}	A_{Deg}
Protection forest (*Hutan Lindung*) NLVF	Peat Swamp Forest	30	30,606	779	452
	Secondary Peat Swamp Forest	23	3,245	95	NA
	Riparian Forest	713	12,111	612	2
	Secondary Riparian Forest	58	399	21	NA
Limited production forest (*Hutan Produksi Terbatas*) NLHPT	Peat Swamp Forest	5,748	35,734	437	840
	Secondary Peat Swamp Forest	1,430	10,204	472	NA
	Riparian Forest	1,053	3,129	533	59
	Secondary Riparian Forest	387	369	161	NA
Total		**9,442**	**95,797**	**3,110**	**1,353**

Source: Land Cover Change Assessment, 2016 (Annex 1)

Carbon stocks

Above-ground biomass carbon stock parameters were derived from a report commissioned by the Indonesian-German Forest and Climate Protection Programme (ForClime)[23]; which used a database of more than 200 literature-based sources corresponding to corresponding to Kalimantan and the Indonesian archipelago (Navratil 2013). To estimate below-ground biomass the root:shoot ratio recommended for tropical rain forests in the IPCC Guidelines for National Greenhouse Gas Inventories[24] was applied for all land cover types.

Carbon stock parameters are summarised in Table 19 and Table 20.

Table 19 Carbon stock parameters

Parameter	Value	Source	Justification
Carbon density of forest type i (C_i)	See Table 20	Navratil (2013); IPCC (2006)	Carbon stocks in above ground biomass estimated using a regional study incorporating an extensive literature review and field measurements. Below ground biomass estimated using a root:shoot ratio of 0.37.
Carbon density of degraded forest of forest type i (C_{SF_i})	See Table 20	Navratil (2013); IPCC (2006)	
Carbon density of non-forest (C_{NF})	See Table 20	Navratil (2013); IPCC (2006)	

Table 20 Carbon density of forest types present in the project area

Forest type	Carbon density (Mg C ha^{-1})		
	AGB	BGB	Total
Peat Swamp Forest (C)	107	40	147
Secondary Peat Swamp Forest (C_{SF})	76	28	104
Riparian Forest (C)	127	47	174
Secondary Riparian Forest (C_{SF})	38	14	52
Deforested land (C_{NF})	24	9	33

* AGB = Above Ground Biomass; BGB = Below Ground Biomass

Source: Navratil (2013); IPCC (2006)

[23] Navratil, P. 2013. Land Cover Situation and Land-Use Change in the Districts of West Kalimantan and East Kalimantan, Indonesia Assessment of District and Forest Management Unit Wide Historical Emission Levels. Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, FORCLIME Forests and Climate Change Programme: Jakarta.

[24] Intergovernmental Panel on Climate Change (IPCC) 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Prepared by the National Greenhouse Gas Inventories Programme. Eggleston, H.S., Buendia, L., Miwa, K., Ngara, T. and Tanabe, K. (eds.). IGES, Japan.

G.4.4Baseline emissions estimate

Expected baseline emissions are estimated using the equations in AA-CFREDD Section 3.1.1 (Annex 7) and the parameters described in Section G.4.3 of this PDD. The calculated parameters and values are summarised in Table 21 and Table 22, and the calculations are provided in Annex 8. **Expected baseline emissions for the first project period are 6,397 Mg CO_2 per year for NLVF.** Baseline emissions from NLHPT will depend on the area of each forest type that is protected (see Table 23).

Table 21 Expected baseline emission estimate parameters

Parameter	Values	Source
Average proportion of forest type *i*, legal classification *j* and topography class *k* within the reference region that was deforested in each year of the reference period ($D_{RR_{i,j,k}}$)	See Table 22	AA-CFREDD Equation 1 (see Annex 8)
Average proportion of forest type *i*, legal classification *j* and topography class *k* within the reference region that was degraded in each year of the reference period ($G_{RR_{i,j,k}}$)	See Table 22	AA-CFREDD Equation 2 (see Annex 8)
Baseline scenario emissions from deforestation and forest degradation expected during the project period (E_{BL})	NLVF = 31,985 Mg CO_2 NLHPT see Table 23	AA-CFREDD Equation 3 (see Annex 8)

Table 22 Average proportion of forest strata in the reference region deforested (D_{RR}) and degraded (G_{RR}) during the reference period

Legal designation	Forest type and topographic class	Annual % deforested	Annual % degraded
j	i, k	D_{RR}	G_{RR}
Protection forest (*Hutan Lindung*)	Peat Swamp Forest	0.2%	0.13%
	Secondary Peat Swamp Forest	0.1%	NA
	Riparian Forest	1.7%	0.01%
	Secondary Riparian Forest	0.5%	NA
Limited production forest (*Hutan Produksi Terbatas*)	Peat Swamp Forest	0.1%	0.21%
	Secondary Peat Swamp Forest	0.4%	NA
	Riparian Forest	1.5%	0.17%
	Secondary Riparian Forest	4.0%	NA
Total		**0.7%**	**0.28%**

Source: Land Cover Change Assessment, 2016 (Annex 1).

Table 23 Expected baseline emissions (E_{BL}), project scenario emissions (E_{PS}), leakage emissions, and climate benefit (B), during the project period per hectare of NLHPT in the project area (E_{BL})

Forest type	Annual (Mg CO_2 ha^{-1} yr^{-1})				Total (Mg CO_2 ha^{-1})			
	E_{BL}	E_{PS}	E_{LK}	B	E_{BL}	E_{PS}	E_{LK}	B
Peat Swamp Forest	0.80	0.08	0.04	0.69	4.01	0.40	0.18	3.43
Secondary Peat Swamp Forest	1.09	0.11	0.05	0.94	5.47	0.55	0.25	4.68
Riparian Forest	8.77	0.88	0.39	7.50	43.86	4.39	1.97	37.50
Secondary Riparian Forest	2.76	0.28	0.12	2.36	13.82	1.38	0.62	11.81

G.5 Climate benefits

The climate benefits are estimated according to the requirements of the Plan Vivo Standard, and the Approved Approach for estimation of climate benefits from REDD in community managed forest (AA-CFREDD; Annex 7), as summarised below.

G.5.1Climate benefit methodology

The methodology for estimating climate benefit (B) is described in AA-CFREDD Section 3.1.4 (see Annex 7) with the equation:

$$B = E_{BL} - E_{PS} - E_{LK}$$

The methodology and parameters for estimating baseline emissions (E_{BL}) are described in Section G.4.3, and for leakage emissions (E_{LK}) in Section G.6.1. The methodology for estimating expected project scenario emissions (E_{PS}) is described in AA-CFREDD Section 3.2.1 (see Annex 7). Following this approach, project scenario emissions are estimated by multiplying the baseline scenario emissions by an expected effectiveness factor (F), which for the first project period is a conservative estimate of the percentage of baseline emissions and removals that are expected to be avoided as a result of project activities.

Expected effectiveness

It is expected that the combination of project activities will be sufficient to prevent all deforestation and forest degradation that would have resulted from the activation of timber, concessions within the project areas. The project areas are not expected to be affected by expansion of agricultural activities by the Nanga Lauk community, as project areas in Limited Production Forest will exclude any land within 2 km of the main rivers, which correspond to the areas where mineral soil is present. Potential causes of deforestation and degradation that may not be fully prevented by project activities include: i) encroachment by logging and oil palm companies into the project areas; and ii) timber harvesting by Nanga Lauk

community members within the project areas. The potential impacts of these causes on the expected effectiveness of the project in preventing the deforestation and forest degradation are discussed below.

Since none of the potential impacts are expected to significantly affect the effectiveness of project activities; reduction of close to 100% of baseline emissions is expected. It is noted, however, that other unavoidable or unexpected impacts could affect the project area. **A more conservative estimate for project effectiveness (F) of 90% is therefore adopted for the first project period.**

At the end of the project period, analysis of remote sensing data will be used to estimate the actual percentage of emissions from deforestation and forest degradation avoided, and for subsequent project periods a value of F will be adopted to reflect the observed effectiveness of project activities in previous periods (see AA-CFREDD Section 3.2.2; Annex 7).

Encroachment by timber and oil palm companies
If project activities are carried out as planned, timber and oil palm companies will have no legal basis for expansion of their activities into the project areas. A small amount of encroachment from timber and oil palm concessions adjacent to the project areas, is possible however. Clear boundary marking, and regular patrols are designed to prevent this and any encroachment that does occur is not expected to significantly reduce the climate benefits achieved by the project.

Timber harvesting by Nanga Lauk community
Timber harvesting (sustainable use) zones within the Limited Production Forest will be excluded from the Plan Vivo project area. It is expected that most timber harvesting by the Nanga Lauk community can be contained within these areas, and forest patrols are designed to prevent encroachment into the project area. Timber harvesting within the project areas is therefore expected to be rare and would be quickly detected, so it is not expected to significantly reduce the climate benefits achieved by the project.

G.5.2 Expected climate benefits

Expected climate benefits are estimated using the equation in AA-CFREDD Section 3.1.4 (see Annex 7) and the parameters described in Sections G.4.3, G.5.1, and G.6.2. The calculated parameters and values are summarised in Table 24 , and the calculations are provided in Annex 8. **Expected annual climate benefits for the first project period are 1,512 Mg CO_2 per year for NLVF.** Climate benefits from NLHPT will depend on the area of each forest type that is protected (see Table 23).

Table 24 Parameters for estimation of climate benefits for Nanga Lauk Village Forest (NLVF) and Nanga Lauk Production Forest (NLHPT) during the project period

Parameter	Value		Source
	NLVF	NLHPT	
Baseline scenario emissions from deforestation and forest degradation expected during the project period (E_{BL})	31,985 Mg CO_2	See Table 23	See Section G.4.3
Expected project scenario emissions from deforestation and forest degradation expected during the project period (E_{PS})	3,198 Mg CO_2	See Table 23	10% of E_{BL}(See Section G.5.1)
Leakage emissions expected to result from displacement of deforestation and degradation during the project period E_{LK})	1,439 Mg CO_2	See Table 23	See Section G.6.2
Climate benefits expected to result from reduced deforestation and forest degradation as result of project activities during the project period (B)	27,347 Mg CO_2	See Table 23	AA-CFREDD Equation 16 (see Annex 8)

G.6 Leakage and uncertainty

G.6.1 Leakage methodology

The methodology for estimating expected leakage emissions is described in AA-CFREDD Section 3.3.1 (Annex 7). The project will adopt the expected leakage approach (Option 3.3.1b) for estimating expected leakage. Following this approach, expected leakage emissions are estimated for the first project period as a proportion of the difference between baseline scenario and project scenario emissions. A conservative estimate for the proportion of leakage expected (L) is determined based on an assessment of potential for displacement of activities that are expected to cause deforestation and forest degradation in the project area under the baseline scenario.

Potential drivers of leakage include all natural resource use activities, with the potential to cause deforestation or forest degradation, that will be reduced within the project area as a result of project activities and that have potential to be displaced. Potential for displacement also depends on the agents of deforestation and degradation linked to specific drivers. The agents and drivers with potential to cause leakage, and areas that could be affected by displacement are summarised in Table 25.

Table 25 Potential agents and drivers of leakage

Agent	Driver	Displacement potential	Justification
Timber and oil palm companies	Expansion of commercial logging operations	None	Although the project aims to prevent the activities of timber companies within the project area, reducing the amount of timber extracted, it is not expected to result in increased logging outside the project area since all potential logging concessions in the region have already been allocated, and logging operations typically extract up to the legal allowable limit.
	Encroachment	Minimal	Preventing encroachment by logging and oil palm companies into the project area has potential to cause leakage if it the companies decide to encroach into forest outside the project area instead. Since the amount of encroachment, the project expects to prevent is minimal, however, significant leakage is not expected.
Nanga Lauk Community	Timber harvesting	<5% of total climate benefit	Expected emission reductions from preventing degradation of limited production forest, by timber companies and the Nanga Lauk community, will not exceed 10% of the total expected climate benefit from the project. Commercial logging is expected to be the major cause of emissions from forest degradation in the baseline scenario, and the project will implement leakage mitigation activities to reduce the chance of degradation outside the project area by facilitating the design of sustainable forest management plans for the whole area of Nanga Lauk Production Forest and supporting tree planting activities to meet future demand for timber. Potential for leakage from displacement of timber harvesting by the Nanga Lauk community is therefore not expected to be greater than 5% of the total climate benefit.
	Agricultural expansion	None	Since project areas will exclude land along waterways where agricultural expansion could take place, the project does not expect to reduce agricultural expansion, so there is no potential for leakage.

Since there is little potential for leakage from the major drivers of deforestation and forest degradation, an expected leakage emissions proportion (L) of 5% will be adopted for the first

project period. At the end of the project period, analysis of remote sensing data will be used to estimate the actual emissions from leakage in an area within which leakage could occur, which will be defined by the boundary of Nanga Lauk village, since it is unlikely that the activities of the Nanga Lauk community would be displaced beyond this. For subsequent project periods, a value of L will be adopted to reflect the leakage observed in previous project periods using the leakage area approach (see AA-CFREDD Section 3.3.2b; Annex 7).

G.6.2 Potential leakage

Potential leakage emissions are estimated using the equation in AA-CFREDD Section 3.3.1b (see Annex 7) and the parameters described in Section G.6.1. The calculations are provided in Annex 8. **Potential leakage emissions for the first project period are 80 Mg CO_2 per year for NLVF.** Climate benefits from NLHPT will depend on the area of each forest type that is protected (see Table 23).

Table 26 Potential leakage emissions parameters

Parameter	Value	Source
Leakage emissions expected to result from displacement of deforestation and degradation during the project period (E_{LK})	NLVF: 1,439 Mg CO_2 NLHPT: see Table 23	AA-CFREDD Equation 11 (see Annex 8)

G.6.3 Sources of uncertainty

There are a number of sources of uncertainty associated with the data and assumptions used to estimate climate benefits. The main sources of uncertainty and approaches used to reduce uncertainty are summarised below.

Data

Two main types of data source are used in the estimation of climate benefits. Land cover maps, and carbon density estimates. The accuracy of land cover maps was assessed with in-situ validation and was typically >80% (see Annex 1). The accuracy of land cover change maps is likely to be lower since they will reflect errors in both of the maps being compared. Considerable effort was made to reduce error and the resulting maps are considered to provide descriptions of land cover and land cover change with an acceptable level of uncertainty.

Estimates of carbon density also have uncertainty associated with the values used, which were derived from an extensive review of relevant studies in the region. While the average values adopted for the land cover types have a standard deviation associated with the survey from which they were collected, and from the combination of data from a number of

different surveys. If this uncertainty was reflected in the estimates used, for example by using a lower 90% confidence interval of the mean, it would be likely to result in a considerable under-estimate of carbon stocks. Instead, the mean values are adopted as these are expected to give the most accurate reflection of carbon stocks in the appropriate land cover types. It is unlikely that field surveys at the project site would reduce this uncertainty, since surveys of a small number of relatively small plots generally result in estimates with high levels of uncertainty, and the survey effort required to obtain higher precision is typically prohibitive for small-scale projects.

Assumptions

Although it is not possible to quantify the uncertainty of assumptions used to estimate expected climate benefits, it is likely that the uncertainty is greater than for the data used. The project therefore employs a number of approaches to prevent the uncertainty associated with assumptions used in the climate benefit estimation methodology from resulting in an over-estimate of climate benefits.

Expected baseline scenario emissions are estimated by assuming that the patterns of deforestation and degradation that occurred in the reference region during the reference period would occur in the project area during the project period, if project activities are not carried out. If baseline emissions are overestimated, this could result in an over-estimation of climate benefits. To reduce the likelihood of overestimating baseline emissions, only deforestation and forest of the same type and legal classification as forest in the project area is considered when considering patterns of deforestation and forest degradation in the reference region. Actual deforestation and degradation that occurred in the reference region during the project period is also used to verify emission reductions achieved.

The project scenario assumes that project activities are effective at preventing the deforestation and degradation expected under the baseline scenario. A suite of activities was developed to address specific drivers of deforestation and degradation in the project area increasing the likelihood that the project activities will result in the expected benefits if carried out as planned. Some uncertainty remains however, so a conservative estimate of expected effectiveness is applied to intentionally bias the estimate of climate benefits so that they are likely to be underestimated. During the project period, activity-based monitoring and adaptive management will be used to ensure that the project activities remain relevant to changing conditions. After the project period, climate benefits will be verified by assessing the amount of deforestation and degradation that occurred during the project period.

There is also uncertainty associated with the estimation of leakage, and again a conservative estimate of expected leakage is applied to reduce the likelihood that leakage is underestimated prior to verification at the end of the project period.

G.6.4Validation of assumptions

The main assumption of the project is that if the activities are carried out as planned, they will result in the expected climate benefits. Two types of approach will be used to collect data to validate this assumption: i) Activity-based monitoring throughout the project period to determine whether activities are being carried out as planned; and ii) Verification of climate benefits and updating key parameters at the end of the project period.

Activity-based monitoring indicators, and indicators used to verify climate benefits, are described in Section K.1.1.

H. Risk Management

To help ensure the environmental integrity of emission reductions achieved by the project, for which Plan Vivo certificates are issued, a proportion of certificates will be held in a risk buffer. The proportion of certificates in the risk buffer is determined by consideration of two types of risk: i) The risk that project activities will not result in the expected climate benefits; and ii) that climate benefits achieved during a project period will be reversed after the project period.

Risk buffer certificates will be retired at the end of the project period if verified climate benefits fall below the benefits estimated at the start of the project period; thereby insuring against under-delivery during the project period and reversals of climate benefits achieved in previous project periods.

H.1 Identification of risk areas

H.1.1 Risk assessment methodology

To ensure that the number of certificates held in the risk buffer is proportional to the risks of non-delivery and reversal of climate benefits, the level of risk in six key areas is considered, to provide an overall assessment of the risk levels. The categories of risk considered were: Political, Financial, Technical, Institutional, Social, and Environmental. Within each of these categories, specific risk factors were identified. Project activities were designed to mitigate the identified risks as far as possible. The level or risk that remains after the application of these migrating activities was scored for: i) impact – the proportion of climate benefits that would be lost if the risk factor was realised; and ii) likelihood – the probability of the risk factor occurring. Both impact and likelihood were scored on a five-point scale: Very low = 0.05, Low = 0.1, Moderate = 0.25, High = 0.5, Very high = 0.75.

The risk score for each risk factor was then calculated by multiplying impact and likelihood scores, and a total risk score was calculated by summing the risk scores for each factor. The total risk score was used to determine the proportion of certificates held in the risk buffer.

The risk assessment should be reassessed at the start of each project period and updated if appropriate by revision of this PDD.

H.1.2Risk assessment result

The results of the assessment of risks of non-delivery and reversals of climate benefits are summarised in Table 27.

Table 27 Assessment of risks of non-delivery and reversal of climate benefits

Risk	Mitigation actions	Impact	Likelihood
Political			
Legal recognition - Application for legal recognition of management rights (for NLHPT) and permits for use (NLVF and NLHPT) T are rejected.	The activities required to secure legal recognition are included in the management plan, and therefore progress towards legal recognition is included as an activity-based indicator. If the application is rejected, or progress towards recognition is not made, certificate issuance will be withheld.	NLVF = Low NLHPT = High Permit requirements for ecosystem services are under development by the District and National Government. Until these are formulated, there is no potential impact. If the application for extension of the village forest to include NLHPT is refused, there would be a significant impact on the climate benefits from NLHPT.	NLVF = Very low NLHPT = Moderate Once village forest status is assigned, the likelihood that required permits will not be issued is very low. For NLHPT, there is a moderate chance that application for recognition as village forest will be rejected. Once approved, the likelihood of receiving permits should be reduced to Very low.

Risk	Mitigation actions	Impact	Likelihood
National legislation - Transaction of emission reduction credits is prevented or controlled by national legislation. The Government of Indonesia is currently developing legislation governing carbon and ecosystem service transactions, which could limit the potential for the project to raise finance through sale of emission reduction certificates in the voluntary carbon market	The marketing strategy for the project is not solely reliant on the sale of carbon offsets, having a diverse range of funding sources will enable the project to respond to emerging legislation. Furthermore, Plan Vivo agreements will only be entered into when finance for the period of the agreement is secured.	Very Low – Since Plan Vivo agreements will only be entered into once finance has been secured, there is no risk of non-delivery. The Government of Indonesia maintain a commitment to reducing emissions from deforestation and forest degradation and supporting social forestry initiatives, so it is unlikely that legislative change would lead to reversals in benefits achieved.	High – There is a high likelihood that legislation relating to carbon and ecosystem services will come in to force during the first project period.
Financial			
Insufficient finance is secured to support project activities creating a risk of non-delivery and reversals.	Plan Vivo agreements will only be signed when finance for the period of the agreement is secured, reducing the risk of non-delivery. Reversals are not expected if the project is terminated early as the Nanga Lauk community will continue to benefit from forest protection.	Low – A lack of finance will not affect delivery of climate benefits from certificates that have been issued and would have a very low impact on reversals.	Moderate – Markets for certificates from this type of project are fairly young and sales not certain.
Technical			
Project activities fail to prevent unsustainable use of forest resources by Nanga Lauk community members.	Project activities including development of village regulations, patrols and awareness raising activities have been planned to prevent forest degradation from unsustainable use of forest resources.	Low – Unsustainable use of forest resources is a minor cause of baseline emissions.	Low – If project activities are carried out as planned, there is a low likelihood they will not deliver the expected benefits.

Risk	Mitigation actions	Impact	Likelihood
Technical capacity to implement effective forest patrol and monitoring activities is not maintained.	Capacity of the forest patrol group will be assessed at monthly and quarterly meetings, and on-job training will be provided by experienced group members where necessary.	Low – The link with activity-based indicators reduces the potential for lack of capacity to prevent delivery of the project.	Low – Training is a key focus of project activities.
Institutional			
Capacity of the project coordinator to support the project is not maintained.	The project coordinator has received training required and will have support of technical partners throughout the project period.	Low – Training provided to the project coordinator limits the impact from a lack of maintenance of capacity.	Very low – Technical support partners will ensure that the necessary capacity is maintained.
Social			
Willingness to carry out administrative tasks required for project monitoring and reporting is not maintained.	The project will provide capacity building in monitoring and reporting and incentivise completion of the required tasks with performance-based support.	Low – Failure to complete monitoring and reporting requirements would result in withholding an issuance of certificates.	Very low – Performance-based support, backed up with the required capacity building activities is expected to result in high willingness to complete required monitoring and reporting activities.
Corruption leads to misuse of project finances.	The project will develop and implement mechanisms for effective and transparent financial management and provide financial management training to LPHD and community groups.	Moderate – Misuse of funds could undermine community support for the project as well as jeopardize project activities.	Very low – The financial accounting systems and financial management training will eliminate most of the potential for misuse of project funds.
Environmental			
Forest fires in NLVF and NLHPT.	A fire tower will be constructed and manned during high risk periods to enable early detection of forest fires, so that fire patrol teams can be mobilized.	High – Even with early detection, forest fires have the potential to affect a significant proportion of the project areas.	Low – Fire prevention and control measures are expected to considerably reduce likelihood of fire having a significant impact on the project areas.

H.2 Risk buffer

H.2.1 Risk buffer percentage

The risk buffer percentage was calculated using the approach and risk analysis described in Section H.1. The risk values for the different risk factors identified are summarised in Table 28. **The risk buffer percentage for the project period is 13.5% for NLVF.** For NLHPT a risk buffer of 25.5% will be applied until the management rights for the area are formally recognised.

Table 28 Risk scores

Risk factor	Risk score		
	Impact	Likelihood	Total
Political			
Legal recognition	NLVF = 10% NLHPT = 50%	NLVF = 0.05 NLHPT = 0.25	NLVF = 0.5% NLHPT* = 12.5%
National legislation	5%	0.5	2.5%
Financial			
Insufficient finance	10%	0.25	2.5%
Technical			
Project activities	10%	0.1	1%
Technical capacity	10%	0.1	1%
Institutional			
Project coordinator capacity	10%	0.05	0.5%
Social			
Willingness for monitoring and reporting	10%	0.05	0.5%
Corruption	50%	0.05	2.5%
Environmental			
Forest fire	25%	0.1	2.5%
TOTAL			**NLVF = 13.5%** **NLHPT* = 25.5%**

* On approval of management rights for NLHPT, the risk score for Legal recognition should be reduced to 0.5%, and the risk buffer for certificates from this area should be reduced to 13.5%

I. Project Coordination & Management

I.1 Project organisational structure

I.1.1 Stakeholder analysis

To identify groups with potential to influence of be affected by the project, five types of stakeholder were considered:

- Groups within the community that may be affected by the project in different ways (for example farmers, timber harvesters, honey collectors, women, youth etc.)
- Government ministries and departments involved in natural resource management
- Local administrative bodies
- Local or national organisations and donors working on natural resource management
- Private sector organisations, especially those involved in agriculture, forestry and extractive industries

Twenty-six potential stakeholders (institutions and individuals) were identified (see Table 29). Each stakeholder was assessed to determine whether they are likely to be positively or negatively impacted by the project and scores were assigned from 1 to 5 for i) Importance - where 5 = stakeholders whose needs the project should consider the highest priority, and 1 = stakeholders whose needs are the lowest priority for the project; and ii) Influence - where 5 = stakeholders with the greatest power to facilitate or impede the project, and 1 = stakeholders with the least power to influence the project. The results of the stakeholder analysis were summarised in a stakeholder diagram (Figure 10).

Table 29 Stakeholder table for Nanga Lauk Village

	Stakeholder	Interest in project	Impact	Importance	Influence
Community					
A	Lembaga Pengelola Hutan Desa/LPHD	As manager of the *Hutan Desa*.	+	5	5
B	Periau (Honey Farmers' group)	As user of the *Hutan Desa*.	+	5	5
Government					
C	BPDAS Kalimantan Barat	Technical Implementation Unit of Ministry of Environment and	+	5	5

	Stakeholder	Interest in project	Impact	Importance	Influence
		Forestry that facilitates Village Forest (*Hutan Desa*) program.			
Local administration					
D	Bappeda Kapuas Hulu	District agency that has mandate on HoB program in Kapuas Hulu.	+	5	5
E	Kapuas Hulu Estate Crop & Forestry Service	District agency that mandated as Project Implementation Unit (PIU) of the ADB project.	+	5	5
F	West Kalimantan Provincial Forestry Service	Provincial agency that will take over all forestry related activities from district forestry service, based on UU No. 23/2014 and its amendments.	+	5	5
G	Kapuas Hulu Forest Management Unit	The project site is located inside the FMU.	+	5	5
H	Jumtani, S.Hut.	Kepala Bidang Konservasi dan Perhutanan Sosial/ Head of Conservation and Social Forestry Division in Kapuas Hulu District Estate Crops and Foresty Service.	+	5	5
NGO					
I	People Resources and Conservation Foundation/PRCF	PRCF has been consistently working on Community empowering in Conservation actions in West Kalimantan.	+	5	4
J	Titian Foundation	Titian Foundation is working on Community Land Use Management programme in a district adjacent to ADB selected project site and wish to expand their current programme.	+	4	4
K	Kaban Foundation	Focused on community supports in Agroforestry and Agriculture.	+	3	2
L	WWF Kalimantan Barat	Consistently working on conservation and spatial planning programme within Kapuas Hulu regency.	+	3	3
M	Fauna and Flora International-Indonesia Programme	Provides technical supports on Community Forest and Plan Vivo projects initiation in West Kalimantan.	+	3	5
N	GIZ-Forclime	Initiated Community Forest and Carbon Projects in Nanga Lauk	+	3	4

	Stakeholder	Interest in project	Impact	Importance	Influence
		Village that now become ADB selected project site.			
O	OEDAS	An NGO formed by a group of individuals relatively close to Governor of West Kalimantan.	-	1	3
P	Aliansi Organik Indonesia (AOI)	Organized Honey production and Trading.	+	3	4
Q	FORINA (Forum Orang Utan Indonesia)	Orang Utan conservation and identification of potential release site.	+	3	4
R	GEMAWAN (Lembaga Pengembangan Masyarakat Swandiri)	Local rubber farmer capacity building.	+	2	2
S	SAMPAN (Sahabat Masyarakat Pantai)	Development of Non-timber forest products supply chain.	+	2	2
T	YDT (Yayasan Dian Tama)	Agroforestry development.	+	1	2
U	Assosiasi Pendamping Perempuan Usaha Kecil (ASPPUK)	Women working group capacity Enhancement.	+	3	3
V	Lanting Borneo	Utilization of Customary law in local protected areas.	+	2	2
W	Komunitas Pariwisata Kapuas Hulu (Kompakh)	Development of capacity in Eco-Tourism.	+	2	2
Private sector					
X	Budi Tri	Business entity with relatively big impact in cash flow in villages within the region.	+	3	2
Y	PT Bumi Raya Wood Industries	A logging company that is no longer active in the area and the license has recently cancelled by the Ministry of Environment and Forestry (MoEF).	-	1	4
Z	PT Annisa Surya Kencana	A logging company that obtained recommendation from the West Kalimantan Governor to apply a logging license at Limited Production Forest area from ex-logging concession area of PT Bumi Raya Wood Industries.	-	1	4

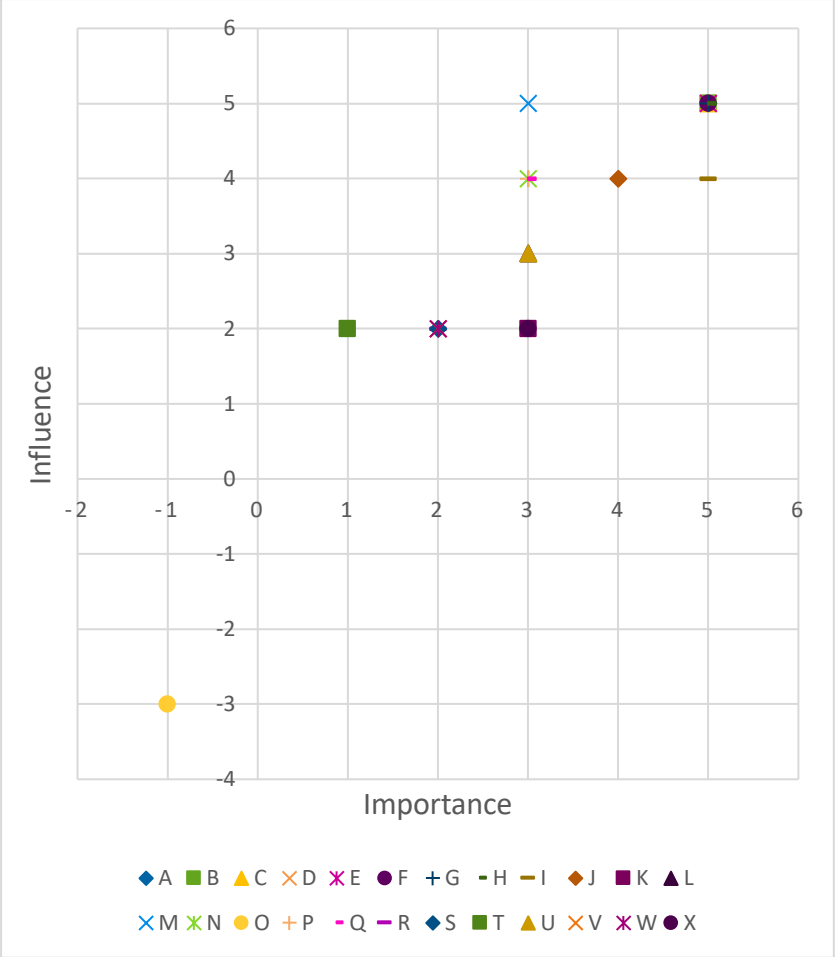

Figure 10 Stakeholder matrix for Nanga Lauk Village. For legend see Table 29. Source: Stakeholder Analysis, 2016.

I.1.2 Project coordinator

The project coordinator is *Yayasan* People Resources and Conservation Foundation – Indonesia (PRCF-Indonesia), a national NGO established in 2000 focusing on strengthening local participation in conservation of biodiversity and ecosystem functions through protection efforts and wise utilization of natural resources as well as improvement of socio-economic and cultural revitalization that impact communities.

PRCF-Indonesia is a member organisation of the US-based PRCF Federation that has developed and operated in several Southeast Asian countries as a federation of semi-autonomous country programs, many of which are now registered as national NGOs in each country. The capacity and experience of the PRCF-Indonesia are summarised in Table 30. Contact details of key personnel are in Annex 9.

Table 30 Project coordinator profile

Name and role in project: PRCF-Indonesia (Project Coordinator)
Legal status: National NGO
Long-term objectives: To strengthen local participation in conservation of biodiversity and ecosystem functions through protection efforts and wise utilization of natural resources as well as improvement of socio-economic and cultural revitalization that impact to communities.
History and achievements: Since its establishment in 2000, PRCF-Indonesia has carried out at least 26 projects in West Kalimantan under four programmes: • Women Empowerment and Strengthening Community Cultural Identity Programme (1999-present) • Democracy and Peace Building Programme (2003-2010) • Habitat and Endangered Species Conservation Programme (2004-present) • Community Based Forest Management, Non-Timber Forest Management and Environment Services Development Programme (2010-present)
Current activities: In addition to the SFBMB project, PRCF-Indonesia are currently implementing four other projects: • Village Forest Development to Support Biodiversity Conservation and Sustainable Utilization of NTFP in Kapuas Hulu District, West Kalimantan. Running from June 2014 – May 2016, funded by Tropical Forest Conservation Act – Kalimantan, No. 003/01/02/1237/TFCA2/CYC.1/IV/2014, [IDR 1,584,233,000] • Strengthening Community-based Forest Management through Village Forest (*Hutan Desa*) for reducing deforestation and land degradation in West Kalimantan. Running from Oct 1015 to Oct 2016, and funded by The Asia Foundation [IDR 577,400,000] • Sustainable Consumption and Production (SCP) of hand woven textiles (*Songket, Ulos, Lurik, Abaca, Ikat*): Female Entrepreneurship in Indonesia and Philippines. Running from May 2013 – Apr 2017, and funded by *Asosiasi Pendamping Perempuan Usaha Kecil* (ASPPUK), HIVOS, and European Union (EU) [IDR 626,232,652] • Village Forest Development through Sustainable Utilization of NTFP and Ecosystem Services in Kapuas Hulu District, West Kalimantan; In collaboration with Aliansi Organis Indonesia (AOI), Lembaga Energi Hijau (LEH), Rumpun Bambu Nusantara (RBN), Koperasi Produsen Tuah Sidi Easi, and Koperasi Produsen Unyap Bina Usaha; Running from August 2016 – December 2017, funded by Millennium Challenge Account-Indonesia Green Prosperity Project, Window-2 of CBNRM, Grant No: 2016/Grant/055 [IDR 11,139,692,700]
Key personnel: • Imanul Huda (Director) – Expertise in: Program management; Community Based Forest Management; Biodiversity conservation; and Community Development • M. Syamsuri (Program Coordinator) – Expertise in: Community Based Forest Management; NTFPs; Capacity Building • Fifiyati (Program Coordinator) – Expertise in Women Entrepreneurship; Traditional weaving development; Education • Amaliatun Hasanah (Financial Manager) • Janiarto Paradise Pawa (GIS Specialist) – Expertise in: GIS and landscape architecture, Biodiversity Conservation • Aloysius Kahariayadi (NTFP specialist) – Expertise in: NTFPs development • Agus Dwi Wahyudi (Agriculture Specialist) – Expertise in: Sustainable Agriculture • Rio Afiat (Rural Economic Development Specialist) – Expertise in: Institutional Economy • Edi Waluyo Slamet (Rural Economic Development Specialist) - Expertise in: Production & Marketing

I.1.3 Organisational structure

The organisational structure for the project is described in Figure 11.

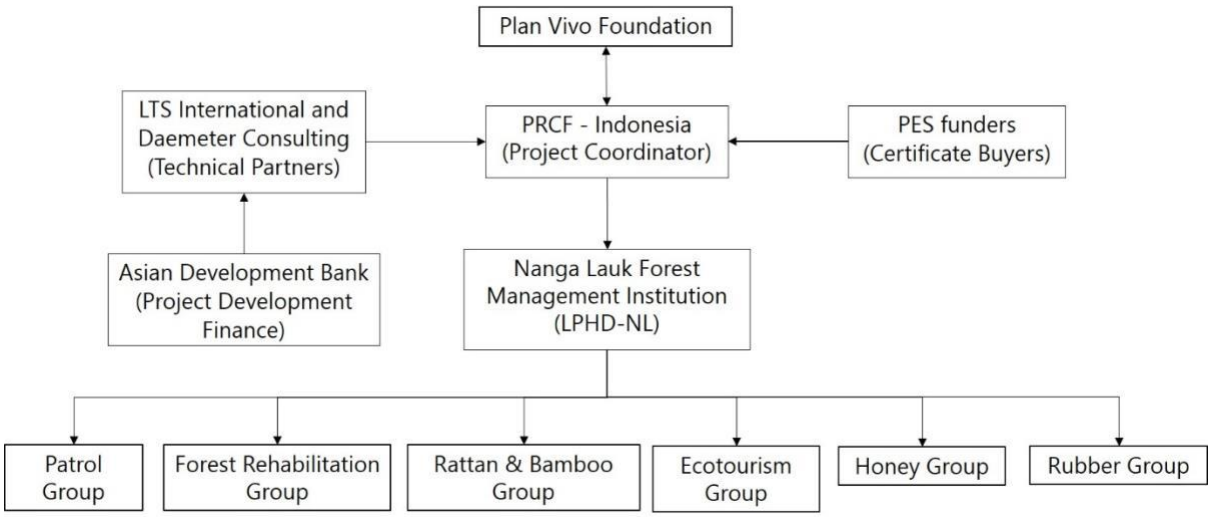

Figure 11 Organisational structure.

I.2 Relationships to national organisations

I.2.1 Communication with national organisations and government

As described in Section B.1.1, the Nanga Lauk community has gained management rights over NLVF and has requested the issuance of the same management rights for NLHPT; and as described in Section G.1.3, licences for ecosystem services derived from both forest areas will be sought from the relevant authorities. The project will closely monitor the process for obtaining the NLHPT management rights and licenses for utilizing ecosystem services.

Communication with the Kapuas Hulu Utara FMU and the Social Forestry and Environment Partnership Office of Kalimantan Region, the sub-ordinate office of Directorate General of Social Forestry and Environment Partnership of MoEF (*Perhutanan Sosial dan Kemitraan Lingkungan*), will be maintained in relation to the responsibility of Nanga Lauk Community as village forest management rights holder. LPHD as the village forest management institution must develop management plans (10-year plan and annual plan), submit annual reports, protect the area from destruction and environmental pollution, maintained the forest function, conduct forest protection, mark the boundary, do planting and maintenance of the plants, conduct forestry enterprises, and pay forest resources provision fees.

The LPHD is entitled to protection from destruction and environment pollution, and from the area being taken over by another party to use for NTFP collection, timber, environmental

services, or to obtain benefit from the genetic resources. They are also entitled to obtain facilitation in managing the village forest and conflict resolution, partnership in business development, facilitation in developing management plan and annual plan, as well as obtaining fair treatment based on gender or other means. Resources to provide this support are limited, however.

I.2.2 Links to other government schemes or projects

Nanga Lauk Village has been chosen as a representative of Kapuas Hulu District as model village for empowering women as the key to household prosperity. Through the program of Improving Women's Role toward Healthy and Prosperous Households (*Peningkatan Peranan Wanita Menuju Keluarga Sehat Sejahtera*), the women in Nanga Lauk community have obtained various training to improve their capacity in 2017. Other government programs which have been planned, and will involve both men and women, include: rattan product development and marketing of honey from Kapuas Hulu District Industrial Service; and village forest management facilitation by Kapuas Hulu Utara FMU of West Kalimantan Provincial Forestry Service.

I.3 Legal compliance

I.3.1 Compliance with legal requirements

National and regional regulations and legislation relevant to the proposed project activities are summarised in Table 31. The project will act in compliance with these, and other relevant regulations. Nanga Lauk community has obtained management rights for Nanga Lauk Village Forest as described in Section B.1.1. A copy of the letter from the Minister of Environment and Forestry is provided in Annex 10.1.

The project was designed in collaboration with the Directorate of Ecosystem Services on Conservation Areas (DESCA), which is a Government agency under the Indonesian Ministry of Environment and Forestry (*Kementerian Lingkungan Hidup dan Kehutanan*). DESCA is the implementing agency for the ADB funded project that is supporting the development of a Plan Vivo Project in Nanga Lauk Village. When Nanga Lauk was selected as a Plan Vivo project site, DESCA circulated a letter of notification to all relevant regulatory bodies and NGOs active in the area, including national and district authorities and local international organisations. A copy of the letter, and list of addressees is provided in Annex 10.2.

Table 31 Relevant regulations and legislation

Type	Reference	Title
Forest carbon		
Regulation of the Minister of Forestry	P.68/Menhut-II/2008	Penyelenggaraan Demonstration Activities Pengurangan emisi dari Deforestasi dan Degradasi Hutan
Regulation of the Minister of Forestry	P.36/Menhut-II/2009	Peraturan Menteri Kehutanan tentang Tata Cara Perizinan Usaha Pemanfaatan Penyerapan dan/atau Penyimpanan Karbon pada Hutan Produksi dan Hutan Lindung
Regulation of the Minister of Forestry	P.30/Menhut-II/2009	Tata Cara Pengurangan Emisi dari Deforestasi dan Degradasi Hutan (REDD)
Regulation of the Minister of Forestry	P. 20/Menhut-II/2012	Penyelenggaraan Karbon Hutan
Regulation of the Minister of Forestry	P.11/Menhut-II/2013	Perubahan atas Permenhut No. P.36/Menhut-II/2009
Regulation of the Minister of Forestry	P.50/Menhut-II/2014	Perdagangan Sertifikat Penurunan Emisi Karbon Hutan Indonesia atau *Indonesia Certified Emission Reduction*
Local governance		
Law	UU No. 23/2014	Pemerintahan Daerah
Government Regulation in Lieu of Law	Perpu No. 2/2014	Perubahan atas UU No. 23/2014
Law	UU No. 2/2015	Penetapan Perpu No. 2/2014 sebagai Undang-undang
Law	UU No. 9/2015	Perubahan kedua atas UU No. 23/2014 tentang Pemerintahan Daerah
Regulation of the Minister of Forestry	P.7/Menhut-II/2012	Penugasan (medebewin) sebagian urusan pemerintahan bidang kehutanan tahun 2012 kepada Bupati Berau, Bupati Malinau, dan Bupati Kapuas Hulu dalam rangka *Demonstration Activities REDD*
Regulation of the Minister of Forestry	P.25/Menhut-II/2012	Petunjuk telnis pelaksanaan Penugasan sebagian urusan pemerintahan bidang kehutanan tahun 2012 kepada Bupati Berau, Bupati Malinau, dan Bupati Kapuas Hulu dalam rangka *Demonstration Activities REDD*
Regulation of the Minister of Forestry	P.102/Menhut-II/2014	Pedoman pelaksanaan penugasan sebagian urusan pemerintahan bidang kehutanan tahun 2015 kepada Bupati Berau, Bupati Malinau dan Bupati Kapuas Hulu dalam rangka pengelenggaraan Program Hutan dan Perubahan Iklim (*Forest and Climate Change*)
Village forests		
Regulation of the Minister of Environment and Forestry	P.83/MENLHK/SETJEN /KUM.1/10/2016	Social Forestry
Regulation of the Director General of Land	P.11/V-Set/2010	Tata cara penyelenggaraan Hutan Desa

Type	Reference	Title
Rehabilitation and Social Forestry		
Regulation of the Governor of West Kalimantan	Pergub No. 3 Tahun 2010	Pedoman verifikasi permohonan Hak Pengelolaan Hutan Desa
Regulation of the Minister of Forestry	P.43/Menhut-II/2012	Tata hubungan antara instansi kehutanan pusat dan daerah dalam penyelenggaraan Hutan Kemasyarakatan dan Hutan Desa
Ministerial Decree	No. SK 685/MNLHK-PSKL/PKPS/PSL.0/2/2017	Pemberian Hak Pengelolaan Hutan Desa kepada Lembaga Pengelola Hutan Desa Lauk Bersatu seluas ±1.430 (seribu empat ratus tiga puluh) hektar pada Kawasan Hutan Lindung di Desa Nanga Lauk Kecamatan Embaloh Hilir Kabupaten Kapuas Hulu Provinsi Kalimantan Barat
Nanga Lauk Village Regulation	Perdes No. 140/03/PMD-NL-2016	Pembentukan Lembaga Pengelola Hutan Desa di Desa Nanga Lauk
Nanga Lauk Village Head Decree	SK Kades No. 140/02/PMD-NL-2016	Susunan Pengurus Lembaga Pengelola Hutan Desa di Desa Nanga Lauk

I.3.2 Project coordinator policies

In its establishment document[25] the project coordinator organization has determined that membership is opened to any individual who has the same perspectives as its vision, missions, and goals as well as other national legal requirements and qualified to work on one of the organization's program.

The project coordinator organization staff whose salary is above the minimum salary for paying income tax must have a tax ID number and pay income tax as necessary. The organization provides health insurance, worker/pension insurance, benefits (e.g. holiday allowance), etc. according to the government policies on employment.

I.4 Project management

I.4.1 Project timeline

A timeline showing the project development phase and the first two project periods is provided in Figure 12. The start date of the project is 1 Jan 2018, and the project will seek its first certificate issuance on submission of an annual report in December 2018. Ex-post

[25] Notarial Act No. 93, dated October 21, 2000; No. 90, dated July 24, 2001, and No. 55, dated November 20, 2002, all from Eddy Dwi Pribadi, SH Notary

certificates will then be issued each year on acceptance of annual reports submitted to the Plan Vivo Foundation.

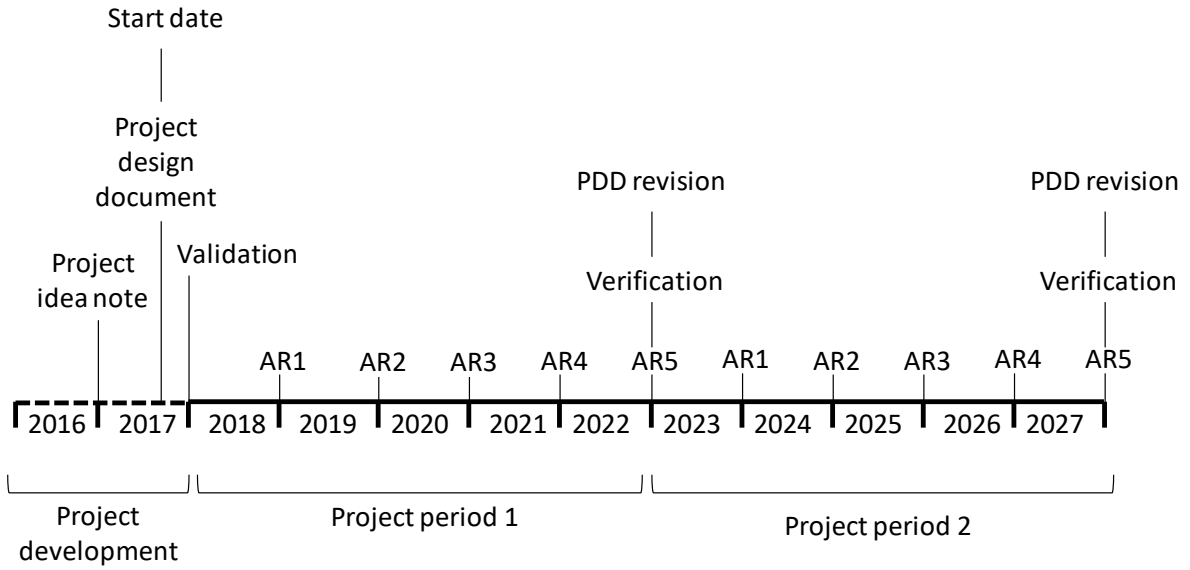

Figure 12 Project timeline. AR = Annual Report.

I.4.2 Record keeping

The project coordinator will maintain records of project documents, management plans, and reports received from project activity groups as paper copies with electronic versions stored on a hard drive and backed up on a cloud-based server. Full financial records of all project transactions will be maintained by the project coordinator and made available on request. All monitoring data, and information needed for annual reporting will be stored in a project database (see Annex 11).

I.4.3 Sales and marketing

The project coordinator will be responsible for marketing the project to potential funders, negotiating sales agreements with certificate buyers, processing sales, and recording transactions on Markit environmental registry. A full marketing plan for the project is currently under development, as described in Section I.6.

I.5 Project financial management

I.5.1 Budget and financial plan

A full financial plan has been developed for the first project period, including all costs associated with implementing activities in the management plan (see Annex 2), and the administration costs incurred by the project coordinator and technical partners. This plan will

be reviewed and updated throughout the project period. The proportion of project implementation and management costs incurred by the community groups, project coordinator and technical partners will be used to define the benefit sharing mechanism (see Section J.2.1).

The total cost includes the first year of the project, during which costs are relatively high since much of the training and equipment needed to implement project activities will be provided. There will also be no Plan Vivo certificates available during the first year of the project, since the project will seek *ex-post* certificates for emission reductions achieved at the end of each year (see Section I.4.1). Funding for the first year of project implementation will therefore be sought from a donor that does not require Plan Vivo certificates, after which finance from the sale of certificates issued at the end of the year will be used to fund the following year of project activities. Approaches that will be used to raise this finance are described in Section I.6.

I.5.2 Mechanism for disbursement of funds

All project funds from the sale of Plan Vivo certificates, or other means of finance, will be received by the project coordinator in a dedicated bank account that requires at least two signatories for all transactions. This bank account will be separate from the project coordinators organisational account and will be used solely for managing project finances.

The project coordinator will be responsible for contracting trainers, technical specialists, and verifiers as required to implement the management plan and fulfil all monitoring and reporting requirements. The project coordinator will also be responsible for purchasing equipment required for community groups to implement the activities described in the management plan and disbursing this equipment in line with the schedule described in the benefit sharing mechanism (see Section J.2.1) and Plan Vivo agreement (see Section J.1.1).

Cash payments to community groups will be made to the group's treasurer and at least two signatories from the group administrators will be required for all transactions. All amounts disbursed from group accounts will be recorded and reported to the project coordinator at quarterly meetings.

I.6 Marketing

I.6.1 Marketing plan

For the first year of project implementation, donor finance that is not linked to the issuance of Plan Vivo certificates will be sought. This will enable the project to begin operations, and to start receiving ex-post certificates at the end of the first year. The first year of the project therefore provides the project coordinator with the opportunity to identify and build

relationships with potential funders, and secure agreements to support the project. Performance-based finance for the project will be sought from three main sources:

- Sale of Plan Vivo certificates to buyers whose primary motivation is to offset their greenhouse gas emissions, and/or to make a contribution to climate change mitigation by reducing emissions from deforestation and forest degradation (REDD);
- Finance from funders whose primary motivation is to conserve biodiversity by supporting community forest management that contributes to the maintenance of habitat quantity and quality for threatened and endangered species; and
- Finance from companies whose activities have incurred a deforestation or conservation liability and that wish to support a project that will contribute to conservation of a particular area or prevent a known amount of deforestation or forest degradation, to remove this liability for example through the Round Table on Sustainable Palm Oil (RSPO) Remediation and Compensation Procedures[26].

For all types of performance-based finance, a cost-based model will be used with the aim of raising the finance needed to cover the implementation and management costs and fund contributions summarised in Section I.5.1.

A minimum certificate price will be set at the level needed to cover the costs of project implementation and management if all certificates are sold. If income is raised above implementation and management costs, any surplus generated will be transferred to a fund managed by the LPHD to be used to provide additional support to forest management groups, to contribute to village development, and to develop plans for sustainable management of NLHPT.

In addition to representing 1 tonne of CO_2 emission reduction, each Plan Vivo certificate will also be associated with sustainable management of 0.03 ha of forest habitat for one year, and prevention of 0.002 ha deforestation and 0.00001 hectares of forest degradation.

In addition to marketing Plan Vivo certificates for reduction of CO_2 emissions, the project can therefore also be marketed through the following performance-based metrics:

- Supporting sustainable management of forest habitat, based on the number of hectares protected; and
- Preventing deforestation, based on hectares of deforestation avoided.

[26] http://www.rspo.org/news-and-events/announcements/update-on-the-endorsement-of-the-rspo-remediation-and-compensation-procedures-racp

A full marketing plan for accessing finance for the project from these different sources, using the most appropriate performance-based metrics, will be developed during the first year of project implementation.

I.7 Technical support

I.7.1 Capacity development

Developing capacity of the community groups to effectively protect their forest and generate an income from sustainable forest management is a main aim of the project activities. Training needs were identified during the project development phase and required training has been incorporated into the management plan. The capacity of forest patrol and monitoring groups will be continually assessed throughout the project period, and additional training will be provided as required.

I.7.2 Ongoing technical support

The project coordinator will receive support from the technical partners (see Annex 9) throughout the first project period, to assist with validation of the project, annual reporting, verification, and updating the PDD prior to the second project period.

J. Benefit sharing

J.1 Plan Vivo agreements

J.1.1 Plan Vivo agreement procedures

A Plan Vivo agreement template was drafted during the project development phase (see Annex 4). This agreement will include details of project activities to be carried out by different activity groups, activity-based indicators that will be monitored and thresholds that must be met to receive the support described in the agreed benefit sharing mechanism (see Section J.2.1). Representatives of all project activity groups were involved in drafting this agreement template, and the agreed version has the support of the community.

J.1.2 Risks and mitigation measures

There are two main sources of risk associated with the Plan Vivo agreements: i) the risk that community groups will not meet their obligations for carrying out project activities; and ii) that the project coordinator will not be able to provide the support agreed in the benefit sharing mechanism. These risks will be mitigated through activity-based monitoring, and by securing required finance before entering into Plan Vivo agreements and tracking costs and updating financial plans and pricing strategy throughout the project period, as described below.

Activity-based indicators (see Section K.1.1) will be tracked by the project coordinator on a quarterly basis and reported each year in an annual report to the Plan Vivo Foundation. If monitoring of activity-based indicators suggests that annual thresholds will not be met, the project coordinator will provide the support needed to ensure that activities are carried out as described in the management plan.

Plan Vivo agreements will only be signed when sufficient finance has been secured. If finance for the whole project period is not available, then the period covered by the agreement will be adjusted, so that it only covers the period for which funding is available. When additional finance is secured the agreement will then be extended up to the length of the full project period. To help ensure that the finance available is sufficient to support the project activities, financial plans will be reviewed regularly and updated as required. When adjustments are made, the pricing strategy for Plan Vivo certificates and other types of support (see Section I.6.1) will be updated accordingly.

J.2 Payments and benefit sharing

J.2.1 Benefit sharing mechanism

The allocation of finance among the different parties will be different during the first year of the project implementation, where funding is not performance-based, and for subsequent years where funding will be allocated according to performance in the previous year. After the first year of project implementation, all support received by the community groups will be performance-based. A combination of training, in-kind support, and cash payments will be made to each group, based on their requirements for completing the activities in the management plan. Part of the finance raised for the project through the sale of Plan Vivo certificates, and other means of support, will also be used to cover the costs incurred by the project coordinator and technical partners. Any finance raised in addition to that required to cover project implementation and management costs will be held in a fund managed by the LPHD, with the oversight of PRCF-Indonesia, to be used to support long-term forest protection and village development activities.

The final benefit sharing mechanism will be agreed by the project coordinator and community groups at the time when Plan Vivo agreements are signed. An indicative allocation of finance and support among the different activity groups and the project coordinator for the first project period, based on the costs of project management and implementation detailed in the financial plan, is provided in Table 32. Costs allocated to the project coordinator are expected to be higher in the first period, than in subsequent periods when the proportion received by the project coordinator and paid for Plan Vivo and professional fees is expected to be below 40%.

Table 32 Approximate allocation of project implementation and management costs for the first project period

	Proportion of total cost
Community Groups	
LPHD	27%
Forest patrol group	10%
Forest honey group	1%
Rattan and bamboo group	4%
Forest rehabilitation group	8%
Ecotourism group	1%
Rubber group	1%
Environment and education group	2%
Fish group	1%
Project coordinator (including Plan Vivo and professional fees)	45%
TOTAL	**100%**

J.2.2 Performance-based payments

After the first year of project implementation, all support received by community groups will be performance-based and will be dependent upon meeting threshold values for activity-based indicators (see Section K.1.1).

Indicator values will be reported on an annual basis through submission of an annual report to the Plan Vivo Foundation (see Annex 12). If all thresholds are met, a full issuance will be requested. If indicator values fall below the thresholds for one or more activity-based indicators, the participating communities will be required to implement the identified corrective actions.

If any activity-based forest protection indicator value falls below the threshold for two or more consecutive monitoring periods, then a proportion of the certificate issuance will be withheld until it can be demonstrated that the indicator threshold has been met. The proportion withheld will be agreed between the project coordinator and the Plan Vivo Foundation and should be proportional to the level of underperformance and the likely impact this will have on climate benefits.

If any activity-based livelihood activity indicator value falls below the threshold for two or more consecutive monitoring periods, then the project coordinator will withhold a proportion of the support to that group until it can be demonstrated that the indicator threshold has been met. The proportion withheld will be agreed between the project coordinator and the LPHD and should be proportional to the level of underperformance.

K. Monitoring

K.1 Climate benefits

The project coordinator will work with participant communities to monitor the project activities that are expected to deliver climate benefits throughout the project period. At the end of each project period, a technical partner will be contracted to verify the benefits achieved by conducting an analysis of land cover change that occurred during the project period. Drivers of deforestation and forest degradation will also be monitored by forest patrol teams, as described in Section K.4.1; and leakage will be verified according to the approaches described in AA-CFREDD (Annex 7), as described in Section K.4.2.

K.1.1 Climate benefit monitoring plan

The project will employ two types of climate benefit monitoring: i) activity-based indicators that will be tracked throughout the project period to demonstrate that activities are being carried out as planned; and ii) land cover change assessment to verify climate benefits and update technical specifications at the end of each project period.

Activity-based indicators

The aim of activity-based indicators is to provide evidence that management plans are being carried out as described. Since these management plans are reviewed and determined to be appropriate to deliver the expected climate benefits; issuance of Plan Vivo certificates for the climate benefits described in Section F.1 will be requested if all activity-based indicator thresholds are met.

Indicators are described in Table 33 for each of the main activities in the management plan, including threshold values and corrective actions required if thresholds are not met.

Table 33 Activity-based indicators

Indicator	Threshold	Assessment method and means of verification	Corrective actions
1) Securing rights	In the last 12 months, progress has been made towards securing rights to management (for NLHPT) and utilization (for NLVF and NLHPT) of the project areas.	Description of progress made, and challenges encountered and copies of regulations, permits and licenses issued included in annual report.	Project coordinator to review barriers to progress and develop a plan to overcome them with the LPHD.

Indicator	Threshold	Assessment method and means of verification	Corrective actions
2) Forest management institution functioning	LPHD office has equipment and LPHD members have the necessary capacity to implement management plans; and in the last 12 months, members have met at least once a month, and reported to the project coordinator at least once every 3 months.	Quarterly equipment inventory and review of meeting reports by project coordinator.	Review membership of management institution and resume programme of monthly meetings.
3) Village regulations	Regulations on the use of forest resources are in place and are sufficient to ensure sustainable forest management, prevent deforestation and forest degradation, and conserve biodiversity.	Copy of village regulations reviewed annually by project coordinator.	Revise village regulations.
4) Boundary marking	For the NLVF, the boundary of the project areas is clearly marked in year-2 after the start of the project; for NLHPT the boundary of the project areas will be marked 20% in year-1 after the rights are secured; 40% in year-2, and 40% in year-3; sign boards with details of village regulations on use of forest resources and fire monitoring tower are in place.	Description of activities included in annual report, and annual inspection conducted by the project coordinator.	Carry out required boundary marking activities.
5) Forest patrol and monitoring	Forest patrol teams have necessary equipment and capacity to complete effective patrol and monitoring activities, and have conducted one boundary patrol, and 12 routine patrols in NLVF and 4 times in NLHPT, within the last 12 months.	Quarterly inventory of equipment, and review of patrol reports by project coordinator.	Project coordinator to provide necessary equipment, and training; Review membership of patrol groups and patrol schedule and update as required.
6) Rattan and bamboo	In the last 12 months, progress has been made in the development of rattan and bamboo management, processing and marketing activities.	Quarterly review of progress and sales records by project coordinator.	Review barriers to progress and update plans accordingly.
7) Forest honey	In the last 12 months, progress has been made in the development of forest honey enterprises and marketing.	Quarterly review of progress and sales records by project coordinator.	Review barriers to progress and update plans accordingly.
8) Ecotourism	In the last 12 months, progress has been made in the development of ecotourism facilities and program.	Quarterly progress review and annual inspection by project coordinator.	Review barriers to progress and update plans accordingly.

Indicator	Threshold	Assessment method and means of verification	Corrective actions
9) Forest rehabilitation	In the last 12 months, progress has been made in the development of nursery facilities, nursery maintenance, and implementation of planting.	Quarterly progress review and annual inspection by project coordinator.	Review barriers to progress and update plans accordingly.
10) Rubber product development	In the last 12 months, progress has been made in the development of rubber products marketing plan and marketing activities.	Quarterly progress review and annual inspection by project coordinator.	Review barriers to progress and update plans accordingly.
11) Fish product development	In the last 12 months, progress has been made in the development of fish products marketing plan and marketing activities.	Quarterly progress review and annual inspection by project coordinator	Review barriers to progress and update plans accordingly.
12) Environment and Conservation education	In the last 12 months there has been one environment and conservation awareness raising event in Nanga Lauk Village	Report on awareness raising activities included in Annual Report	Conduct awareness raising event

Verification of climate benefits

To verify climate benefits achieved during a project period and revise estimates of climate benefits expected in subsequent project periods, an assessment of land cover change in the project area and reference region during the project period will be carried out at the end of each project period, by a trained remote sensing and GIS technician. The leakage area approach will be used to verify leakage (see AA-CFREDD Section 3.3.2b; Annex 7).

The parameters that will be assessed are described in AA-CFREDD (Annex 7) and summarised in Table 34. The methods and datasets used will follow those used for the initial land cover change assessment (see Annex 1) and will be reported in a revised version of this PDD.

Table 34 Land cover change parameters assessed to verify climate benefits and update the PDD

Parameter	Approach	Frequency
Area of forest type *i*, legal classification *j* and topography class *k* in the reference region converted to non-forest during the project period ($AA_{Def_{i,j,k}}$)	Analysis of remote sensing (RS) data	Every 5 years
Area of forest type *i*, legal classification *j* and topography class *k* present within the reference region at the start of the project period ($AA_{RR_{i,j,k}}$)	Analysis of remote sensing (RS) data	Every 5 years
Area of forest type *i*, legal classification *j* and topography class *k* in the reference region converted to degraded forest during the project period ($AA_{Deg_{i,j,k}}$)	Analysis of remote sensing (RS) data	Every 5 years
Area of forest type *i*, legal classification *j* and topography class *k* within the project area that was deforested during the project period ($D_{PA_{i,j,k}}$)	Analysis of remote sensing (RS) data	Every 5 years
Area of forest type *i*, legal classification *j* and topography class *k* within the project area that was degraded during the project period ($G_{PA_{i,j,k}}$)	Analysis of remote sensing (RS) data	Every 5 years
Area of forest type *i*, legal classification *j* and topography class *k* within the leakage area that was deforested during the project period ($D_{LA_{i,j,k}}$)	Analysis of remote sensing (RS) data	Every 5 years
Area of forest type *i*, legal classification *j* and topography class *k* within the leakage area that was degraded during the project period ($G_{LA_{i,j,k}}$)	Analysis of remote sensing (RS) data	Every 5 years
Area of forest type *i*, legal classification *j* and topography class *k* present in the leakage area at the start of the project period ($A_{LA_{i,j,k}}$)	Analysis of remote sensing (RS) data	Every 5 years

K.1.2 Community involvement

Community members from the relevant activity groups will be responsible for collecting the information needed to assess activity-based indicator values and reporting these to the project coordinator. The project coordinator will compile this information and inform the community groups if any corrective actions are required to ensure that thresholds are met for the reporting period. At the end of each annual reporting period, all monitoring results will be discussed in a community meeting, and the consequences for issuance of certificates and receipt of performance-based support will be explained.

Forest patrol teams composed of community members will also be responsible for collecting and reporting information on biodiversity (see Section K.3.1), and drivers of deforestation and degradation (Section K.4.1). Participatory wellbeing assessment will also be used to verify the socio-economic benefits of the project (see Section K.2.1).

The results of the land cover change assessment completed at the end each project period will be used to revise Plan Vivo agreements for the subsequent project period. Maps showing the location of any deforestation and degradation that occurred within the project

area during the project period will be presented and discussed in a community meeting. The monitoring results, along with feedback from the activity groups, will be used to refine management plans, and update benefit sharing mechanisms and Plan Vivo agreements.

K.2 Socio-economic impacts

Socio-economic impacts of the project will be tracked with activity-based monitoring during the project period and verified with participatory wellbeing assessment at the end of each project period.

K.2.1 Socio-economic monitoring plan

The activity-based indicators described in Section K.1.1 will be used to assess whether the project is on track to achieving the expected socio-economic benefits. Since the management plans are reviewed and determined to be appropriate to deliver the expected socio-economic benefits described in Section F.2.1, it can be assumed that if all activity-based indicator targets are met then the project is on track to delivering the expected socio-economic benefits.

In addition to the annual reporting of activity-based indicators, each year the project coordinator will conduct a participatory well-being assessment with a stratified random sample of 65 households. The same households will be assessed each year to determine the proportion of households whose well-being has improved or declined.

The indicators and levels that will be used to assess wellbeing were identified by members of the participant community and are described in Table 35. Initial values (High, Medium or Low) will be recorded for each indicator prior to the start of the project, and the same households will be revisited at the end of each year to determine whether the level for each indicator has improved, remained constant or declined. The results from this survey will be presented in a village meeting and discussed in focus groups to determine any linkages between the patterns observed and the project activities, and whether there is evidence for improved wellbeing during the project period. The results from the survey, and focus group discussions, will be presented in the annual report submitted to the Plan Vivo Foundation, and used to revise the management plans if appropriate.

Table 35 Socio-economic indicators assessed at the end of each project period

Indicator	Level		
	High	Medium	Low
1) House quality	Large house (at least 12 x 6 m^2), constructed with high quality timber walls (*kawi, belian, cerinak, tekam, bengkirai*), tile floors, and coated metal roof.	Medium sized house (approx 5 x 10 m^2), constructed with medium quality timber (*meranti, kelansau*) walls and floors, and metal (Apollo brand) roof.	Small house (4 x 8 m^2 or less, constructed with low quality timber (*kayu pantai, busuk bujang, tebedak*) walls and floors, and metal (Gajah brand) roof.
2) Means of transportation	Boat engine 40 horse power or greater, and/or more than 1 motorbike	Boat engine, and at least 1 motorbike	No boat engine or motorbike
3) Land assets	More than two hectares each of rubber gardens, and fallow land	Around 1 hectare each of rubber garden, and fallow land	Less than 1 hectare of rubber garden and no fallow land
4) Fishing equipment	A complete set of fishing equipment including one or more *Jermal, Temilar, Pukat,* and *Rabai*	*Pukat*	*Pancing*
5) Source of income	Two or more of the following sources of income: Large grocery shop; Fish catch >5kg per month; 2 or more fish cages, >1000 *tikung*, >5000 rubber trees.	Two or more of the following sources of income: Small grocery shop; Fish catch >2.5kg per month; 1 fish cage; >300 *tikung*; >1000 rubber trees.	One or more of the following sources of income: Fish catch <2.5kg per month; <300 *tikung*; <1000 rubber trees.
6) Education	Children educated outside West Kalimantan Province	Children educated within West Kalimantan Province	Children educated in Nanga Lauk Village
7) Household appliances	Household has all of the following: 5000 watts, Generator, TV, Refrigerator	Household has one or more of the following: Generator, TV, Refrigerator	No Generator, TV or Refrigerator
8) Savings	More than 30 grams of jewelry and/or more than IDR 5 million in bank account	More than 1 gram of jewelry and/or more than IDR 1 million in bank account	No jewelry or cash savings

K.3 Biodiversity and ecosystem service impacts

Biodiversity and ecosystem service impacts are linked to the maintenance of forest cover and habitat quality by preventing deforestation and forest degradation. The approaches used to estimate and verify climate benefits therefore provide a good proxy for benefits to

biodiversity and other ecosystem services. Additional monitoring of high conservation value species, and threats to biodiversity will also be carried out by forest patrol teams.

K.3.1 Biodiversity and ecosystem service monitoring plan

The biodiversity and ecosystem service benefits of the project are expected to result from prevention of deforestation and forest degradation that would reduce the amount and quality of forest habitat available for the species identified in Section B.2.2 and disrupt a broad range of ecosystem services. The activity-based indicators described in Section K.1.1 will be used to determine whether the project is on track to achieving these benefits. Since the management plans are reviewed and determined to be appropriate to deliver the expected biodiversity and ecosystem service benefits described in Section F.3.1, it can be assumed that if all activity-based indicator targets are met, then the project is on track to delivering the expected biodiversity and ecosystem service benefits.

Furthermore, the verification of deforestation and degradation avoided during the project period as described in Section K.1.1 will serve to demonstrate the maintenance of forest habitats and ecosystems, as well as carbon stocks, and therefore provides a means to verify benefits to biodiversity and ecosystem services as well as greenhouse gas emission reductions.

In addition to annual reporting of activity-based indicators, and the verification of deforestation and forest degradation prevented at the end of each project period, forest patrol teams will also record signs and sightings of high conservation value species, and threats to biodiversity they encounter during their patrols. The indicators that will be recorded will be finalised during the training of forest patrol and monitoring teams but are likely to include some or all of the indicators in Table 36. Patrol teams will also record the track followed during patrols using GPS, and the time spent patrolling, and distance covered. All encounters will be recorded in patrol team reports which will be assessed every 3 months by the project coordinator. The results of biodiversity and threat monitoring by forest patrol teams will be used to inform the revision of project activities if appropriate and will be summarised in annual reports to the Plan Vivo Foundation (see Annex 12).

Table 36 Biodiversity indicators assessed by forest patrol teams

Indicator	Details recorded	Approach	Frequency
Encounters with priority species*	Location of observation (coordinates), distance from observer, type of observation (seen/heard), sex and reproductive status (if known), confidence in identification	Recorded by patrol teams	Reported to project coordinator every 3 months
Signs of priority species*	Location (coordinates), type of sign (spoor/scat/other), confidence in identification	Recorded by patrol teams	Reported to project coordinator every 3 months
Unsanctioned animal traps located and removed	Location (coordinates), type of trap	Recorded by patrol teams	Reported to project coordinator every 3 months
Other threats to biodiversity	Location (coordinates), type (e.g. unsustainable fishing practices, or signs of unsanctioned hunting such as gunshots heard)	Recorded by patrol teams	Reported to project coordinator every 3 months

* Priority species will be determined prior to the initiation of forest patrol and monitoring activities and will include keystone species (expected to be indicators for a broader range of species), species significant to international conservation efforts, and species of local interest.

K.4 Other monitoring

In addition to the monitoring of climate, socio-economic, biodiversity and ecosystem service benefits described in Section K.1, K.2 and K.3, the project will also carry out monitoring of drivers of deforestation and forest degradation throughout the project period, to enable the project coordinator and participating communities to respond to any threats identified.

K.4.1 Drivers of deforestation and forest degradation

Evidence of drivers of deforestation and forest degradation active within the project area will be recorded during forest patrol activities and reported to the project coordinator by the forest patrol teams. Evidence collected will include photographs, location data, and area estimates if appropriate. This evidence will be reviewed every three months, and project activities will be revised if necessary. The indicators that will be tracked will be finalised during the training of forest patrol and monitoring teams but are likely to include some or all of the indicators in Table 37.

Table 37 Deforestation and forest degradation indicators assessed by forest patrol teams

Indicator	Details recorded	Approach	Frequency
Unsanctioned opening of fields	Location, area of forest cleared (measured or estimated), reason for clearance (e.g. agriculture/road building), responsible party (if known)	Recorded by forest patrol teams	Reported to project coordinator every 3 months
Unsanctioned trees felled	Location, approximate date felled (if known), species (if possible), reason for felling (e.g. timber), responsible party (if known)	Recorded by forest patrol teams	Reported to project coordinator every 3 months
Area affected by forest fire	Location, area affected (measured or estimated), cause of fire (natural or human), reason for fire (if known), severity of damage, responsible party (if applicable and known)	Recorded by forest patrol teams	Reported to project coordinator every 3 months

Annexes

The following annexes are provided as separate files.

Annex 1 – Land cover change assessment

Annex 2 – Management plan

Annex 3 – Evidence of community participation

Annex 4 – Draft Plan Vivo agreement

Annex 5 – Training curricula

Annex 6 – GIS data

Annex 7 – Approved approach

Annex 8 – Technical specification calculations

Annex 9 – Key people

Annex 10 – Permits and legal documentation

Annex 11 –Database template

Annex 12 – Annual report template