THE MAYAS PROJECT

Project title	The Mayas Project
Project ID	3591
Crediting period	01-January-2019 to 9-June-2053
Project lifetime	Project activities will initially be implemented between 01-January-2019 and 9-June-2053 (34.44-year first crediting period), thereafter a 60-year licence extension will be sought to extend the project to 31-December-2103 (94-year project lifetime).
(CCB) GHG accounting period	Changes in GHG emission reductions and/or carbon dioxide removals resulting from project activities will be monitored between 01-January-2019 and 9-June-2053; 34.44-year lifetime (first crediting period)
Original date of issue	First submitted for pipeline listing on 20-July-2022 Submitted for validation on 04-December-2024.
Most recent date of issue	04-December-2024
Version	1.0
VCS Standard version	4.7
CCB Standards version	3.1
Project location	Ketapang District West Kalimantan Province, Indonesia
Project proponent(s)	PT Mohairson Pawan Khatulistiwa Jl. Papandayan No. 11A, Bogor, Jawa Barat, 16128, Indonesia Wim Ikbal, Director, wimikbal@ptmpk.com, +62-251-8367221
Validation/verification body	SCS Global Services, Christie Pollet-Young, cpollet-young@scsglobalservices.com, +1-510-452-8000
History of CCB status	N/A

Gold Level criteria	**Climate Change Adaptation Benefit**. The project will support communities to adapt to climate change by support for climate resilient agroforestry practices; adjustment of agricultural calendars, crop patterns and planting practices; diversification of sustainable livelihood options; watershed protection; fire prevention; integrated natural disaster management and prevention systems (e.g., early warning systems, monitoring protocols, and improved techniques and technologies). **Exceptional Community Benefits.** With the average income between 2.5 and 3 million IDR per household (464,684 – 557,620 IDR per capita), an average household size of 5.38 and a national poverty threshold of 582,932 IDR per capita most households in the project zone fall below the regional poverty level. Thus, the project zone qualifies as a rural area in which more than 50% of households live under the national poverty line. The project will positively affect the wellbeing of up to 30,000 people living around the project area. **Exceptional Biodiversity Benefits.** The project fulfils criteria for both vulnerability and irreplaceability. The project area supports between 1.5 and 2.3% of global population of the Critically Endangered Bornean Orangutan population, in addition to 23 other Critically Endangered, Endangered or Vulnerable species. All are likely to become locally extinct without the project's intervention. Monitoring will demonstrate that threatened species continue to persist in the project area and measures will be taken to enhance populations where possible.
Expected verification schedule	Q4-2024
Prepared by	PT Mohairson Pawan Khatulisiwa (MPK)

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1 SUMMARY OF PROJECT BENEFITS

1.1 Unique Project Benefits

Outcome or impact estimated by the end of project lifetime	Section reference
1) Climate: The project will protect and restore a unique 33,747 hectare area of peat swamp forest resulting in the avoided emissions of over 84,236,212 tCO2e over the initial crediting period.	3
2) Community: The project will generate net positive livelihood and well-being benefits for communities living around the project area, reaching up to 30,000 people living in 12 village communities.	4
3) Biodiversity: The project will protect and enhance the globally important biodiversity existing in the project area, including up to 2.3% of the global population of the Critically Endangered Bornean Orangutan.	5

1.2 Standardized Benefit Metrics

Category	Metric	Estimated by the end of project lifetime	Section reference
GHG emission reductions or carbon dioxide removals	Net estimated removals in the project area, measured against the without-project scenario	N/A	N/A
	Net estimated reductions in the project area, measured against the without-project scenario	84,236,212 tCO2e	3.2.4
Forest cover	For REDD projects: Estimated number of hectares of reduced forest loss in the project area measured against the without-project scenario	32,026 ha	3.2.1.1
	For ARR projects: Estimated number of hectares of forest cover increased in the project area measured against the without-project scenario	N/a	N/A
Improved land management	Number of hectares of existing production forest land in which IFM practices are expected to occur as a result of project	N/A	N/A

	activities, measured against the without-project scenario		
	Number of hectares of non-forest land in which improved land management practices are expected to occur as a result of project activities, measured against the without-project scenario	1,721 ha	3.2.1.1
Training	Total number of community members who are expected to have improved skills and/or knowledge resulting from training provided as part of project activities	5,000	4.1.4
	Number of female community members who are expected to have improved skills and/or knowledge resulting from training as part of project activities	2,500	4.1.4
Employment	Total number of people expected to be employed in project activities, expressed as number of full-time employees	100	4.1.4
	Number of women expected to be employed as a result of project activities, expressed as number of full-time employees	50	4.1.4
Livelihoods	Total number of people expected to have improved livelihoods or income generated as a result of project activities	5,000	4.1.4
	Number of women expected to have improved livelihoods or income generated as a result of project activities	2,500	4.1.4
Health	Total number of people for whom health services are expected to improve as a result of project activities, measured against the without-project scenario	Health service improvement has not been identified as an initial focus for project activities, but it may be introduced at a later date	N/A

	Number of women for whom health services are expected to improve as a result of project activities, measured against the without-project scenario	As above	N/A
Education	Total number of people for whom access to, or quality of, education is expected to improve as result of project activities, measured against the without-project scenario	500	4.1.4
	Number of women and girls for whom access to, or quality of, education is expected to improve as result of project activities, measured against the without-project scenario	250	4.1.4
Water	Total number of people who are expected to experience increased water quality and/or improved access to drinking water as a result of project activities, measured against the without-project scenario	220	4.1.4
	Number of women who are expected to experience increased water quality and/or improved access to drinking water as a result of project activities, measured against the without-project scenario	110	4.1.4
Well-being	Total number of community members whose well-being is expected to improve as a result of project activities	30,000	4.1.4
	Number of women whose well-being is expected to improve as a result of project activities	15,000	4.1.4
Biodiversity conservation	Expected change in the number of hectares managed significantly better by the project for biodiversity conservation, measured against the without-project scenario	33,747 ha	5.1.4
	Expected number of globally Critically Endangered or Endangered species benefiting from reduced threats as a result of project activities, measured against the without-project scenario	9	5.1

2 PROJECT DETAILS

2.1 Project Goals, Design and Long-Term Viability

2.1.1 Summary Description of the Project (VCS, 3.2, 3.6, 3.10, 3.11, 3.13, 3.14; CCB, G1.2)

The Mayas Project aims to protect and restore a 33,747 hectare area of peat swamp forest in Ketapang District, West Kalimantan Province, Republic of Indonesia. The Mayas project avoids GHG emissions from planned logging and conversion activities, while protecting forest from illegal logging, forest encroachment, forest and land fires and opening of canals or ditches. In addition, degraded areas will be restored through planting and canal blocking).

At the time of the project's intervention the area was in the process of being drained, selectively logged and partially converted to industrial tree plantation by the concession license-holding company PT. Mohairson Pawan Khatulistiwa (MPK) in line with a government approved management plan. This would have resulted in greenhouse gas (GHG) emissions averaging 2,406,748 tCO2-e per year (84,236,212 tCO2e over the project lifetime), irreversible loss of globally important biodiversity and a negative impact on the livelihoods and wellbeing of people living around the project area. This imminent threat received global media attention.

In 2017, Yayasan Inisiasi Alam Rehabilitasi Indonesia (YIARI), a non-profit organization based in the region and working to protect the area, began discussions with MPK, leading to an agreement in late 2018 to transfer the ownership of the company to a new investor. Under a new management MPK is now wholly committed to the long-term protection and restoration of the project area, with the full support of the Indonesian Government.

MPK will fully protect the remaining peat forest areas (now renamed as The Mayas Project) and restore those areas already affected by fire, land clearance and drainage. In parallel the Mayas Project will work in close collaboration with the communities surrounding the area to ensure benefits derived from the project area (no permanent settlements exist within the project area) are used to improve rural livelihoods and wellbeing and to develop greater resilience to climate change. The project will also protect the globally important biodiversity of the project area, including a population of Critically Endangered Bornean Orangutan estimated to be between 813 and 1,204 (around 2% of the global population) and significant populations of at least eight other critically endangered or endangered species.

The project is not located within a jurisdiction covered by a jurisdictional REDD+ program.

2.1.2 Audit History (VCS, 4.1)

Audit type	Period	Program	Validation/verification body name	Number of years
Validation	01-Jan-2019 to 09-Jun-2053	CCB VCS	SCS Global Services	34
Verification	01-Jan-2019 to 31-Dec-2023	CCB VCS	SCS Global Services	5

2.1.3 Sectoral Scope and Project Type (VCS, 3.2)

Sectoral scope	Agriculture, Forestry, and Other Land Use (AFOLU)
AFOLU project category	Reducing Emission from Deforestation and Degradation (REDD) Wetland Restoration and Conservation (WRC)
Project activity type	Combination of following Activity Type: • Avoiding Planned Deforestation • Conservation of Intact Wetlands • Restoring Wetland Ecosystem Project activity type was defined according to a decision tree located in the VM007

2.1.4 Project Eligibility (VCS, 3.1, 3.6, 3.8, 3.18, 4.1; CCB Program Rules, 4.2.4, 4.6.4)

The project meets all applicable rules and requirements set out under the VCS and CCB Programs.

The project was opened for public comment on XX-DATE-XXXX. The project's validation statement was submitted on XX-DATE-XXXX, within the one-year time limit.

To date the project has met all requirements to relevant deadlines. The project was submitted for pipeline listing on 20-Jul-2022. It was granted a first extension to its validation deadline on 26-Dec-2023 and a second on 23-Feb-2024, the latter requiring that it be submitted 'under validation' by 31-Dec-2025.

At the time of submission to undergo validation, all applied methodologies and tools were eligible under the VCS Program (See Section 3.1.1).

2.1.5 Transfer Project Eligibility (VCS, 3.23, Appendix 2)

Not applicable

2.1.6 Project Design (VCS, 3.6)

The project is in a single location. It is not a Grouped Project

2.1.7 Project Proponent (VCS, 3.7; CCB, G1.1)

Organization name	PT Mohairson Pawan Khatulistiwa
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Title	Director
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Telephone	+62-251-8367221
Email	wimikbal@ptmpk.com

2.1.8 Other Entities Involved in the Project

Organization name	Yayasan Inisiasi Alam Rehabilitasi Indonesia (YIARI)
Role in the project	YIARI is a non-profit foundation with expertise in wildlife protection, biodiversity conservation and implementing sustainable community-led conservation strategies in the same region as the Mayas Project. In 2009 YIARI established the first rescue centre for orangutans in Ketapang, West Borneo. For more than ten years, YIARI has been working alongside communities and other local actors to raise awareness of the importance of natural ecosystems and for the preservation of natural ecosystems, particularly forest and swamp forest ecosystems home to orangutan and other endangered and critically endangered wildlife. YIARI will provide services to the Mayas Project including; community development and consultation, and communities facilitation for forest protection, and biodiversity conservation consultancy.
Contact person	Dr Karmele Llano Sanchez
Title	CEO
Address	Jl. Curug Nangka, Bogor, Jawa Barat, 16610, Indonesia
Telephone	+62-251-8417712
Email	karmele@yiari.or.id

Organization name	PT Karbon Natura Indonesia (KNI)
Role in the project	KNI is an Indonesian company engaged in the implementation of sustainable and responsible natural resource management practices for the benefit of climate change, biodiversity and people. KNI has been involved with the Mayas Project since its inception, and provides technical assistance focusing on carbon accounting, MRV, hydrological restoration & revegetation
Contact person	Irwansyah Reza Lubis
Title	Director
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Telephone	+62-21-2550 2654
Email	info@karbonatura.com

2.1.9 Project Ownership (VCS, 3.2, 3.7, 3.10; CCB, G5.8)

MPK holds legal license to the entire project area through Decree of the Minister of Forestry Number: SK216/Menhut-II/2008 (See Section 2.5.8). A copy of this license is available to auditors on request. This license, together with prevailing legislation, grants MPK the right to generate and sell carbon credits and to implement all planned project activities. This corresponds to 'Project ownership arising or granted under statute, regulation or decree by a competent authority' as per VCS Standard 4.7.

2.1.10 Project Start Date (VCS, 3.8)

Project start date	01-January-2019
Justification	After a series of actions and negotiations, on 4th December 2018 MPK signed a binding agreement with new investors. This led to the immediate cessation of the logging, conversion and drainage plans of the company under its previous owners, and so is the effective date on which the project implemented activities which led to generation of GHG emission and reductions or removals. As would be expected for a project that seeks to avoid planned deforestation, these activities were by their nature legal, political and financial. For ease of carbon accounting, and to avoid the small partial calendar year treatment in

	2018, the start date was conservatively taken as being 1st January 2019.

2.1.11 Benefits Assessment and Project Crediting Period (VCS, 3.9; CCB, G1.9)

Crediting period	The project crediting period runs from the project start date on 1st January 2019 until 9th June 2053 (34.44 years). This crediting period corresponds to the remaining term of the initial licence held by MPK. This period also corresponds to the period over which changes in climate change adaptive capacity and resilience, biodiversity and community well-being resulting from project activities are monitored. Prior to the end of this licence term, MPK will seek a licence term extension to extend the project activities and crediting period as allowed in Ministry of Forestry regulation for a further 60 year period
Start date of first or fixed crediting period	01-January-2019 to 09-June-2053
CCB benefits assessment period	As above

2.1.12 Differences in Assessment/Project Crediting Periods (CCB, G1.9)

Not applicable (no differences)

2.1.13 Project Scale and Estimated Reductions or Removals (VCS, 3.10)

☐ < 300,000 tCO_2e/year (project)

☒ ≥ 300,000 tCO_2e/year (large project)

Estimated annual GHG emission reductions/carbon dioxide removals (ERRs) of the project are 2,406,748. tCO_2e (before Buffer). This corresponds to a 'Large Project'. The predicted annual breakdown is shown below

Calendar year of crediting period	Estimated reductions or removals (tCO_2e) before buffer
01-January-2019 to 31-December-2019	2,152,402
01-January-2020 to 31-December-2020	2,468,549
01-January-2021 to 31-December-2021	2,567,481

Calendar year of crediting period	Estimated reductions or removals (tCO_2e) before buffer
01-January-2022 to 31-December-2022	3,064,776
01-January-2023 to 31-December-2023	2,417,242
01-January-2024 to 31-December-2024	2,114,024
01-January-2025 to 31-December-2025	2,167,092
01-January-2026 to 31-December-2026	2,179,773
01-January-2027 to 31-December-2027	2,236,798
01-January-2028 to 31-December-2028	2,316,346
01-January-2029 to 31-December-2029	2,308,344
01-January-2030 to 31-December-2030	2,308,098
01-January-2031 to 31-December-2031	2,329,651
01-January-2032 to 31-December-2032	2,372,398
01-January-2033 to 31-December-2033	2,397,740
01-January-2034 to 31-December-2034	2,398,474
01-January-2035 to 31-December-2035	2,411,207
01-January-2036 to 31-December-2036	2,424,407
01-January-2037 to 31-December-2037	2,433,651
01-January-2038 to 31-December-2038	2,435,221
01-January-2039 to 31-December-2039	2,468,460
01-January-2040 to 31-December-2040	2,504,278
01-January-2041 to 31-December-2041	2,554,308
01-January-2042 to 31-December-2042	2,552,565
01-January-2043 to 31-December-2043	2,550,253

Calendar year of crediting period	Estimated reductions or removals (tCO_2e) before buffer
01-January-2044 to 31-December-2044	2,556,336
01-January-2045 to 31-December-2045	2,569,920
01-January-2046 to 31-December-2046	2,566,895
01-January-2047 to 31-December-2047	2,571,284
01-January-2048 to 31-December-2048	2,578,570
01-January-2049 to 31-December-2049	2,576,556
01-January-2050 to 31-December-2050	2,565,869
01-January-2051 to 31-December-2051	2,555,161
01-January-2052 to 31-December-2052	2,523,271
01-January-2053 to 09-June-2053 (prorated)	1,038,812
Total estimated ERRs during the first crediting period	84,236,212
Total number of years	34 years
Average annual ERRs	2,406,748

2.1.14 Physical Parameters (CCB, G1.3)

2.1.14.1 Topography

The project area lies within a tropical coastal peatland with a low and flat topography. Based on available data the highest elevation of the peat dome, located in the eastern portion of the project area, is approximately 14 meters above mean sea level, while in a few isolated hills the elevation rises to a maximum of 83 meters above mean sea level (Figure 1). The area is generally level with the majority of slopes within the peatland not exceeding 0.6%. The greatest slopes reach around 7% on the hill patches as shown in Figure 1.

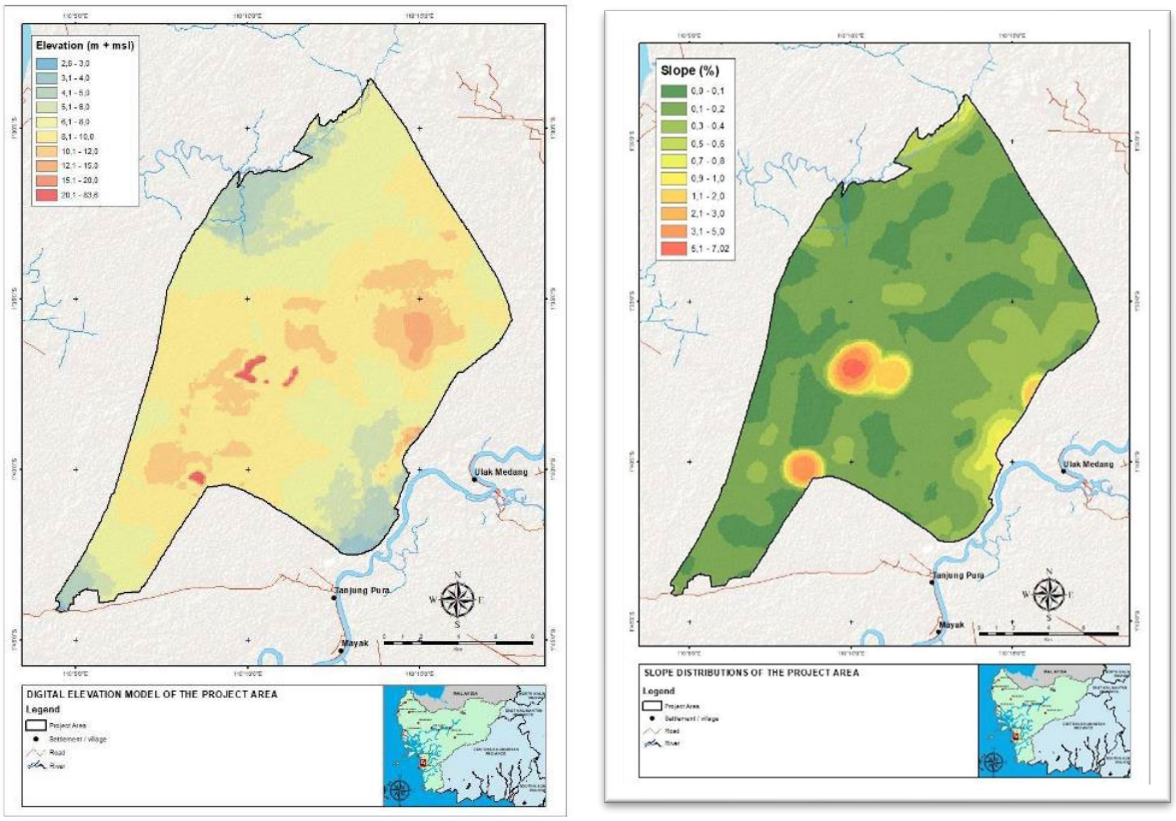


Figure 1. Digital Elevation Model of the project area (left) and slope distributions of the project area (right)

2.1.14.2 Soil Types

Based on data from the Regional Physical Planning Program for Transmigration (RePPProT) and direct surveys (see Annex 1 and Annex 2 of the Annexes), the project area is dominated by peat soils (about 32,729 hectares; 96%). Non-peat soils are concentrated near rivers and hill areas. Further details about peat soil distribution are given in Section 3.2.1.2.

2.1.14.3 Climate

The Project Area lies within the equatorial weather region of West Kalimantan, dominated by two rainfall peaks in April and December and a dry season typically between July and September. Based on data from Rahadi Oesman Meteorological Station in Ketapang (15 km from the project boundary; Figure 2) collected between 1987-2019, average annual rainfall is 3,476 mm/year. The lowest average monthly rainfall can be found in August (128 mm) and the highest is December (518 mm). Monthly average air temperature is relatively stable at around 27°C, while relative humidity averages around 85%. The timing and severity of the wet and dry season can also be affected by the El Niño Southern Oscillation (ENSO) or other climate variability, such as the Indian Ocean Dipole (IOD). El Niño events can cause decreased rainfall, while La-Nina or IOD events can cause the opposite effect.

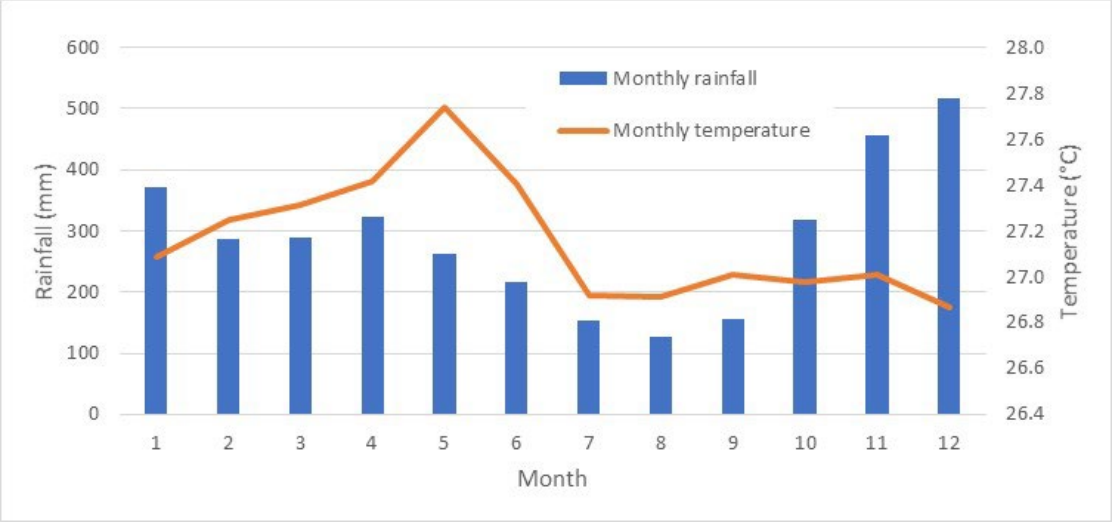


Figure 2. Average monthly rainfall and temperature for 1987-2019 period (source: Rahadi Osman Station, Ketapang)

2.1.14.4 Hydrology

The project area forms its own hydrological unit, comprised of numerous catchments draining to the Tulak and Pawan rivers, and numerous creeks to the Sukadana coastline. Water balance in the area is typical of tropical peat swamp forest, where 50-60% of annual rainfall is lost to evapotranspiration while 35-45% is lost through saturation-excess overland flow during the wet seasons. The balance of the water input (around 1-5%) is attributed to loss through groundwater flow and a proportion to refill and maintain aquifer storage.

Typical tropical peat swamp forest, like the project area, is characterized by a shallow water table depth, with a yearly average around 20cm below soil surface. In dry seasons, when evapotranspiration exceeds rainfall, the water table depth may drop by 50-80cm below the soil surface, while in wet seasons, soil pores are quickly filled to saturation and saturation-excess flood and overland flow takes place.

2.1.14.5 Vegetation and land use

The project area lies within a tropical peat forest ecosystem. At the project start date in 2019, it is estimated that 94.9% of the project area (32,026 hectare) was identified as forest. Meanwhile, the remaining 5.1% of the project area (1,721 hectare) was non-forest swampland (Figure 3, 4 & 5, see also Table 18).

A forest inventory conducted in 2020 confirmed that the peat swamp forest is composed of mixed tree and non-tree species. The tree species composition reflects the high vegetation diversity of peat-swamp forest with at least 104 tree species from 42 families found within the project area. Common species found in peat swamp forest including perepat darat (*Combretocarpus rotundatus*), jelutong (*Dyera polyphylla*), punak (*Tertamerista glabra*), malam-malam/kayu hitam (*Diospyros sp.*), resak (*Vatica spp.*), meranti rawa (Shorea sp.), balangeran (*Shorea balangeran*),

nyatoh (*Palaquium spp.*), kempas/benggeris (*Kompassia malaccensis*), and gemor (*Alseodaphne coriácea*). The complete list of tree species found in the project area is presented in Appendix 1.

Lianas, palms, herbaceous vegetation, and other non-tree species grow abundantly on the forest floor (Figure 5). Commonly occurring palm species include asam payo (*Eloidoxa conferta*), palem merah (*Cyrtoctachys lakka*), and rattan (*Calamus sp., Khortalsia sp.*). Other herbaceous plants and sedges found in the project area peat forest are *Rhapidophora spp.*, *Cryptocoryne spp.*, *Liparis spp.*, *Freycinetia spp.*, *Thoracostachyum spp.* and *Schleria spp*.

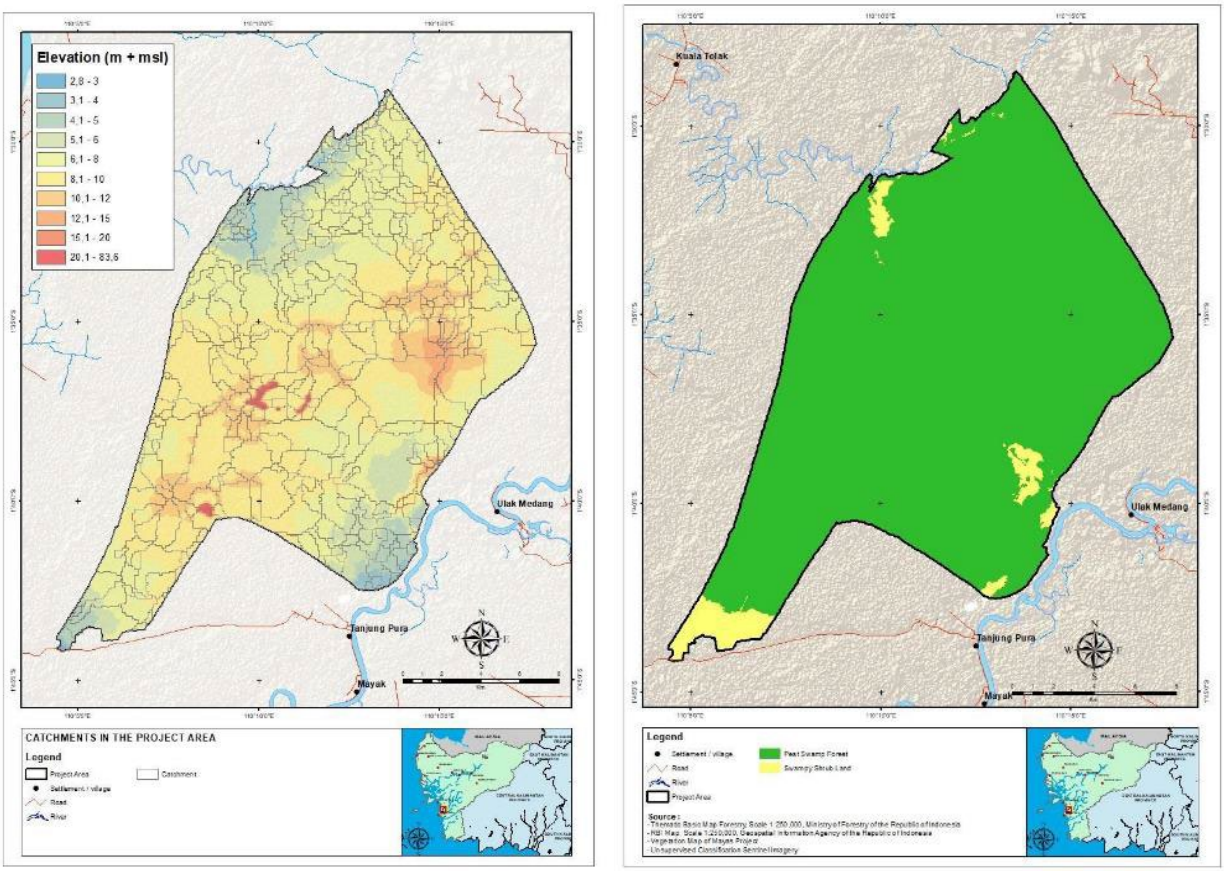


Figure 3. Catchments in the project area (left), Main vegetation types within the project area (right)

Within the non-forest proportion of the project area (4.3%; Figure 3 & Figure 5) vegetation cover is dominated by ferns, and shrub species. Common fern species observed in field are Swordferns (*Nephrelopsis spp.*), Climbing Fern (*Stenochlaena palustris*), *Pteridium spp.*, and *Glechnium spp*. Sedges and grass species such as *Scleria purpurescens*, *Hymenachne acutiguma*, and Cogongrass (*Imperata cylindrical*) are also found abundantly. Amid the dominance of fern and sedge species, some woody species are growing including Paperbarks (*Melaleuca sp.*), tumih (*Combretocarpus rotundatus*), *Tetractomia tetranda*, gerunggang (*Cratoxylon arborescens*), and *Trema orientalis*. These are characterized as pioneer tree species which can grow quickly after disturbances to the naturally-occurring vegetation (e.g., fire).



Figure 4. Peat swamp forest dominating the project area (left), Condition of the understory vegetation in the project area peat forest (right)



Figure 5. Transition of forest and non-forest in the project area (left); vegetation condition of non-forest in the project area (right)

2.1.15 Social Parameters (VCS, 3.18; CCB, G1.3)

Within the project area there are no permanent settlements. Surrounding the project area, with adjoining administrative boundaries, are 12 village communities supporting a population of 30,000 people (see

Table 46, Section 4). These village communities define the Project Zone.

The 12 villages vary significantly in size from the smallest (Ulak Medang) of 667 people, to the largest (Kuala Tolak) of 4,280. Most villages are comprised of simple houses built from timber, brick and corrugated iron. Livelihood activities of communities within the Project Zone – for both subsistence and income generation – are highly dependent on natural resources. The most important natural resource-dependent livelihoods activities, both for subsistence and income generation, are:

- Agriculture (mainly rice and vegetables)
- Fishing and aquaculture (including added value processing of fish products)

- Non-timber forest product collection (also for medicinal and cultural purposes)
- Hunting for subsistence and trade
- Logging for subsistence and income generation

The 12 villages in the project zone were established between 16 and approximately 100 years ago (Kuala Satong, Tanjung Pura respectively). The great majority (>99%) of villagers belong to the Melayu ethnic group and are all majority Muslim (>99%) with a small minority of Christians and Confucius followers (<1%). While Indonesia has not formally adopted the term 'Indigenous Peoples' pursuant to the United Nations Declaration on Indigenous Peoples (UNDrIP), these villages would likely be considered Indigenous Peoples under international law. Villages are often divided into sub-villages or hamlets (*Dusun*), for example Sukamaju is divided into Dusun Teratai, Dusun Bujang Garang and Dusun Kalimantang. Children have access to primary and secondary education and literacy levels among the younger generations are high (80-90%). About 1-2% of teenage girls drop out of school because of unplanned pregnancies. Access to healthcare is possible but is limited by the cost of treatments. For a detailed description of the socio-economic conditions within the project zone please refer to Section 4.1.1.

2.1.16 Project Zone Map and Project Location (VCS, 3.11, 3.18; CCB, G1.4-7, G1.13, CM1.2, B1.2)

The project is located in the sub-districts of Muara Pawan and Matan Hilir Utara, Ketapang district, West Kalimantan Province, Republic of Indonesia (110°02'30" - 110°15'20" East, 1°35'30" - 1°48'00" South). See Figure 6.

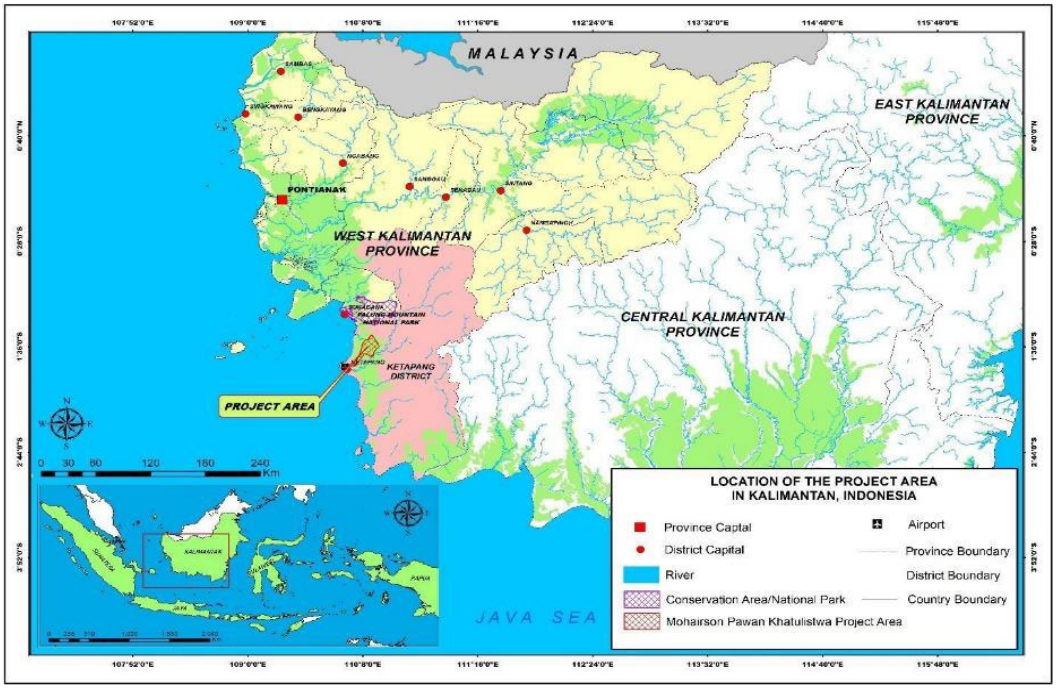


Figure 6. Location of the project within Ketapang District of West Kalimantan Province, Indonesia

The Project Zone for the Mayas Project covers 132,061 hectares, including the project area, as shown in Figure 7. This represents the area in which project activities will be conducted and includes all village communities identified as stakeholders (see Section 2.1.8 below). A map showing identified High Conservation Value (HCV) areas is also included Figure 7. Refer to Sections 5.1.2and 5.1.3 for further details on the identification of HCV areas.

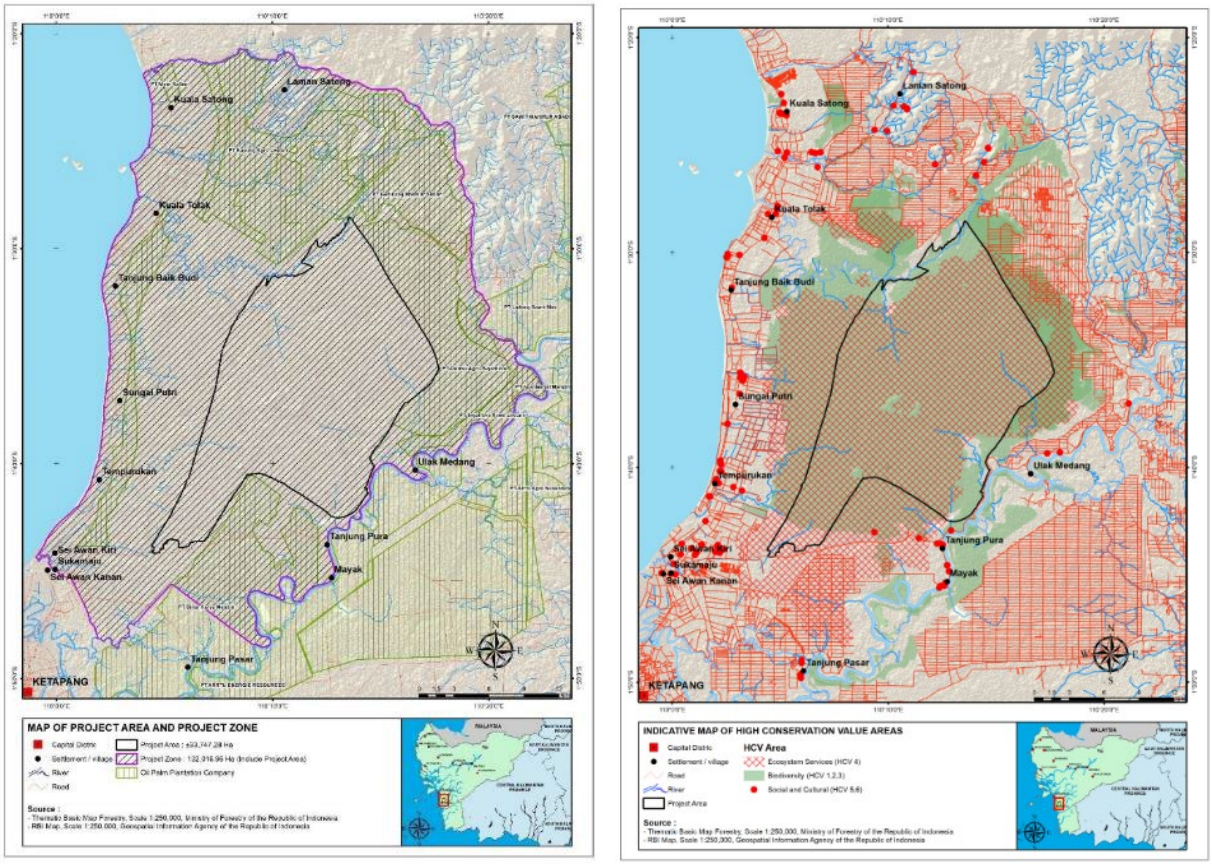


Figure 7. Map of Project Zone, Project Area with surrounding villages and plantations (left), HCV areas (right, refer to Sections 5.1.2 for more details)

2.1.17 Project Activities and Theory of Change (VCS, 3.6; CCB, G1.8)

The Mayas Project has developed a strategic plan to achieve its core objective of establishing a long-term sustainable landscape management model that ensures forest, biodiversity and climate are protected and appropriately managed through carbon finance, while silvicultural systems in already cleared areas of the concession and other livelihoods strategies provide local communities with meaningful opportunities to improve their wellbeing. This strategic plan, showing project objectives, activities, outcomes and performance indicators is shown in full as Appendix 2. Key activities are summarized here.

Goal 1: Design and implement a forestry management scheme that protects forest and biodiversity

Outcomes of Goal 1: Forest and biodiversity are maintained in MPK concession; Landscape conservation (forest, peat and biodiversity) and environmental management are improved

1.1. Reduce threats to habitat and biodiversity

- Conduct education and socialisation at village levels about illegal forest activities; Engage community participation through Conservation in Religion and other approaches.
- Establish forest protection patrols; Conduct forest patrols for data collection and reporting on illegal activities; Collect data on actors, routes, access
- Conduct assessments and investigations into illegal logging and illegal hunting practices with a focus on large traders

1.2. Develop and implement an Integrated Fire Management (IFM) strategy

- Prevention: Develop an IFM system and a Fire Prevention Plan; engagement with local communities; engagement with neighbouring companies
- Detection and suppression: Establish forest fire patrols; Conduct training and capacity building for staff in forest fire management; Develop systems for rapid fire detection and weather prediction; Develop SOP's for detection, suppression and recovery
- Promote protection of peatlands and good forestry management practices at the government level as one way to combat climate change.

1.3. Enhance the protection and restoration of peatlands

- Hydrology assessments: Conduct assessment of water table; buffer zones
- Identification and design of strategies. Re-wetting and water management by canal blocking and other water management strategies; Conduct mapping of canals; Construction and maintenance of hydrology infrastructure.
- Restoration/revegetation: Mapping and identification of suitable areas (e.g. burnt areas); Forest rehabilitation and reforestation via nursery-derived planting
- Identify all anthropogenic aspects that require drainage and develop strategies for preventing the development of new canals and infrastructure that damage the peat.
- Buffer zone management: mapping, monitoring, zonation, mitigation of impact
- Routine measurement and spatial/temporal mapping of hydrological variables of peatlands in concessions

1.4. Establish a multi-silviculture system in degraded and cleared areas

- Field and desk-based research to prioritise well adapted timber species; establish nurseries, plant and monitor seedlings.

Goal 2: Improve local wellbeing while reducing the dependence on natural resources of communities around Project Mayas, engage and support communities through participatory methods and radical listening approaches.

Outcomes of Goal 2: Monetary and non-monetary aspects of wellbeing improve as a result of project activities (including local governance)

2.1. Advocate and implement strategies to mitigate tenurial conflict within the MPK area

- Conduct conflict management and resolution strategies; establish grievance mechanisms; conduct training and capacity building in conflict resolution processes.
- Establish partnerships with communities and other stakeholders.

2.2. Conduct village management planning through participatory approaches

- Participatory mapping and land suitability analysis; Development of village land use and management plans (RPJMDes)
- Obtain approval from communities through FPIC methods; Develop grievance mechanisms.

2.3. Engage communities in improved agricultural practices, agro-forestry, organic farming and paludiculture programmes, particularly on adjacent community land prone to fire, which can trigger wider land and forest fires:

- Conduct socialisation and training/capacity building on agricultural techniques that increase yields while preserving peatland.
- Establish agroforestry / paludiculture systems for the economic benefit of local communities: establish nurseries; select suitable sites; conduct training; establish pilot projects; plant and monitor.

2.4. Develop sustainable income streams through appropriate assessments, design, support, capacity building

- Conduct participatory market research; Business strategies analysis; Build business/action plans.
- Develop Sustainable livelihoods and business approaches; establish business entities where appropriate (cooperatives, local government/village-level companies, etc.); establish pilot projects, Conduct training and capacity building.

2.5. Improve access to education, capacity building and skills development

- Support disadvantaged children to become computer literate and access formal education, support women to improve literacy and financial management skills, support farmers to develop new farming techniques.

2.1.18 Sustainable Development Contributions (VCS, 3.17)

Project activities that support and contribute to Sustainable Development Goals are shown below. These goals also reflect nationally stated sustainable development priorities, as mandated by Indonesia's Presidential Regulation no. 59/2017 concerning the implementation of SDGs in Indonesia.

Promoting sustainable agricultural practices through agricultural trainings (to increase yields with organic fertilizer production and plant-based pesticide production), demonstration plots, increasing crop diversity and supporting farmer groups in improving their practices. Farmers are growing rice, sugarcane, chilli, eggplant, shallots and fruit trees, rotating crops and most importantly clearing land without the use of fire, greatly minimising the environmental impact of agriculture. The project is supporting the establishment, formalisation and professionalization of small business units through loan access, allowing them to grow and improve profits. These practices improve food security, local wellbeing and alleviate poverty thus contributing to SDG1, SDG2, SDG3, SDG10 and SDG13.

The project promotes learning opportunities for some of the most disadvantaged households in target communities. Children are able to access formal education opportunities (supporting them to improve literacy skills), but also informal ones where they are able to learn computing, English language, public speaking and presentation skills, environmental knowledge and how to market themselves to future employers) thus contributing to SDG3, SDG4 and SDG10.

The project has facilitated an all-female fire-fighting unit which patrols hotspots in the project zone during high-risk periods to catch and extinguish fires as quickly as possible. The team uses drones to monitor the area and promptly identify the location of fires. The project also has an all-female team of weavers who produce eco-pots for nurseries growing both agricultural and native tree seedlings (replacing more widely used plastic ones) made out of dried *pandanus* leaves. Women play an active role in all agricultural activities. Overall, the project proactively mainstreams gender and promotes leadership roles for women, especially in the development of sustainable livelihoods opportunities, thus contributing to SDG5 and SDG13.

The project always targets the poorest households in each community, therefore reducing inequality and tackling poverty. This contributes to SDG1 and SDG10

The project supports climate action through climate change mitigation and the avoidance of approximately 2 million tonnes CO2 emissions yearly, thus contributing to SDG13.

The project protects hundreds of species and halts biodiversity loss (measured by comparing baseline biodiversity losses to with-project biodiversity maintenance and/or gains), thus contributing to SDG15.

Partnership programs to strengthen and improve the livelihoods of communities around forests to support sustainable development through agroforestry programs, agricultural interest areas and other business support on community-owned land and other unproductive land contribute to SDG17.

2.1.19 Implementation Schedule (CCB, G1.9)

Major milestones in project implementation are shown below in Table 1. See also Section 2.1.10 and Table 1for additional information.

Table 1. Implementation schedule and major milestones for the Mayas Project

Date	Milestone(s) in the project's development and implementation
2018	Initial peat biodiversity surveys begun. Initial community consultation begun. Initial Participatory mapping and planning initiated, baseline data gathering
01-Jan 2019	Project start date and start of first crediting period (See Section 2.1.10)
2019	Fire prevention activities initiated. Baseline activity based on *previously* approved management plan halted (Avoided Planned Deforestation/ Degradation; APD and Conservation of Undrained or Partially Drained Wetlands; CUPP)
2020	Nurseries established; revegetation program and canal blocking begun (peatland rewetting and conservation), submission of multi-business proposal to MOEF based on Perdirjen No. 01/2020
2021	Project activities, including community program, fully operational
2022	Project Pipeline listing under VCS.
2025	VCS and CCB Validation & Verification (2019-2023). Dissemination of reports
2025-2053	VCS-CCB Monitoring Event, Verification, dissemination of reports (minimum every five years); continuation of all project activities
2051	License extension sought (+60 years)
2053	End of initial crediting period
2053+	Project activities continued; project Monitoring and Verification continued (TBD)

2.1.20 Risks to the Project (CCB, G1.10)

Risks to the project's climate benefits were assessed using the VCS NPRA tool (see Appendix 3). Results of this analysis, together with the associated mitigation measures, are recorded via the online NPRA tool. While primarily concerned with climate benefits, the results of the analysis are equally applicable to community and biodiversity benefits (for further details see Sections 4 & 5 respectively). No additional risks have been identified at the project outset.

2.1.21 Benefit Permanence (CCB, G1.11)

The Mayas Project is implemented under a long-term concession licence with 34 years remaining under the initial term. Prior to the expiry of this licence the project will seek a further long-term extension in order to maintain the project activities and benefits beyond the initial crediting/licence period. In parallel, the project will continue to advocate to government the importance of fully protecting any remaining intact peat ecosystems to preserve their social, environmental and climate benefits. An alternative outcome to a further long-term extension would be the designation by government of the area as being fully legally protected. Furthermore, the community development program will seek to enhance the local economy in a sustainable way in order to demonstrate the long-term value obtained through the long-term protection of the peat forest ecosystem as opposed to its short-term destructive exploitation. As with the climate and environmental benefits, the project will continue to advocate for the recognition of this societal and long-term economic benefit. Through these measures the Mayas Project will seek to ensure the long-term permanence of the projects benefits beyond its initial lifetime.

2.1.22 Financial Sustainability (CCB, G1.12)

The Project has access to secure financing sufficient to implement all planned activities for the duration of the crediting period. Details can be provided to the auditors on request.

2.2 Without-project Land Use Scenario and Additionality

2.2.1 Conditions Prior to Project Initiation and Land Use Scenarios without the Project (VCS, 3.13; CCB, G2.1)

Prior to the project's initiation, the project area was legally designated and licenced for drainage, selective logging and conversion to industrial timber plantation, all based on a legally approved management plan. Work began in 2016-2018 to implement this plan through the construction of drainage canals (see Figure 8). As such, the baseline scenario adopted is a continuation of the conditions existing prior to the project's initiation, albeit the project was able to stop further implementation of the planned activity at an early stage. Full details of the baseline selection, additionality assessment and legally authorized baseline activity are given below in Sections 3.1.4 and 3.1.5.

For further information on the Ecosystem Type, and present and prior environmental conditions of the project area (climate, hydrology, topography, soils, vegetation, and ecosystems of the project area) see Section 2.1.4 above.



Figure 8. Drainage canal construction activities in MPK's concession, Jan-Feb 2017

2.2.2 Most-Likely Scenario Justification (CCB, G2.1)

See Section 2.2.1 above and Sections 3.1.4 and 3.1.5 below.

2.2.3 Community and Biodiversity Additionality (CCB, G2.2)

As described in the previous sections, the baseline scenario is derived from a clear management plan that was legally approved and already underway at the project outset. This allows us to predict with considerable certainty the likely impact on biodiversity and communities if the plan had not been halted by the project.

Under the baseline scenario the natural forests of the Mayas Project area would have been drained, logged and in part replaced with mono-culture acacia and jabon plantations. The natural forest would have been damaged or destroyed completely and the peat ecosystem would have been degraded. The loss of natural tree diversity would have resulted in the local extinction of many animal and plant populations, including that of the Bornean Orangutan. Under the project,

these natural ecosystems will be fully protected. For further information see sections 5.1.1 and 5.1.2.

The impact on communities of the baseline scenario would also have been profound. Loss of the natural forest would have led to the loss of access to all non-timber forest products currently utilized by project-zone communities. Culturally important areas would have been lost. While regulations would compel a licence-holding plantation company to identify such areas and ensure protection and access, this practice is widely ignored or only partially implemented, putting such areas at risk. Under the baseline scenario social capital would have been at risk. The typical response to the arrival of a large commercial operation is the erosion of social cohesion as benefits and costs become unequally distributed and factions form. There likely would have been a lack of inclusive participation of communities and lack of transparency in decision-making, leading to an opportunity for elite capture in which dominant groups typically benefit disproportionately, while hindering the flow of benefits to the marginalized households. Increased immigration and competition for scarce resources further creates opportunities for conflict. Under the project scenario social capital will be enhanced by the project working with, and supporting, legitimate social institutions within project-zone communities. The decisions of such institutions will be respected and support delivered in line with their requirements, while great efforts will be made to ensure benefits are equitably distributed. The Mayas Project also aims to identify and reach poorer and marginalized communities (following Indonesian Government definitions) and community members through a variety of sustainable livelihoods initiatives. These are designed to lift the poorest out of poverty by engaging them in community-based business development, agroforestry, and sustainable non-timber forest product use. Similarly, under the baseline scenario, it is likely that commercial land-use designations would prevail over village-based claims. Commercial companies typically base their claims on centrally created tenure maps. Where conflicts exist the typical response is short-term payment at undervalued rates. The Mayas Project works with all project-zone communities to create spatially accurate maps that define the agreed extent of village land and the agreed boundary of the project area, as well as recognition of other spatially explicit landscape features.

An often stated ‘benefit’ of commercial exploitation is said to be increased employment, however, there is little precedence among plantation companies for active community engagement in operations or decision-making, and a great deal of precedent for importing a work force from other regions. Any local employment opportunities are typically for unskilled manual labourers who are offered little or no opportunity to receive further training. The Mayas Project is primarily implemented at the village level, in collaboration with village communities. Opportunities for involvement range from participation in planning and mapping initiatives, to direct employment (in both junior and senior positions, on a full-time, part-time or casual basis), to participation in a range of thematic initiatives. The Mayas Project will also implement a comprehensive program of training and capacity building programme, linked to agro-biodiversity-based livelihoods, improving agroforestry practices on peat, expanding opportunities for aquaculture, initiating mangrove

restoration along the coastal portion of the project zone, improving financial management, fire management and wildlife monitoring among others.

2.2.4 Benefits to be used as Offsets (CCB, G2.2)

The Mayas project is not seeking to utilize any distinct community and biodiversity benefits as offsets in any other form.

2.3 Safeguards and Stakeholder Engagement

2.3.1 Stakeholder Identification (VCS, 3.18, 3.19; CCB G1.5)

The project has adopted a wide definition of stakeholders: all agents thought to be affected by the project (positively or negatively), including those by simple virtue of proximity. By far the most important group of identified stakeholders are the village communities adjacent to the project area. Twelve such village communities were identified, including all villages and hamlets which share administrative borders with the project area and/or were known to access resources within the project area. This information was verified through semi-structured interviews and using local knowledge and longstanding relationships with some of the communities. Stakeholder identification was conducted during social baseline surveys conducted between 2018 and 2021, including:

1) Participatory rural appraisals (PRAs), informal discussions, as well as semi-structured focus group discussions (FGDs).

2) Cross-checking of information obtained through PRAs and FGDs by engaging community members who did not participate in the formal discussions through informal dialogue.

Table 2 lists all stakeholders identified by the project considered likely to be affected by the implementation of the Mayas Project. Local communities are further classified by livelihoods, as these are the most common unit of alliance in the local social context. Most community groups engage in multiple livelihood activities rather than depending on a single source of income, and thus typically belong to more than one group. No community groups have legal rights over the project area, but they may rely to a lesser or greater extent on the resources within the project area, hence their inclusion as stakeholders.

Table 2. Stakeholders in the Project Zone

Category	Stakeholder	Description, Rights, Interest and Overall Relevance to the Project
Communities	Project-zone village residents	All groups of people who live in the 12 project-zone villages located adjacent to the project area, and who derive income, livelihood or cultural values from the project zone. These groups of people are collectively

Category	Stakeholder	Description, Rights, Interest and Overall Relevance to the Project
		referred to as the project-zone communities. Maintaining strong relationships with all project-zone village residents and ensuring strong positive community impacts will be essential to long-term project sustainability.
Customary Institutions	Dewan Adat Dayak Laman Satong	The Dayak Customary Council is an organization of the Dayak indigenous people recognized by the Indonesian government that carries out coordination and legislative duties at the Regency level to assist customary leaders in customary law development, as well as in the preservation of indigenous customs in the region. The Laman Satong community to the north of the concession (the only village in the project area with indigenous members of the Dayak tribe around the project area) is a member of the organization. By maintaining good communication and coordination with this customary institution, the project will ensure it responds to indigenous concerns and interests.
	Majelis Adat Budaya Melayu Sukamaju	The Melayu Cultural Customary Assembly is an indigenous peoples' organization recognized by the Indonesian government as a form of expression of the will of the Malay people to gather, discuss the existence of Malay customs and culture, both in the context of the region, province and national. The community around the project area is part of the members of the organization. By maintaining good communication and coordination, support from indigenous peoples' organizations can be given when needed.
Community livelihoods groups	Farmers	Groups of people making a living from traditional farming (e.g. vegetables, rice) and/or agroforestry (e.g. cultivating and collecting rubber and/or jelutong, growing/harvesting fruit trees). Supporting farmers and ensuring farming practices become more sustainable and less dependent on burning practices will be essential to long-term project success and sustainability.
	Fishers	Groups of people making a living out of fisheries and/or aquaculture. Supporting fishermen and encouraging

Category	Stakeholder	Description, Rights, Interest and Overall Relevance to the Project
		sustainable fishing practices within and outside of the Project Area will be essential to long-term freshwater biodiversity maintenance and long-term sustainability of fisher livelihoods.
	Non-timber forest product (NTFP) collectors	Groups of people dependent on the collection of rattan, damar resin, meranti resin, honey, etc. Supporting sustainable collection of NTFPs will ensure NTFP dependent livelihoods are secure over the long-term.
	Loggers	Groups of people dependent on the illegal extraction of timber from the concession and selling onto sawmills and villagers in the project zone for construction materials. Logging is dangerous and strenuous work which villagers take up when faced with lack of opportunity. Supporting illegal loggers to take up other employment and shift away from logging inside the Project Area will ensure the area is preserved over the long-term and that local villagers are able to benefit from better working conditions.
	Hunters	Individuals dependent on hunting for meat to sell in markets or trapping wildlife for live trade (deer, song-birds, etc). Can be legal or illegal depending on species hunted and location. Supporting illegal hunters to take up other employment and shift away from hunting inside the Project Area will ensure Project Area biodiversity is preserved over the long-term and that local villagers are able to benefit from better working conditions.
	Women's livelihood groups	Groups of women organised to strengthen or start new livelihoods initiatives of benefit to their households and the wider community they live in. Supporting women's groups will be fundamental to building relationships with the wider community, supporting sustainable livelihoods strategies and strengthening gender equality at the household and village management level.
Other stakeholders	PT. Kayung Agro Lestari	Neighbouring palm oil concessions. YIARI has a long-term collaboration in best management practices for

Category	Stakeholder	Description, Rights, Interest and Overall Relevance to the Project
	PT. Gemilang Makmur Subur	conservation and other conservation strategies at the landscape level with three of the four companies. None have legal rights over the Project Area, but operate in concessions adjacent to it. Engaging with concession holders constructively will also help the project reduce the risk of fires and illegal logging through integrative and collaborative management strategies.
	PT. Sinar Karya Mandiri	
	PT. Damai Agro Sejahtera	
	Sub-district government	Sub-district government with influence over policies, regulations and decisions in the project zone. Sub-district government governs the Project Zone, maintaining good communication and coordination will ensure support from government authorities is forthcoming when needed.
	District government	Ketapang district government with authority over district-level policies and regulations. District government governs the villages in the Project Zone and the Non-government land areas (APL areas). Maintaining good communication and coordination will ensure support from government authorities is forthcoming when needed.
	Provincial Government	Through the Forestry Agency (Dinas Kehutanan) which is the provincial branch of the MoEF.
	National government	Decisions concerning HP HPK (Conversion Production Forest) all fall under the Ministry of Environment and Forestry (MoEF).

2.3.2 Stakeholder Descriptions (VCS, 3.18, 3.19; CCB, G1.6, G1.13)

Please refer to Table 3 in the previous section (Section 2.3.1). Baseline impact on these groups, and the anticipated project benefit is described in Section 4.

2.3.3 Stakeholder Access to Project Documents (VCS, 3.18, 3.19; CCB, G3.1)

Hard and soft copies of project documentation, including participatory mapping reports, participatory rural appraisal reports, summary Project Description Document and summary Monitoring Reports, validation and verification audit report, copies of the signed MoU, meeting registers and any other key document will be made available to any stakeholder interested in reading through the correspondence procedure and opening website pages. Summaries of the PDD and monitoring reports in Indonesian language will be made publicly available, through

village facilitators in all target villages. To overcome literacy barriers, the project will aim to conduct sessions which summarise the content of the PDD, monitoring reports and other project documentation. Backups of all hard copies will be stored in the project documentation repository and made available again if materials are lost or damaged.

2.3.4 Dissemination of Summary Project Documents (VCS, 3.18, 3.19; CCB, G3.1)

Please see section 2.3.3

2.3.5 Informational Meetings with Stakeholders (VCS, 3.18, 3.19; CCB, G3.1)

Village facilitators will run sessions to provide village participants with opportunities to consult monitoring results and receive clarification on project activities, progress and next steps. Two weeks prior to the meetings, posters publicising the event will be hung in communal spaces and announcements will be made by village facilitators. Village facilitators will take extra care to ensure more marginalised households are informed as a priority. Similar engagement will be set up with private sector and government partners using available means of communication

.

2.3.6 Risks from the Project and No Net Harm (VCS, 3.18, 3.19)

Natural and human-induced risks and mitigation measures are identified and quantified via the online NPRA tool. See Section 2.1.20 for more details. Risks to stakeholder participation are considered in the next section below (2.3.7). Measures taken to ensure the safety of employees and vulnerable groups is given in Sections 2.3.4, 2.3.18 and 2.3.19. See also Appendix 3.

2.3.7 Community Costs, Risks, and Benefits (CCB, G3.2)

The Mayas project will always strive to ensure consultation and collaboration with communities is conducted to the highest standards of integrity and in a timely, transparent and accessible manner.

Many Mayas Project staff have long-standing relationships with the communities in the Project Zone through their prior work with YIARI. They uphold the highest standards of transparency when interacting with communities because maintaining the level of personal trust developed is paramount, but also because this is considered the best strategy for genuine engagement and long-term success of the project.

In its community engagement strategy, the Mayas Project has therefore prioritised clarifying costs (with respect to upholding responsibilities, such as halting illegal hunting, logging activities and uncontrolled fire use in agricultural land-use clearance and other practices) and risks (the fact that halting these activities where necessary will impact some households in the short-term and that some of the livelihoods strategies might not yield immediate benefits as hoped), while emphasising the project's strategy to ensuring those most in need of project benefits receive them. More specifically, where some villagers are highly dependent on logging or hunting, the Project will

endeavour to provide alternatives for those members of the communities that provide at least the same level of income and better working conditions. More generally, the Project will implement a broad agro-biodiversity-based livelihoods strategy and target the poorest and most disadvantaged households in target Project Zone communities.

The Mayas Project is aware of the responsibility it is taking on to ensure no community members are negatively affected by Project activities and strives to empower local communities and equip them with the tools and knowledge necessary to lift themselves out of poverty to ensure livelihoods activities have the highest chance of being effective and sustainable in the long-term. Similarly, activities targeting community benefits have been and will continue to be designed to be managed in the future by the local communities themselves, without the need for intensive external interventions. The project striving to ensure communities are able to undertake and manage activities themselves is the most secure means of ensuring the activities will continue even after project's lifetime. Finally, the project itself is anticipated to set an example of sustainable land use management in the region, leading to wider adoption of the practices it is pioneering. The project will continue to offer tours to government agencies, other non-profits and any other groups interested in learning about its activities in order to spread best practices and lessons learned throughout the region. In this way the Mayas Project is and will continue to contribute to a wider region managed more sustainably with respect to carbon emissions, biodiversity conservation and equitable development of local communities.

Please also refer to section 2.3.10 on consultations.

2.3.8 Information to Stakeholders on Validation and Verification Process (VCS, 3.18.6, 3.19; CCB, G3.3)

The schedule of the field visit will be made public by communicating this at least 3 weeks in advance, and there will be meetings in each of the target villages prior to this to explain why the audit is happening and what sorts of questions may be asked. Communication methods used are likely to include posters in community meeting rooms, announcements at routine community meetings and special sessions which will discuss the validation and verification process in more depth, explaining the opportunity this presents for communities to discuss positive and negative aspects of the project, raising questions and concerns.

2.3.9 Site Visit Information and Opportunities to Communicate with Auditor (VCS, 3.18.6; CCB, G3.3)

Please refer to section 2.3.10. Communities will be encouraged to speak directly and independently to the auditors. To facilitate this type of communication, community members will be encouraged to speak with auditors without the presence of MPK staff using a local translator or other non-MPK staff to overcome language barriers if necessary.

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2.3.10 Stakeholder Consultations (VCS, 3.18; CCB, G3.4)

Since 2017 (and indeed prior to that date), the Mayas Project has conducted a series of stakeholder consultations, baseline social surveys and participatory mapping activities at the village level and beyond. These consultation meetings are detailed in full in Appendix 4**Error! Reference source not found.** including 166 meetings with over 2,000 participants. Through this process, the project has disseminated information on ecosystem services in the project area, planned activities, expected impacts from the project and management plans. Meeting minutes and attendance sheets are available upon request. During all consultations with communities, efforts have been made to ensure that straightforward and accurate information is provided as a basis for any decisions, including information on costs, risks and benefits (see Section 2.3.4 above). A document explaining the project's Stakeholder Consultation Strategy is available and describes the need to ensure any information is presented in a form that can be fully understood by participating community members and in a timely manner to allow due consideration, together with guidelines as to how that should be achieved. All project staff need to follow this document when holding a meeting with local communities.

2.3.11 Continued Consultation and Adaptive Management (VCS, 3.18; CCB, G3.4)

The Mayas Project applies the principle of Free, Prior and Informed Consent (FPIC) and recognises that this is an ongoing process without a firm end-point as it evolves alongside the dynamics of the local context. As such the Project will use several approaches to ensure communication and consultation remains active throughout:

1. A village facilitator / focal point that reports progress, issues encountered, needs and wishes of vulnerable groups and wider community to MPK staff once per month. These reports will be filed in the project filing system and used to inform formal and less formal focus group discussions and other types of community meetings. Once these points have been confirmed with the wider community, action points will be incorporated in the MPK socio-economic work plan.

2. Monthly or bi-monthly visits from MPK staff to each target community to discuss a variety of project components including livelihoods strategy design, implementation and progress. Relevant and implementable feedback from visits will be incorporated in the MPK socio-economic work plan.

3. A functional Grievance Redress Mechanism will be essential to maintaining communication channels open and ensuring community members feel their concerns and grievances are heard and addressed in reasonable timeframes.

MPK management and implementation strategy is fully adaptable and based on the principle of empowering staff and managers and to reflect on practices and adapt and change as required in order to achieve objectives. This adaptive approach is then incorporated into the project wide planning and budgeting process such that no management practice or activity is fixed – all are

open to change if change is required, as long as it is in compliance with company policies (e.g., on health and safety, ethics and compliance) and supportive of furthering project objectives.

2.3.12 Stakeholder Consultation Channels (CCB, G3.5)

FPIC, participatory mapping, participatory rural appraisals, conflict resolution meetings, thematic Focus Group Discussions, awareness raising and general consultation meetings have all been carried out by YIARI and MPK staff in target communities, involving as wide representation from different stakeholder groups as possible, and when this was not possible, speaking to a smaller group of community representatives. Mayas Project staff are particularly aware of elite capture issues within communities and will always carry out inclusive consultations when these are possible and practical. Because of the Covid-19 pandemic there have been restrictions on numbers of people that could gather at any one time (maximum 30 with 1.5 meters social distancing), this has meant project staff have had to facilitate the same meeting multiple times with smaller groups of stakeholders and/or visit individual households.

2.3.13 Stakeholder Participation in Decision-Making and Implementation (VCS, 3.18, 3.19; CCB, G3.6)

As well as considerations discussed in 2.3.8 and 2.3.9, the Mayas Project is aware of practicing culture and gender-sensitive approaches to participation in decision-making and implementation. From a cultural perspective, communities are quite homogenous, as almost 100% of them are ethnically Melayu and are practicing muslims. Over 99% of Project staff are Indonesian nationals with the majority also being practicing muslims and with in-depth understanding of the local cultural and socio-economic context. The staff employed to facilitate participatory mapping and participatory rural appraisals are from West Kalimantan and mostly Melayu themselves. This has reduced the risk of any cultural misunderstandings during data gathering, consultation and initial implementation of project activities.

Project Mayas has ensured a gender-sensitive approach to participation by:

1. Ensuring all villages are aware that the Project is taking a strong gender-sensitive approach, where the role of women in natural resource management and sustainable livelihoods is particularly valued and enhanced;
2. Ensuring meetings relative to decision-making processes for the whole community include separate all-female sessions where facilitators are able to gather input from women only. This input must be reported back to the community as a whole;
3. Ensuring at least 30% of consultation participants are female (targeting 50% in the future);
4. Ensuring the establishment of women's livelihood groups that support female leadership development;

5. Ensuring sustainable livelihoods initiatives are led by women in at least 50% of cases; and

6. Ensuring project design and implementation benefits from the input of women's groups heads.

7. Promoting the success of local women in leading positive change for their local communities.

2.3.14 Anti-Discrimination Assurance (VCS 3.19; CCB, G3.7)

MPK has anti-discrimination policies which set out that their staff are to be aware and proactive in identifying and preventing any type of discrimination or harassment happening in the Mayas Project, including discrimination based on gender, race, religion, among others. These policies are set out in the MPK staff manual, Code of Conduct, and Anti-Harassment Policy which all staff receive training on and are available to be accessed by all staff with access to the company database system (see also Section 2.3.17 below, and the staff manual can be made available to auditors on request). If ever deemed necessary MPK will provide additional training to ensure all staff have a complete understanding of the policies and, their obligations under it.

2.3.15 Feedback and Grievance Redress Procedure (VCS, 3.18.4; CCB, G3.8)

The Mayas Project has developed a formal grievance and redress procedure to prevent and handle any conflicts with and among communities and other stakeholders which may arise during the implementation of project activities.

One of the most important elements of the grievance redress procedure is to prevent potential conflicts before they arise. Such precautionary approaches include the implementation of FPIC-based community consultations, participatory planning, regular communication and trust and relationship building between project staff and community members. This helps to identify underlying grievances well in advance and allow them to be addressed in a less formal way.

If any grievances occur and are reported from the project-zone communities and/or other relevant stakeholders in the form of letters, short messages or verbal communication, MPK will respond to them by following the formal handling process as shown in Figure 9. All reported cases will be assessed to identify and verify the cause, actors and scale of grievances, and MPK's team of experts will recommend resolution options based on the feedback from the stakeholders. The degree of intervention and process will depend on the nature of disputes, and MPK will continue to monitor the cases. The project believes that most if not all grievances will be resolved this way, because based on past experience bringing in a third party will put communities ill at ease and in some cases undermine the trust that has been built. We think this will reduce the likelihood of formal grievances being raised.

However, if a grievance is not amicably resolved after this process, support will be sought from an external conflict resolution specialist or mediator. If this process is still unsuccessful in resolving

the complaint a request to an Ombudsman will be submitted for formal mediation and arbitration and will be subject to a hearing at which both disputing parties have the opportunity to testify. All cases will be referred and examined to the extent allowed by Indonesian laws and regulations of the relevant jurisdiction before decisions are made, and both parties are bound to satisfy the result of arbitration.

Grievance redress procedure	• There are 3 levels in resolving complaints or issues that arise. The duration for complaint resolution is <10 days at level 1, <21 days at level 2, and <60 days at level 3. • Complaints can be expressed via email at info@ptmpk.com, by contacting the MPK Call Center at 0811-9341-795, or verbally in person. • The Communications and Public Relations department will respond to incoming messages by collecting information and completing the reporter's identity details according to the prepared form, and verifying with recordings or other documentation. • Conducting internal meetings with relevant departments based on the Priority Decision Flow, first classifying the scope, gathering information related to the complaint, and reviewing documents together. • Communicating the agreement with the reporter; if both parties reach an agreement, the complaint resolution is considered complete. If no agreement is reached, the complaint moves to Level 2. • In Level 2 complaint resolution, the Board of Directors may also be involved in considering certain aspects related to the complaint resolution. It may also require a Conflict Resolution Specialist or a professional mediator at this level. • If an agreement is not reached, the complaint resolution escalates to level 3, where the ombudsman will be involved at this stage.

The Grievance process is shown diagrammatically in Figure 11 below.

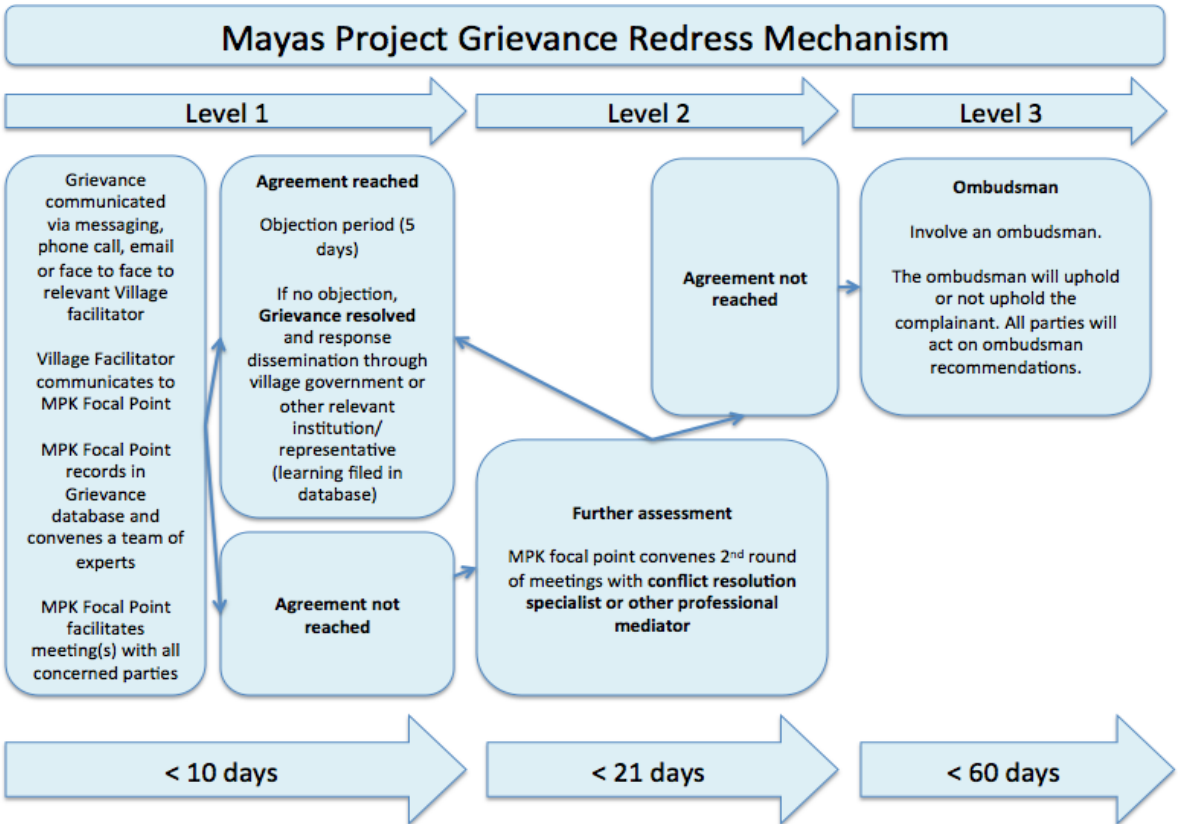


Figure 9. Mayas Project Grievance Redress Mechanism

2.3.16 Accessibility of the Feedback and Grievance Redress Procedure (VCS, 3.19; CCB, G3.8)

Communities will have both the village facilitator's contact and that of the MPK Focal Point in the form of mobile phone numbers and email addresses. These contacts and expected timescale to receive a response will be publicised in communal spaces through poster displays. Contacting the village focal point (or the MPK focal point directly) to voice any concerns or complaints will be a fixed agenda item at all community Project Mayas meetings and announced at every opportunity by local village facilitators.

Socialization of the Complaints Mechanism Procedure will be carried out for internal companies and stakeholders. Publication media can be in the form of posters and/or e-posters containing cellphone and email contacts, as well as a general description of the flow of resolving complaints or conflicts. This will become the Complaints Mechanism Publication Plan.

2.3.17 Worker Training (VCS, 3.19; CCB, G3.9)

The project is committed to providing training opportunities which increase participation of community members and skills development in targeted, locally appropriate ways. The project is

also fully committed to provide HSSE and fire training as a priority – focusing on staff safety and highest risk activities first.

2.3.18 Community Employment Opportunities (VCS, 3.19.13; CCB, G3.10)

The Mayas Project invests in people living within the project zone, the wider region, and Indonesia as a whole. It provides employment opportunities irrespective of gender, age, social class or ethnicity and other factors. A particular emphasis is placed on project-zone communities because this type of engagement is fundamental to the long-term effectiveness of the project. Staff or contractors, whether employed on a long-term of short-term basis, are all entitled to employment terms based on similar types of work and working conditions in the area of employment. Open positions have been advertised in a variety of ways to reach a broad array of potential applicants. This includes online posting on job boards and through social media. Local facilitators and/or field staff will visit all villages to announce job vacancy opportunities for certain level, so that the village government has an opportunity to discuss the position's requirements and qualifications. We expect about 50% of project field staff to be hired from project zone communities. All other project staff are from Indonesia.

2.3.19 Occupational Safety Assessment (VCS, 3.19; CCB, G3.12)

Worker safety and safe operations are a central priority of the Mayas Project, which conforms with the requirements of the labour law, UU No. 13/2003 and the provisions of Occupational Safety UU No. 01/1970, Government Regulation No. 50 of 2012 concerning the Implementation of the Occupational Safety and Health Management System (SMK3), Regulation of the Minister of Manpower No. 5 of 2018 concerning Occupational Safety and Health in the Work Environment, Regulation of the Minister of Manpower and Transmigration No. PER-08/MEN/VII/2010 concerning Personal Protective Equipment (PPE), Regulation of the Minister of Manpower No. PER.03/MEN/1998 concerning Procedures for Reporting and Examination of Work Accidents.

MPK and its employees share a firm commitment to:

a) Pursue the goal of causing no harm to people;

b) Protect the environment;

c) Use material and energy efficiently in the provision of products and services;

d) Respect our neighbours and contribute to the societies in which we operate;

e) Deliver community benefits, biodiversity benefits, carbon offsets and other products and services consistent with these aims;

f) Promote best practice of HSSE in our sector;

g) Manage HSSE matters as any other critical business activity; and

h) Promote a culture in which all staff of MPK (including contractor staff) understand fully this commitment.

To this end, MPK has adopted an HSSE policy stating that it:

a) Has a systematic approach to HSSE management designed to ensure compliance with the applicable law and to achieve continuous performance improvement;

b) Sets targets for improvement and measures, appraises and reports performance;

c) Requires its contractors to comply with this policy whilst engaged by MPK;

d) Engages effectively with neighbours and impacted communities;

e) Includes HSSE performance in the appraisal of staff and rewards accordingly; and

f) Recognises its responsibility to respect human rights in all aspects of doing business. Human rights are fundamental to MPK's core values of honesty, integrity and respect for people, communities and the environment.

MPK's human rights approach will be informed by the UN Guiding Principles on Business and Human Rights and applies to all of its employees, contractors and suppliers.

With support from a third-party contractor, MPK will develop an HSSE Management System with standards that adequately address significant HSSE risks. MPK shall review its HSSE Management System and policies at least once a year and document the results. The HSSE Management System shall contain the following risk management controls:

a) Significant HSSE risks associated with project activities are assessed and controlled to levels as low as reasonably practicable.

b) Staff (including contractor staff) who have responsibilities for HSSE are competent and have the resources to perform their roles.

c) Changes to facilities, processes and organisations are managed to maintain risk controls.

d) Emergency response plans, including those for medical emergencies and environmental disasters (such as fires or flooding), are established and exercised on an annual basis, as a minimum, to maintain preparedness.

e) Incidents are investigated and analysed to identify improvements.

f) Regular reporting to the MPK Board that HSSE controls are being maintained and are effective.

In implementing the above, MPK management will permit any staff (including contractor staff) to stop any work, or prevent any work from starting, where adequate controls of HSSE risks are found not to be in place. Further details on specific mitigation actions implemented by MPK to address HSSE risks are available on request.

2.4 Management Capacity

2.4.1 Project Governance Structures (CCB, G4.1)

The project will be implemented and managed by the Indonesian company MPK with contractual support from its technical consultants YIARI, and PT Karbon Natura Indonesia (KNI). A simplified organisational structure diagram is shown below in Figure 10. A full detailed organogram is available to auditors on request. MPK is responsible for all project implementation, financial and compliance control.

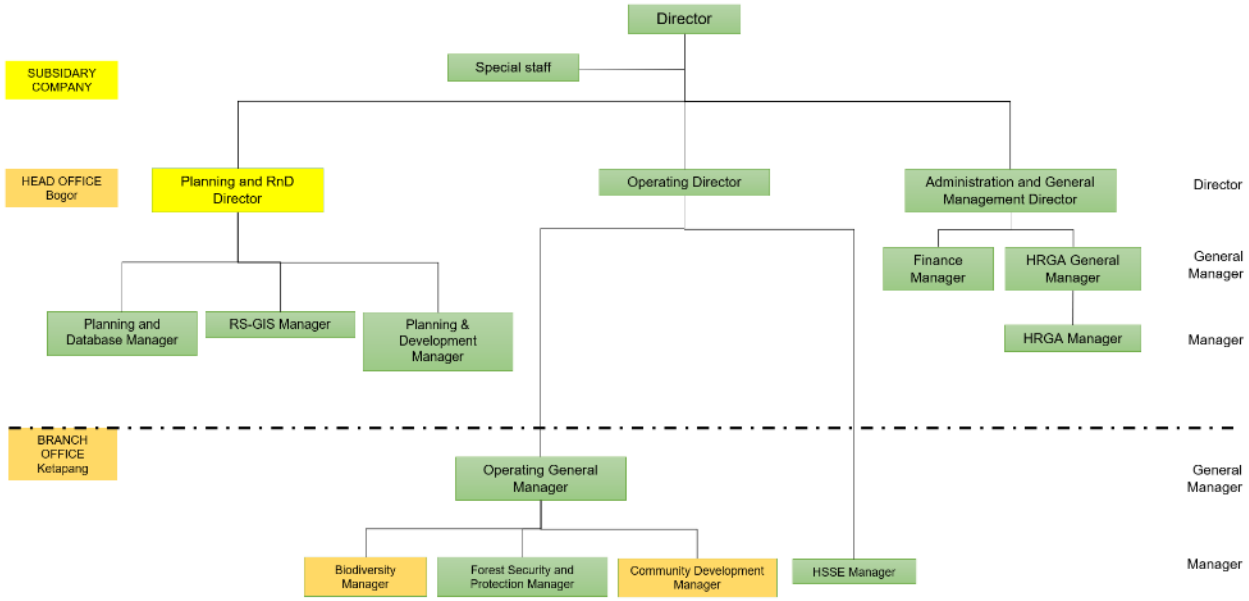


Figure 10. Organogram of MPK

Management and governance of the Mayas Project incorporates the principle of an adaptive management cycle, as depicted (Figure 13) and described in more detail below. This governance model will be maintained for the project's lifetime.

Plan: The project has clearly defined objectives (Section 2.1.1) which are used by the management and field teams to define activities (2.1.17), and in turn to create detailed implementation plans. As part of this planning process project risks are also identified and evaluated (See Section 2.1.20, NPRA).

Implement: As per the project implementation plan, the project activities are implemented by the management and field teams as described above in this section.

Monitor: Each objective and activity have defined monitoring criteria (see Appendix 1: List of tree species identified during forest biomass survey in the Permanent Sampling Plot in 2020) which are used as performance indicators of the activity's progress. Some key activities have inbuilt monitoring mechanisms, such as community consultation processes (see Section 2.3)

Evaluate: Project management meetings are held at routine intervals depending on the level of implementation, these feed up to quarterly coordination meetings between all core project partners where project progress is monitored against the implementation plan and the key performance indicators, at these monthly meetings the central risk register is also amended if required. Minutes are recorded at meetings to ensure any decisions are documented. At intervals which correspond to the production of project Monitoring Reports, any such cumulative changes to that date are then additionally capture in the Monitoring Report itself and updated NPRA score.

Adjust: Where the need for change is highlighted by the above process this is documented as a management decision and incorporated into the project's objectives, activities, implementation plan or monitoring plan as appropriate for the required adaptation.

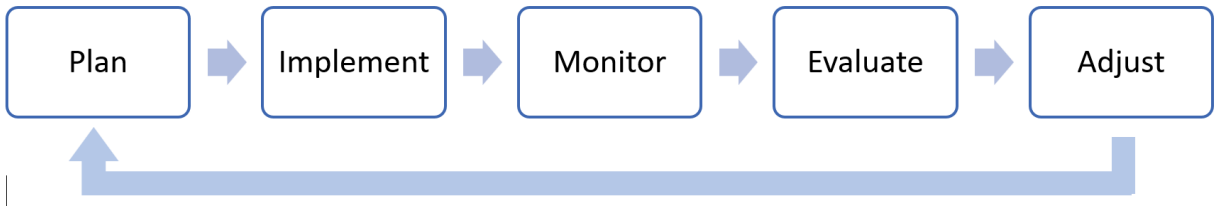


Figure 13. Mayas Project's Adaptive Management Plan cycle.

2.4.2 Required Technical Skills (VCS, 3.19; CCB, G4.2)

MPK and its partners form a highly experienced team with decades of combined professional experience in the design and implementation of the planned project activities. These include:

- Project Management: The Project is being managed by MPK's executive professionals each with >10 years of managing forestry concession and restoration projects.
- Forest Protection and Restoration: Daily Forest protection is conducted by MPK and YIARI which has expertise in peat swamp forest protection and conservation, supported by consultant experts with >10 years' individual experience in peatland restoration and conservation.
- Carbon accounting and monitoring: this role will be led by KNI, a highly-experienced privately-owned consulting company hired by MPK to provide carbon accounting and coordinating carbon monitoring activities, implemented in the field by MPK staff.
- Community Development: this role will be led by YIARI which has >10 years' experience working with communities in the Project Zone.
- Biodiversity Conservation: this role is also led by YIARI as an NGO skilled at wildlife monitoring, illegal wildlife trade issues and human-wildlife conflict resolution.

2.4.3 Management Team Experience (VCS, 3.19; CCB, G4.2)

Resumes for the core project management team are available to the auditors on request.

2.4.4 Project Management Partnerships and Team Development (VCS, 3.19; CCB, G4.2)

Core project partners at the project's outset are as described above and as shown in Section 2.1.8 In addition to these core partners the Mayas Project will seek to establish new partnerships on themes or issues as required whenever such partnerships add value to the project or address a resource need that cannot be resolved internally. MPK employs staff on an industry competitive basis and to date has faced no recruitment challenges; it also offers staff attractive employment benefits in an attempt to retain talent. Projects like the Mayas Project are only as good as the staff that implement, and this is a realty that is fully recognised by MPK and the other core project partners.

2.4.5 Financial Health of Implementing Organization(s) (CCB, G4.3)

MPK has contractually secured financing for the duration of the project crediting period. Supporting documentation can be provided to the auditors on request.

2.4.6 Avoidance of Corruption and Other Unethical Behavior (VCS, 3.19; CCB, G4.3)

MPK has strict ethics and compliance and anti-bribery and corruption policies and practices in place. These include (*inter alia*):

(a) a system of financial controls for the detection and prevention of contravening actions such as bribes,

(b) procedures to ensure compliance with all applicable anti-corruption laws and regulations,

(c) guidelines on what are acceptable gifts and hospitality to be offered or accepted and set value limits for registration and approval,

(d) rules and procedures to ensure that any actual, potential or perceived conflicts of interests and any actions required to mitigate it properly are fully recorded and tracked,

(e) procedures to ensure that facilitation payments are not made,

(f) compliance rules and procedures for relevant ethics and compliance risks, which will include a periodic assessment of the main ethics and compliance related risks to identify any additional risks requiring mitigation, and a system for retaining documents evidencing efforts to support the compliance commitment and programme elements,

(g) antitrust rules for communication with competitors where applicable which are in line with industry practices, and

(h) a data collection and archiving system that assures the protection of personal data. Core management staff have been trained in the implications and application of these policies and

procedures and will receive refresher trainings. Finally, MPK will establish a helpline, email address or similar mechanism and clearly communicate its availability to enable staff and third parties to report any suspected violations of the programme, with a clear policy of non-retaliation and investigation procedures for allegations.

When contracting with third parties, MPK uses risk-based due diligence procedures to ensure that the integrity of such parties is assessed and, where necessary, addressed to the satisfaction of MPK. As such, all MPK contractors to some degree are required to undergo due diligence screenings to confirm that:

(i) the third party has processes in place to comply with applicable anti-bribery Laws and regulations and complies with MPK's standards;

(ii) key individuals providing services are not on international sanctions lists;

(iii) politically exposed individuals that are engaged in the business are identified and their suitability assessed. Copies of all documentation are available to auditors on request.

MPK's ethics, compliance, anti-bribery and corruption policies are communicated to all staff through the staff manual, while senior MPK staff will receive regular training courses on ethics and compliance delivered by internal experts which will cover Indonesian regulatory compliance as well as international best practice. Such training will provide guidance on the identification and mitigation of risks around bribery and corruption, facilitation payments, conflicts of interest, gifts and hospitality, engagement of government officials and money laundering.

2.4.7 Commercially Sensitive Information (VCS, 3.5.2 – 3.5.4; CCB Rules, 3.5.13 – 3.5.14)

No commercially sensitive information has been excluded from this Project Description

2.5 Legal Status and Property Rights

2.5.1 National and Local Laws (VCS, 3.1, 3.6. 3.7, 3.14, 3.18, 3.19; CCB, G5.6)

The Mayas Project is, and will remain, in compliance with all national, regional and local laws and regulations in Indonesia relevant to project activities. A list of relevant national laws and regulations is presented in Appendix 5.

2.5.2 Relevant Laws and Regulations Related to Worker's Rights (VCS, 3.18.2; CCB, G3.11)

The Mayas Project and MPK operate in full compliance with Indonesia's labour laws and continue to strive to set an example of best practice with respect to employment terms, conditions and practices. Indonesian labour law is principally governed by the Labour Law 13 of 2003. This

represents the highest and most comprehensive set of regulations governing employment, including such issues as employment agreements, working hours, wages, paid leave, termination of employment, discrimination and grievance procedures. Below this is a raft of implementing legislation in the form of government regulations, presidential and ministerial decrees.

Amongst many other things, the Staff Manual describes in detail the grievance process that any employees can take if they are unhappy with any term of their employment. If the issue cannot be resolved internally any employees can report their complaint directly to the local Manpower Office which can then address the complaint directly to the company, seek to assist a bipartite resolution, or enlist the assistance of an independent mediator to seek a tripartite resolution. To date no staff have initiated such grievance procedures, but the opportunity always remains open.

In addition to requirements under the body of employment law, MPK is also fully compliant with Social Security Law. These laws require MPK to register all employees for Social Security (known as BPJS Ketenagakerjaan and BPJS Kesehatan) and to make payments on their behalf. All staff are issued membership cards to the scheme.

2.5.3 Human Rights (VCS, 3.19)

The project recognizes, respects and promotes the protection of Indigenous Peoples, Local Communities' rights and customary rights holders. The project supports the United Nations Declaration on the Rights of Indigenous Peoples and ILO Convention 169 by implementing robust FPIC processes, employing traditional musyawarah (inclusive deliberation-style) consultation processes and by ensuring communities themselves co-design programmes and initiatives they know will meaningfully address their most pressing needs. The project promotes inclusive, locally-led decision making processes, while providing opportunities for growth, capacity building and for women to participate, contribute and voice their needs, desires and aspirations.

The project promotes and protects local values (see Section 2.5.4), respects peoples' dignity and strives to ensure an adequate standard of living is reached by the most vulnerable households in the project's target communities.

The project will take a continuous improvement strategy and conduct socio-economic impact-assessments at regular intervals adapting approaches to maximise positive impacts.

2.5.4 Indigenous Peoples and Cultural Heritage (VCS, 3.18, 3.19)

Around 99% of target communities in the Project Zone identify as Melayu (or Malay) people. Melayu are the second largest ethnic group in Indonesian Borneo after the Dayak and are well-known for their strong Islamic identity. Some of the Malays living on Kalimantan coasts are the descendants of early Hindu-Javanese migrants from the era of the Majapahit Empire (around 600 years ago), while others arrived with the establishment of Islamic Kingdoms or sultanates throughout Kalimantan (such as the Kingdoms of Banjarmasin, Kotawaringin, Pontianak, Kutai, etc 500-200 years ago). Others arrived more recently from Riau (Sumatra) and the Malayan

peninsula. The Melayu people in the Project Zone largely fall into the latter group, sometimes called 'contemporary Malays'. Some of the Melayu communities in the project area share cultural elements with the Srivijaya Kingdom in Sumatra. This can be observed in their Keraton/palace buildings, sultanate tombs, use of local languages and traditional weaving culture. It is believed these communities established themselves sometime between 100 and 120 years ago. It is not known whether these communities were farmers originally; in West Kalimantan however they have mainly been dependent on collecting timber or becoming fishers both in rivers and along the coast.

The project preserves and protects Melayu cultural heritage by supporting:

- Weaving – women's groups weave plant-based seedling pots used in mangrove and other tree planting activities. These pots are used in tree nurseries to replace the more commonly used plastic ones.
- Aquaculture – the project supports small aquaculture farms. Aquaculture has long been practiced by these communities, but often the capital needed to start these small businesses is unavailable locally.
- Islamic teachings about nature – the project works with imams and other religious figures to better communicate project goals and activities through language that draws on parallels with teachings in the Koran
- Supporting traditional decision-making structures and processes – although the project supports women and other groups which historically have little or no decision-making power, it does it within existing structures and processes at the village level.

2.5.5 Statutory and Customary Property Rights (VCS, 3.18, 3.19; CCB, G5.1)

2.5.5.1 Statutory Rights

The original license held by MPK is based on the Decree of the Minister of Forestry Number SK 216 / Menhut-II / 2008 concerning the Granting of Business Permits for Utilization of Timber Forest Products in Natural Forest to MPK over a Production Forest Area of ~48,440 hectare in Ketapang, West Kalimantan Province. Minister of Environment and Forestry Decree No. SK.822/MenLHK/Setjen/HPL.0/9/2021 dated September 21, 2021, regarding the Amendment to the Minister of Forestry Decree No. SK.216/Menhut-II/2008 dated June 9, 2008, concerning the Granting of a Forest Timber Utilization Business License in Natural Forests to PT Mohairson Pawan Khatulistiwa for a Production Forest Area of approximately 48,440 hectares in West Kalimantan Province. Minister of Environment and Forestry Decree No. SK.960/MenLHK/Setjen/HPL.2/9/2022 dated September 5, 2022, regarding the Second Amendment to the Decree No. SK.216/Menhut-II/2008 dated June 9, 2008, concerning the Granting of a Forest Timber Utilization Business License in Natural Forests to PT Mohairson Pawan Khatulistiwa for a Production Forest Area of approximately 48,440 hectares in West

Kalimantan Province. In this decree, there is a change in the area size to 36,973 hectares due to portions being excluded as a result of the TORA (Agrarian Reform Object Land) area.

MPK is currently proposing a Work Area Designation process as a result of the implementation of boundary demarcation which contains the location, boundary, area and boundary coordinate points listed in the Ministerial Decree.

For the purpose of the AFOLU project, 33,747.28 hectares of the concession area make up the Project Area. The remaining 3,247.48 hectares have been excluded from the Project Area as they were allocated by the government for community partnership initiatives with MPK. MPK is still responsible for the entire concession area and will collaborate with community land users to implement sustainable land use management in line with the government's request.

In late-2018 MPK entered into agreement with new investors, a process completed in 2019. This led to new company objectives and so changes in how the company utilized its forestry license. The license is valid from 2008 to 2053 with possible multiple extensions under approval from MOEF (in units of 35 years). The original license granted rights for MPK to selectively log the remaining forested area and to establish timber plantations. Under its new management, MPK's original forest utilization license was altered into a new forest rights scheme named Multi-Business Forest License, regulated under Government Regulation (Peraturan Pemerintah) Number 23/2021 ("GR23/2021") and Ministry of Environment and Forestry Decree no 8/2021. This regulation allows for multiple forestry business models to be implemented over the same license area.MPK is in an ongoing process for getting approval of the revised Multi-Business, which includes a license to utilize the license area for environmental services (including carbon), non-timber forest products and silvo-fishery.

2.5.5.2 Customary Rights

The majority of local community members use land outside of the Mayas Project Area. Two villages have settled inside the southern portion of the concession area (but outside the project area, as detailed in the previous section) and have been cultivating land for the past 1-2 decades. This part of the concession is excluded from the Project Area. The Mayas Project recognizes the dependencies of these three villages on this already cleared land and is committed to not resettling the community while finding suitable tenure arrangements. The Mayas Project will fully recognize customary rights and although not in a position to make these official (this land must remain part of the concession until legally excised by government) the project is forming an association to co-manage the land with communities and ensure resident communities are able to benefit from improved sustainable agricultural practices as much as possible, while supporting a reduction of fire use in this area. As a result, these areas are also likely to generate climate benefits but we have conservatively excluded them by not including them in the project area.

In Indonesia *all* land is subdivided into village administrative units (the smallest administrative unit) including protected areas and concessions. Administratively, therefore the MPK concession overlaps with 12 village boundaries. In practical terms, village settlements are generally far from

village administrative borders, and any forest within those borders is of state property and managed by government authorities unless communities have obtained rights of management and use through one of a series of social forestry licenses. The project is committed to a detailed participatory mapping process to map community patterns of use and customary ownership precisely for each village. Social forestry licenses are usually granted over smaller areas of forest than those within administrative borders. The number of total hectares granted in a social forestry license depends on how high local population levels are and whether forest is close and easily monitored from settlements.

Patterns of use, access points to timber and other resources in the Project Area are outlined in the HCV map (Figure 7).

2.5.6 Recognition of Property Rights (VCS, 3.7, 3.18, 3.19; CCB, G5.1)

Please refer to Sections 2.5.1 to 2.5.5 above.

2.5.7 Free, Prior and Informed Consent (VCS, 3.18; CCB, G5.2)

Description of process for obtaining consent

The Mayas Project will design and implement all project activities in participation with project-zone communities and based on full consultation and FPIC principles. The Mayas Project understands FPIC to be an on-going process, not one that reaches an end-point. As such, the Project commits to high levels of engagement, open communication and consultation to inform adaptive management and ensure meaningful benefits to participating communities throughout the duration of the project.

Outcome of FPIC process

The project has invested considerable resources, time and effort to create participatory maps that define the agreed extent of village land and the agreed boundary of the project area, as well as recognition of other spatially explicit landscape features. These maps also allow the project-zone communities to understand their spatial positions in relation to the project area, and to be able to plan future land use within their village boundaries without disputing other village territories or the project area. This tenure-based approach ensures that rights of the project-zone communities to lands, territories and natural resources are respected and protected.

Mutual understanding of the goals and objectives of the Mayas Project between MPK and the project-zone communities is crucial for long-term success. To this end, and as part of the company's commitment to FPIC and outreach activities having been conducted since 2017 2018 MPK will be signing memoranda of understanding (MoU) with each of 12 village authorities in the project zone. This will likely happen following validation and verification, to avoid raising expectations unnecessarily. Each MoU is initially for a three-year period with opportunity for extension after review and evaluation by the village. These processes are shown graphically below in Figure 11.

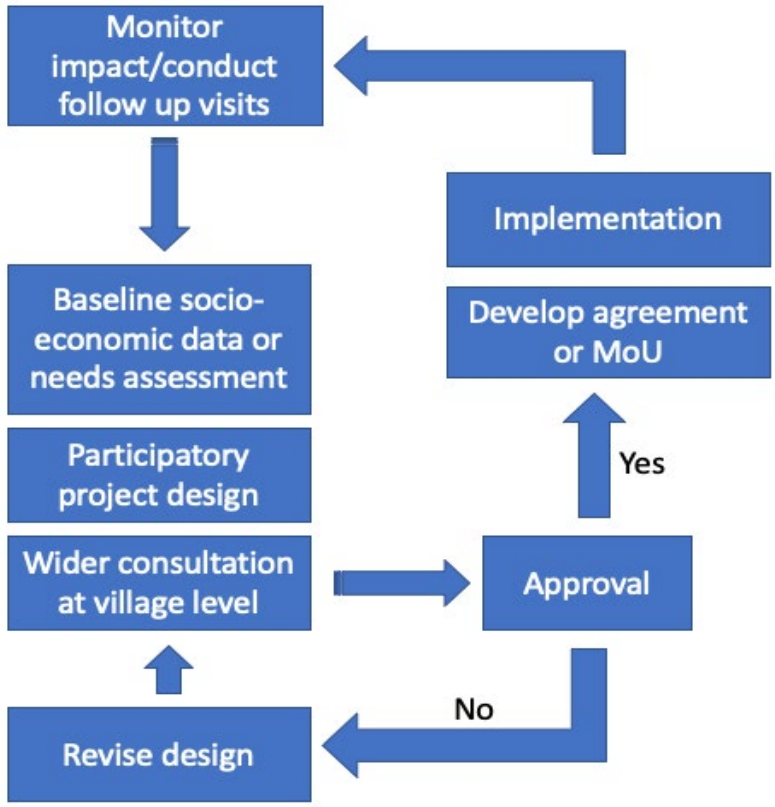


Figure 11. Flow diagram of FPIC processes used by the Mayas Project

2.5.8 Benefit Sharing Mechanisms (VCS, 3.18, 3.19;)

This project does not impact property rights, however it does adopt a policy of benefit sharing for affected stakeholders and local communities living in the proximity of the project. The project's approach to benefit sharing is described in more detail in Section 4.5.6.

2.5.9 Property Rights Protection (VCS, 3.18, 3.19; CCB, G5.3)

As outlined in Section 2.5.5 no voluntary or involuntary removal or relocation will be implemented during this project. No activities important to culture or livelihood will be displaced. Local villagers who depend on illegal logging and hunting practices within the Project Area are a very small minority and will be incentivised to shift from unsustainable livelihoods to sustainable ones which will generate at least as much revenue and will provide better working conditions. This includes other community groups who will be supported to strengthen local governance, monetary and non-monetary wellbeing.

2.5.10 Illegal Activity Identification (VCS, 3.19; CCB, G5.4)

Illegal activities that are either known to occur in the Project Area or Project Zone include:

- Illegal sale of plots of land from within the southern portion of the MPK concession (outside of the project area, as described in Section 2.5.11 below) by members of two villages
- Illegal logging within the boundaries of the MPK concession area with three distinct entry points (from the north and the eastern concession boundaries)
- Illegal hunting of protected species

In all three cases, community members involved in these activities are a very small minority.

Measures to reduce these activities and ensure the risks to project success are minimised include:

- Inclusive awareness raising efforts through community meetings and support in village level land-use and management plan drafting
- Identification of loggers, hunters, and land speculators so as to be able to engage constructively and target their households for involvement in sustainable livelihoods options
- Use community patrols, informants and guard posts to disincentivise the arrival of additional migrant loggers, hunters and land speculators once the resident ones have found other employment
- The creation of village regulations to regulate the security of the village area

Also refer to Section 2.5.4.

2.5.11 Ongoing Disputes (VCS, 3.18, 3.19; CCB, G5.5)

Within the Project Area there are no on-going disputes over land ownership or land rights. Outside of the project area, some communities in the southern portion of the concession (as described above) recognise that the land they use, legally belongs to the state and that management and use rights belong to the concession holder, but they wish to keep using and cultivating it. As described,1 the Mayas Project is collaborating with these two villages (Sukamaju and Sungai Awan Kiri) to co-create a management plan and livelihoods support strategies to improve local community members' wellbeing, while reaching an agreement on eliminating the use of fire within concession boundaries and halting the illegal selling of plots of land to third parties. Halting the use of fire in this portion of the concession is both part of MPK's responsibilities toward the national government and poses serious risks to the short and longer-term success of project activities.

2.5.12 Approvals (CCB, G5.7)

For its operation, MPK has the following approvals (Table 3). Copies of all documents are available on request.

Table 3. List of Formal Approval to the Project

Document Name	Issued by	Approval Purpose
Decision Letter General Secretary Ministry of Forestry and Plantation No 1003/Menhutbun-II/2000 Dated 14 August 2000 on approval of Environment Impact Assessment Document (AMDAL)	Ministry of Forestry and Plantation	This letter provide approval that the operation of the license has passed all regulatory requirements for environmental impact
Decree of the Minister of Forestry Number: SK 216 / Menhut-II / 2008 concerning the Granting of Business Permits for Utilization of Timber Forest Products in Natural Forest to PT Mohairson Pawan Khatulistiwa	Ministry of Forestry	Official license for the rights to utilize timber products in the licensed area
Letter Head of Regional Consolidation Center for Region III Pontianak No. S.551 / BPKH.III / SPKH / PLA.1 / 7/2016 dated 25 July 2016,	Head of Regional Consolidation Center for Region III Pontianak (BPKH)	Designation of final area of the license reduced to 36,994.70hectares
Ministry of Forestry and Environment Decree Letter SK.15/UHP-1/2015 dated 29 October 2015 on the approval of the Work Plan for Utilization of Timber Forest Products in Natural Forest in Production Forests based on Periodic Comprehensive Forest Inventory for the 2016-2025 Period on behalf of PT Mohairson Pawan Khatulistiwa in West Kalimantan Province	Ministry of Forestry and Environment	Approval of the 10 year workplan of MPK for implementing both Selective Logging and Industrial Tree Plantation in the Project Area (baseline scenario)
Head of West Kalimantan Province Forest Office decree letter No 465/Kpts-II/BPHAP/2016 dated 24 March 2016 concerning the Approval of the Annual Work Plan for the Utilization of Timber Forest Products in Natural Forest in 2016	West Kalimantan Province Forest Office	Initial Provincial approval for the 10 year workplan of MPK (baseline scenario)

Document Name	Issued by	Approval Purpose
Production Forests on behalf of PT Mohairson Pawan Khatulistiwa in West Kalimantan Province		
Decree of the Head of the West Kalimantan Provincial Forestry Service No 91/Kpts-II/PKH/2017 dated 29 May 2017 concerning Ratification of the RKT for Businesses Utilizing Timber Forest Products in Natural Forests in the Production Forest of PT Mohairson Pawan Khatulistiwa Year 2017 Decree	West Kalimantan Province Forest Office	Approval of the 2017 RKTPH
Minister of Environment and Forestry Decree No. SK.822/MenLHK/Setjen/HPL.0/9/2021 dated September 21, 2021.	Ministry of Environment and Forestry	Regarding the Amendment to the Minister of Forestry Decree No. SK.216/Menhut-II/2008 dated June 9, 2008, concerning the Granting of a Forest Timber Utilization Business License in Natural Forests to PT Mohairson Pawan Khatulistiwa for a Production Forest Area of approximately 48,440 hectares in West Kalimantan Province.
Minister of Environment and Forestry Decree No. SK.960/MenLHK/Setjen/HPL.2/9/2022 dated September 5, 2022.	Minister of Environment and Forestry	Regarding the Second Amendment to the Decree No. SK.216/Menhut-II/2008 dated June 9, 2008, concerning the Granting of a Forest Timber Utilization Business License in Natural Forests to PT Mohairson Pawan Khatulistiwa for a Production Forest Area of approximately 48,440 hectares in West Kalimantan Province.

2.5.13 Double Counting and Participation under Other GHG Programs (VCS, 3.23; CCB G5.9)

2.5.13.1 No Double Issuance

The project is not receiving or seeking credit for reductions and removals from a project activity under another GHG program, or any other form of community, or biodiversity unit or credit.

2.5.13.2 Registration in Other GHG Programs

The project is currently not registered or seeking registration under other GHG programs. However, as stated on Presidential Decree 98/2021 and Ministry of Forestry Decree no 71/2017 and no 7/2023, the government of Indonesia, requires all carbon project in Indonesia to mandatorily register the project to Indonesian Registry System (SRN) and follow prevalent regulation pertaining to the Economic Valuation of Carbon (NEK). Registration in SRN means that the project opens a registry account, listed. produces a 'DRAM' (PDD), gets validated and the emission reduction is verified. As of monitoring period, MPK has not started registered to open an account. The project believes that the voluntary carbon market can contribute to the fulfilment of Indonesia's NDC's without double claiming the VCU/carbon credit.

2.5.13.3 Projects Rejected by Other GHG Programs

Has the project been rejected by any other GHG programs?

☐ Yes ☒ No

The project has never been rejected by any other GHG program.

2.5.14 Double Claiming, Other Forms of Credit, and Scope 3 Emissions (VCS, 3.24)

2.5.14.1 No Double Claiming with Emissions Trading Programs or Binding Emission Limits

Project reductions and removals or project activities will not be included in another emissions trading program or binding emission limit.

The Mayas Project will never deliberately seek to double count emissions. The project will generate voluntary carbon units that will be retired to international parties which are not obliged to contribute to other country's NDC. By doing this, the Indonesian Government does not need to make a Corresponding Adjustment to their reports of GHG reductions against the country's Nationally Determined Contribution (NDC) target. As such, the carbon finance and implementation support generated by this project will help Indonesia meet its NDC target and thus support the achievement of the Paris Agreement.

The credits generated by the project will be reported to the Indonesian authorities in line with obligations under Minister of Environment and Forestry Regulation P71/MENLHK/SETJEN/KUM1/12/2017, Presidential Decree no P98/2021 on Economic Valuation

of Carbon, Ministry of Environment and Forestry Decree No 21/2022 on the governance of Economic Valuation of Carbon, and any relevant future regulations.

2.5.14.2 No Double Claiming with Other Forms of Environmental Credit

The project activity has not sought, received, or is planning to receive credit from another GHG-related environmental credit system.

2.5.14.3 Supply Chain (Scope 3) Emissions

The project activities do not affect the emissions footprint of any products, goods or services that are part of a supply chain.

2.6 Additional Information Relevant to the Project

2.6.1 Leakage Management (VCS, 3.11, 3.15)

Not applicable. Under the Mayas Project, the project proponent, MPK is also the baseline agent, albeit under different management. The proponent/baseline agent only has control over resource use in the project area (via the concession license) and has no access to other forest resources or licenses. Based on this, leakage is therefore deemed zero. For further information see Section 3.2.3Further Information

Not applicable (no further information).

3 CLIMATE

3.1 Application of Methodology

3.1.1 Title and Reference of Methodology (VCS, 3.1)

Mayas Project applies the latest and most applicable methodology, modules and tools. All applied methodology, modules and tools are listed in the table below.

Type (methodology, tool, module)	Reference ID (if applicable)	Title	Version
Methodology	VM0007	VM0007 REDD+ Methodology Framework (REDD+MF),	Version 1.8, 04 June 2024
Modules	VMD0016 - X-STR	Methods for stratification of the project area (X-STR)	Version 1.3, 27 November 2023
Modules	VMD0001 - CP-AB	Estimation of carbon stocks in the above- and belowground biomass in live tree and non-tree pools (CP-AB)	Version 1.2, 27 November 2023
Modules	VMD0005 - CP-W	Estimation of carbon stocks in the long-term wood products pool (CP-W)	Version 1.2 27 November 2023
Modules	VMD0006 - BL-PL	Estimation of baseline carbon stock changes and greenhouse gas emissions from planned deforestation/forest degradation and planned wetland degradation(BL-PL)	Version 1.4, 27 November 2023
Modules	VMD0013 - E–BPB	Estimation of greenhouse gas emissions from biomass and peat burning (E–BPB)	Version 1.3, 27 November 2023
Modules	VMD0042 – BL-PEAT	Estimation of baseline soil carbon stock changes and greenhouse gas emissions in peatland rewetting and	Version 1.1. 08 September 2020

Type (methodology, tool, module)	Reference ID (if applicable)	Title	Version
		conservation project activities (BL-PEAT)	
Modules	VMD0046 – M-PEAT	Methods for monitoring of soil carbon stock changes and greenhouse gas emissions and removals in peatland rewetting and conservation project activities (M-PEAT)	Version 1.1. 08 September 2020
Modules	VMD0017 – X-UNC	Estimation of uncertainty for REDD project activities (X-UNC)	Version 2.2, 08 September 2020
Modules	VMD0015 - M-REDD	Methods for monitoring of greenhouse gas emissions and removals (M-REDD)	Version 2.3, 27 November 2023
Modules	VMD0009 - LK-ASP	Estimation of emissions from activity shifting for avoiding planned deforestation/forest degradation and avoiding planned wetland degradation (LK-ASP)	Version 1.3, 08 September 2020
Modules	VMD0044 – LK-ECO	Estimation of emissions from ecological leakage (LK-ECO)	Version 1.1. 08 September 2020
Tools	VT0001	Tool for the Demonstration and Assessment of Additionality in VCS Agriculture, Forestry and Other Land Use (AFOLU) Project Activities	Version 3.0, 1 February 2012
Tools	NPRA	AFOLU Non-Permanence Risk Tool	Version 4.2, 03 May 2024

3.1.2 Applicability of Methodology (VCS, 3.1)

Mayas Project activities meet each Applicability Condition of applied methodologies, tools and modules as described in the table below

Reference ID/Title	Applicability condition	Justification of conformance
VMD0006 BL-PL	Baseline deforestation and baseline forest degradation in the project area fall to Planned deforestation/degradation (VCS category APD)	The concession letter and Management Plan/RKU (Rencana Karya Umum) document state that a certain proportion of forested areas within the concession area are planned to be converted into a managed timber plantation and selective logging. This confirms that the baseline scenario is Planned Deforestation/Degradation (corresponding to VCS category APD).
VMD0006 BL-PL	Baselines shall be renewed every 10 years from the project start date.	The Project is committed to renew the baseline case at least every 10 years from the start date of 1st January 2019.
VM007 REDD+ MF	All land areas registered to other carbon trading schemes (both voluntary and compliance orientated) must be excluded from the project area	No land within the concession area is registered to other carbon trading schemes.
VMD0006 BL-PL	If land is not being converted to an alternative use but will be allowed to naturally regrow, this framework shall not be used.	As stated in the RKU document, most of the forested area is planned to be converted into a timber plantation and selective logging. The document also plans a small percentage of forest area to be cleared for construction of a canal and railway to support transportation within the concession. The canal would always contain water and be maintained/deepened regularly, therefore natural regrowth would not occur along the canal. The area along the railway would remain clear vegetation as this would always be used for log transportation.
VMD0006 BL-PL	Conversion of forest lands to a deforested condition must be legally permitted	The government-endorsed RKU document designates 16,255hectare of forested area within the concession area to be converted into a managed timber

Reference ID/Title	Applicability condition	Justification of conformance
		plantation in the absence of the project. This confirms that the conversion of forest is legally permitted.
VMD0006 BL-PL	Documentation must be available to clearly demonstrate with credible evidence and documentation that indeed the land would have been converted to non-forest use if not for the REDD project.	The RKU provides an annual plan of forest conversion as basis for the company to convert forest to a timber plantation and selective logging in the absence of a REDD project. This is credible evidence and demonstrates that without the Project the forest would have been converted to non forest use.
VMD0006 BL-PL	Where, pre-project, unsustainable fuel wood collection is occurring within the project boundaries, modules BL-DFW and LK-DFW shall be used to determine potential leakage.	No unsustainable fuel wood collection is occurring within the project area, therefore, modules BL-DFW and LK-DFW shall not be used to determine potential leakage.
VMD0042 – BL-PEAT	This module is applicable to RDP and CUPP activities on project areas that meet the VCS definition for peatland.3 The scope of this module is limited to domed peatlands in the tropical climate zone.	Project area is situated at the dome summit of Pawan peat dome.
	It must be demonstrated by using the latest version of T-SIG that N_2O emissions in the project scenario are not significant, or that N_2O emissions will not increase in the project scenario compared to the baseline scenario, and therefore N_2O emissions need not be accounted for.	Project activities do not include any fertilizer application. N2O emissions in the baseline would likely be much higher than claimed due to Nitrogen application in acacia/jabon plantations.
	In the baseline scenario the peatland must be drained or	As documented in the RKU of the baseline agent, the project area would

Reference ID/Title	Applicability condition	Justification of conformance
	partially drained. At the start of the project the peatland may still be undrained.	be drained for acacia/jabon timber plantations in the baseline scenario.
VMD0046 – M-PEAT	The project area must meet the VCS definition for peatland. This module is limited to domed peatlands in the tropical climate zone.	As evidenced by a peat survey and mapping results, project area falls into the peatland category, and sits at the dome summit of a peat dome.
	It must be demonstrated using tool T-SIG that N2O emissions in the project scenario are not significant, or it must be demonstrated that N_2O emissions will not increase in the project scenario compared to the baseline scenario, and therefore N_2O emissions need not be accounted for.	Project activities do not include any fertilizer application. N2O emissions in the baseline would likely be much higher than claimed due to Nitrogen application in acacia/jabon plantations.
	In the baseline scenario the peatland must be drained or partially drained.	As documented in the RKU of the baseline agent, the project area would be drained for acacia/jabon timber plantations in the baseline scenario. Part of the area had been drained at the time of the project start date, but the majority of the area has not been drained.
	At project start the peatland may still be undrained. It must be demonstrated using Module LK-ECO that ecological leakage must not occur.	Rewetting efforts in the project activity will be designed appropriately to prevent ecological leakage.
VMD0013 – E-BPB	This module is applicable to REDD project activities with emissions from biomass burning and REDD-WRC project activities with emissions from biomass	As evidenced in the proxy area and within Project Area itself, peat combustion from uncontrolled burning is expected to occur in the baseline scenario.

Reference ID/Title	Applicability condition	Justification of conformance
	and/or peat burning. This module is also applicable to RWE and ARR-RWE project activities with emissions from peat burning.	
VMD0009 – LK-ASP	This tool must be used for projects in areas where planned deforestation happens on forested wetlands, regardless of the absence of wetland within the project boundaries.	The Project Area is forest land that is likely to be converted or degraded in the baseline scenario.
	The module is mandatory if Module BL-PL has been used to define the baseline, and the applicability conditions in Module BL-PL must be complied with in full.	BL-PL has been chosen as one of the modules used in this project.
VMD0016 – X-STR	Any module referencing strata must be used in combination with this module.	Modules requiring stratification are used in this project.
	In case of REDD, aboveground biomass stratification is only used for pre-deforestation/degradation forest classes, and strata are the same in the baseline and the project scenario.	Peatland and non-peatland are recognized using this module.
	For peatland rewetting and conservation project activities this module must be used to delineate non-peat versus peat and to stratify the peat according to peat depth and soil emission characteristics, unless it can be	Peatland area in the project is stratified.

Reference ID/Title	Applicability condition	Justification of conformance
	demonstrated that the expected emissions from the soil organic carbon pool or change in the soil organic carbon pool in the project scenario is de minimis	
	In the case of WRC project activities, the project boundary must be designed such that the negative effect of drainage activities that occur outside the project area on the project GHG benefits are minimized	Cross boundary effects of drainage outside of the Project Area will be minimized or taken into account explicitly in the project activity.
VMD0017 – X-UNC	This module is mandatory when using methodology REDD+ MF. It is applicable for estimating the uncertainty of estimates of emissions and removals of CO2-e generated from REDD and WRC project activities.	This project uses the REDD+ MF.
VMD0044 – LK-ECO	This module is applicable under the following condition: Leakage caused by hydrological connectivity is avoided by project design and site selection	Hydrological restoration design in this project is planned to avoid any hydrological disturbance outside Project Area.
VT0001	AFOLU activities the same or similar to the proposed project activity on the land within the proposed project boundary performed with or without being registered as the VCS AFOLU project shall not lead to violation of any applicable law even if the law is not enforced.	The AFOLU activities proposed by the Project are allowed in the Multi-Business scheme of license held by the Project Proponent, as governed under MOEF Decree no 8/2021. Moreover, the RKU and RKT contain the same activities as the proposed Project Scenario, and has been approved by MOEF.

Reference ID/Title	Applicability condition	Justification of conformance
	The use of this tool to determine additionality requires the baseline methodology to provide for a stepwise approach justifying the determination of the most plausible baseline scenario Project proponent(s) proposing new baseline methodologies shall ensure consistency between the determination of a baseline scenario and the determination of additionality of a project activity	The project has applied the stepwise approach to determine the most plausible baseline scenario resulting in planned deforestation and degradation from continuation of timber logging concession as the single plausible baseline scenario. The proposed project activities are additional to the baseline scenario as it entirely dependent on creation of a carbon project

3.1.3 Project Boundary (VCS, 3.12)

3.1.3.1 Spatial Boundary

The project location, boundary and geographic coordinates are given above in Section 2.1.16. The spatially explicit sub-sets of this project area to which each methodology module is applied are given below in Table 4, Figure 12 and Figure 13. The location of project activities and infrastructure is described and mapped above in Section 2.1.16.

The potential for sea-level rise to impact the project boundary has been assessed. Minimum soil surface elevation in the project area at the project start date is c.3 m-msl. Accounting for 0.3 – 1.3 m sea level rise in 2100, the project area is predicted to be safe from future-anticipated sea encroachment under our management. Sea level rise impact on the drainage practice in the baseline scenario is also predicted not to be severe. With the rising sea level in the future, gravity drainage may become difficult during high tides, but this problem can practically be solved by implementing tidal drainage system; a technique that have been practiced by many plantations and in government agriculture programs in Indonesia since 1980. With these premises we considered that no further project boundary adjustment is required.

Table 4. Project areas by methodology

Area/Methodology	Area (ha)	Map
VM0010-APDeg	13,084.54	Figure 12
VM0007-APD	16,810.06	Figure 12
VM0007-WRC	32,729.8	Figure 13

Area/Methodology	Area (ha)	Map
Non APDeg-APD-WRC Area	592.73	Figure 13
All Project Area	33,747.3	Figure 7(Section 2.1.10)

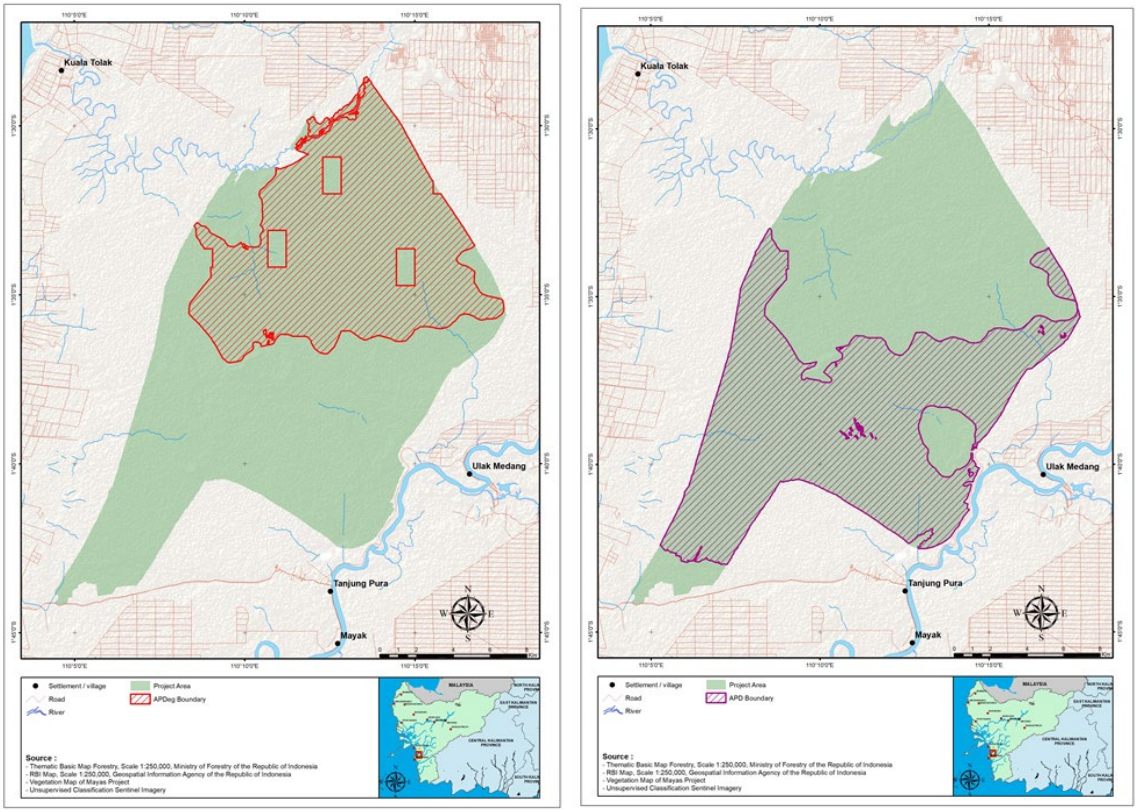


Figure 12. Map of APDeg Project Boundary (left), Map of APD Project Boundary (right)

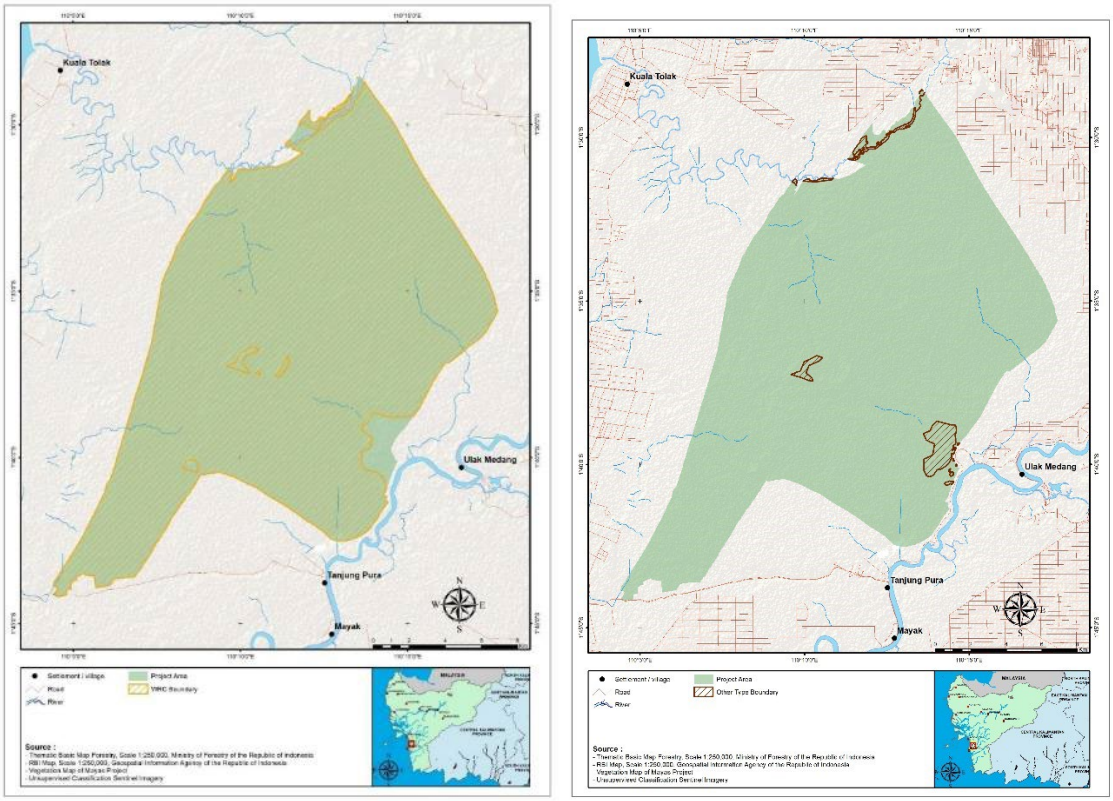


Figure 13. Map WRC Project Boundary (left) Other Non-APD-APDeg-WRC (right)

3.1.3.2 Temporal Boundary

See sections 2.1.10-12 above.

3.1.3.3 Carbon Pools

Carbon pools included in the Mayas Project are shown by methodology in table below (Table 5). All obligatory carbon pools required by the methodologies are included.

Table 5. Carbon pools included in the Mayas Project

Carbon pool	Methodology	Sub-c pool	Inclusion	Justification
Above-ground biomass	VM0007-APD	Tree biomass	Included	Carbon stock change in this pool is always significant
		Non-tree biomass	Excluded	Per VM0007, herbaceous vegetation/non-tree biomass is conservatively excluded
	VM0007-APDeg	Tree biomass	Included	Carbon stock change in this pool is always significant

Carbon pool	Methodology	Sub-c pool	Inclusion	Justification
		Non-tree biomass	Excluded	Excluded as this is conservative when forests remain as forest
Below-ground biomass	VM0007-APD		Excluded	There is risk of double calculation with peat, therefore conservatively excluded
	VM0007-APDeg		Excluded	
Dead wood	VM0007-APD		Excluded	Deadwood is excluded as it will not be greater in the baseline (i.e. cleared land for roads) compared with the project scenario (i.e. primary tropical forest)
	VM0007-APDeg	Logging slash	Included	This will be greater in baseline than the project scenario and is therefore included
		Naturally accumulated	Excluded	This is assumed that carbon stocks in the naturally occurring dead wood pool are equivalent in both the project and baseline scenario. Based on this, this pool is conservatively excluded
Harvested wood products	VM0007-APD		Excluded	This pool is excluded since the process of deforestation in APD area doesn't specifically involve timber harvesting for commercial market
	VM0007-APDeg		Included	All timber above the DBH of 30 cm are assumed to be harvested for commercial timber production, and are therefore allocated to the harvested wood products pool
Litter	VM0007-APD		Excluded	There is risk of double calculation with peat, therefore conservatively excluded
	VM0007-APDeg		Excluded	

Carbon pool	Methodology	Sub-c pool	Inclusion	Justification
Mineral soil organic carbon pool	VMD0043 – BL-PEAT		Excluded	This pool is not relevant
Peat soil organic carbon	VM0007-APD		Excluded	Covered by VMD0043 (BL-PEAT)
	VM0007-APDeg		Excluded	
	VMD0043 – BL-PEAT		Included	97% of Project Area located in Peat deposit land

3.1.3.4 Source of Emissions

Significant sources of emissions in the Mayas Project are shown in the tables below (Table 6 and Table 7), split by relevant methodology module, scenario and source. Insignificant sources of emission are not listed in the table below.

Table 6. GHG source of emission from REDD-APD and APDeg

Source		Gas	Included?	Justification/explanation
Baseline	Burning of woody biomass	CO2	Yes	Mandatory
		CH4	Yes	Mandatory
		N2O	yes	Mandatory
		Other	N/A	N/A
	Combustion of fossil fuels	CO2	No	Conservatively excluded
		CH4	No	Potential emissions are negligible
		N2O	No	Potential emissions are negligible
		Other	N/A	N/A
	Use of fertilizer	CO2	No	Potential emissions are negligible
		CH4	No	Potential emissions are negligible
		N2O	No	Conservatively excluded
Project		CO2	Yes	Mandatory

Source		Gas	Included?	Justification/explanation
	Burning of woody biomass	CH4	Yes	Mandatory
		N2O	Yes	Mandatory
		Other	N/A	N/A
	Combustion of fossil fuels	CO2	No	Can be neglected as this is exclude from baseline accounting
		CH4	No	Potential emissions are negligible
		N2O	No	Potential emissions are negligible
		Other	N/A	N/A
	Use of fertilizer	CO2	No	Potential emissions are negligible
		CH4	No	Potential emissions are negligible
		N2O	No	Excluded from the baseline and therefore project accounting.

Table 7 GHG source from WRC

Source		Gas	Included?	Justification/explanation
Baseline	Microbial decomposition of peat soils	CO_2	Yes	Natural water tables of coastal peatlands of Indonesia are very shallow, close to the soil surface for most the year. Only native or plant species adapted to prolonged flooding or near-saturation can survive in these conditions. Therefore, it has become standard practice by plantation companies or agricultural programs on peatlands to apply drainage to create more favourable conditions for dry-land plant species such as Oil Palm, Acacia and Jabon. Peatland drainage has been known to accelerate microbial decomposition of peat soils (see for example Hooijer, et.al. 2006). When the water

Source		Gas	Included?	Justification/explanation
				table is lowered via drainage, the magnitude and duration of water saturation of the upper layer of peat soils is reduced, allowing more oxygen to enter soil pores. This facilitates microbial decomposition of the organic matter of peat soils; which releases various gases to the atmosphere, including CO_2.
		CH_4	No	Conservatively excluded
		N_2O	No	Conservatively excluded
		Other	No	None
	Uncontrolled burning (combustion) of peat soils	CO_2	Yes	Recurrent fires have become a regular threat to the sustainability of coastal peatlands of Indonesia for decades. This anthropogenic impact is closely related to drainage. Fire has historically been present within the MPK concession boundary and the surrounding Project Area. Peat combustion, like any other aerobic combustion of organic matter, releases various gases to the atmosphere, among others CO2, CH4 and N2O.
		CH_4	Yes	Idem
		N_2O	Yes	Idem
		Other	No	None
Project	Microbial decomposition of peat soils	CO_2	Yes	At the start of this project a small area of peatland had been drained. CO2 release from this area is accounted for and will be monitored, as well as any other part evidently subject to drainage.
		CH_4	No	De minimis
		N_2O	No	The deforestation agent was very likely to apply Nitrogen fertilizers in the baseline scenario (common practice for such plantations). The project proponent will avoiding any Nitrogen application as part of project activities. Therefore,

Source		Gas	Included?	Justification/explanation
				N2O emission is expected to be much larger in the baseline than that in the project scenario.
		Other	No	None
	Uncontrolled combustion of peat soils	CO_2	Yes	Uncontrolled burning during the project period will be monitored and GHG release will be accounted for.
		CH_4	Yes	Idem
		N_2O	Yes	Idem
		Other	No	None

3.1.4 Baseline Scenario (VCS, 3.13)

See Section 3.1.5 below.

3.1.5 Additionality (VCS, 3.14)

3.1.5.1 Regulatory Surplus (VCS, 3.14)

The Mayas project is located in a UNFCCC Non-Annex 1 country. The project activities are not mandated by any law, statute or other regulatory framework.

3.1.5.2 Additionality Methods (VCS, 3.14)

The project baseline (Section 3.1.4) and project additionality are considered in parallel using VT0001: Tool for the Demonstration and Assessment of Additionality in VCS Agriculture, Forestry and Other Land Use (AFOLU) Project Activities (Version 3.0). This tool is applicable for use with VM0007.

Per VCS Standard V4.7, the baseline scenario represents the activities and GHG emissions that would occur in the absence of the project activity. In the case of the Mayas Project, the baseline scenario identified is planned selective logging and industrial timber plantation activities which were formally approved by the Government of Indonesia in 2016 and which were underway by early 2017. This baseline scenario and the additionality of the project activity were determined using VT0001 in the steps described in detail below.

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

In this step, alternative land use scenarios that represent plausible baseline scenarios have been determined following the sub-steps:

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

The list of scenarios below (in Table 8) is derived from existing land uses in the Project Area surroundings as well as an analysis of past and current trends and practices on peatland areas in Kalimantan and Indonesia, regardless of the tenure status of the land. From seven alternative scenarios, only one, the mining scenario, was dropped as no mining activity is present now or known historically in the project area.

Table 8. List of credible land use scenario (Sub-step 1a)

Scenarios	Land use options
Industrial tree plantation (status quo)	Very common, huge expansion in early 2000s-2010s. In the approved management plan (RKU), c.60% of the area is designated for this use. Construction of core drainage canals began in 2016. See Figure 14.
Commercial oil palm plantation	Common on peat, but not on areas designated by government as forest estate (as is the case for the MPK concession). Most cases of oil palm plantations within the forest estate area involve communities or smallholders (see Sub-step 1b). Oil palm is more common on land excised from the forest estate (APL), or land earmarked for excise (HPK). See Figure 14.
Selective logging (status quo)	Much of the peat forests of Kalimantan were selectively logged in the 1970s-90s including the Project Area. The original 2008 MPK license was issued as a logging license but was subsequently amended such that only c.40% was designated for selective logging. See Figure 14.
Unprotected forest	Such areas exist but are generally transitional; existing as a state between commercial exploitation and illegal local exploitation (logging, clearance / fire, then agriculture, typically by smallholders). Since 2011, most unlicensed (existing or pending) peat or forest areas have been placed under moratorium, which provides protection from legal planned commercial exploitation, but little practical protection from illegal local exploitation.
Protected forest (project)	As above, while some legal protection is provided through the moratorium and other regulations, these do not apply to areas that were already licenced or subject to a pending application in 2011. In theory the area could be designated as a national park or other similar protected area, but none have been created in the recent decade, so in all practical senses the area would be unprotected and vulnerable to unplanned degradation (logging, fire, drainage). NGO-based conservation projects have been suggested or created in some areas, but these are typically donor-based and therefore typically small-scale and short-lived.

Scenarios	Land use options
Small-holder agriculture	Common all over Kalimantan, but mostly in non-peat or shallow peat areas. Tends to be closer to access points such as roads, rivers/coasts (sand, mineral or shallow peat). Considered here due to prevalence in general. Often a strategy for illegal land speculation.
Mining	Some sandy ridges, heath forest and mineral soils area on the edge of peatlands occasionally have gold deposits which attracts miners, either legal or illegal. Mining activities are normally nomadic, once stock is depleted, miners will move to other areas. No known mining activity occurs within the project area.

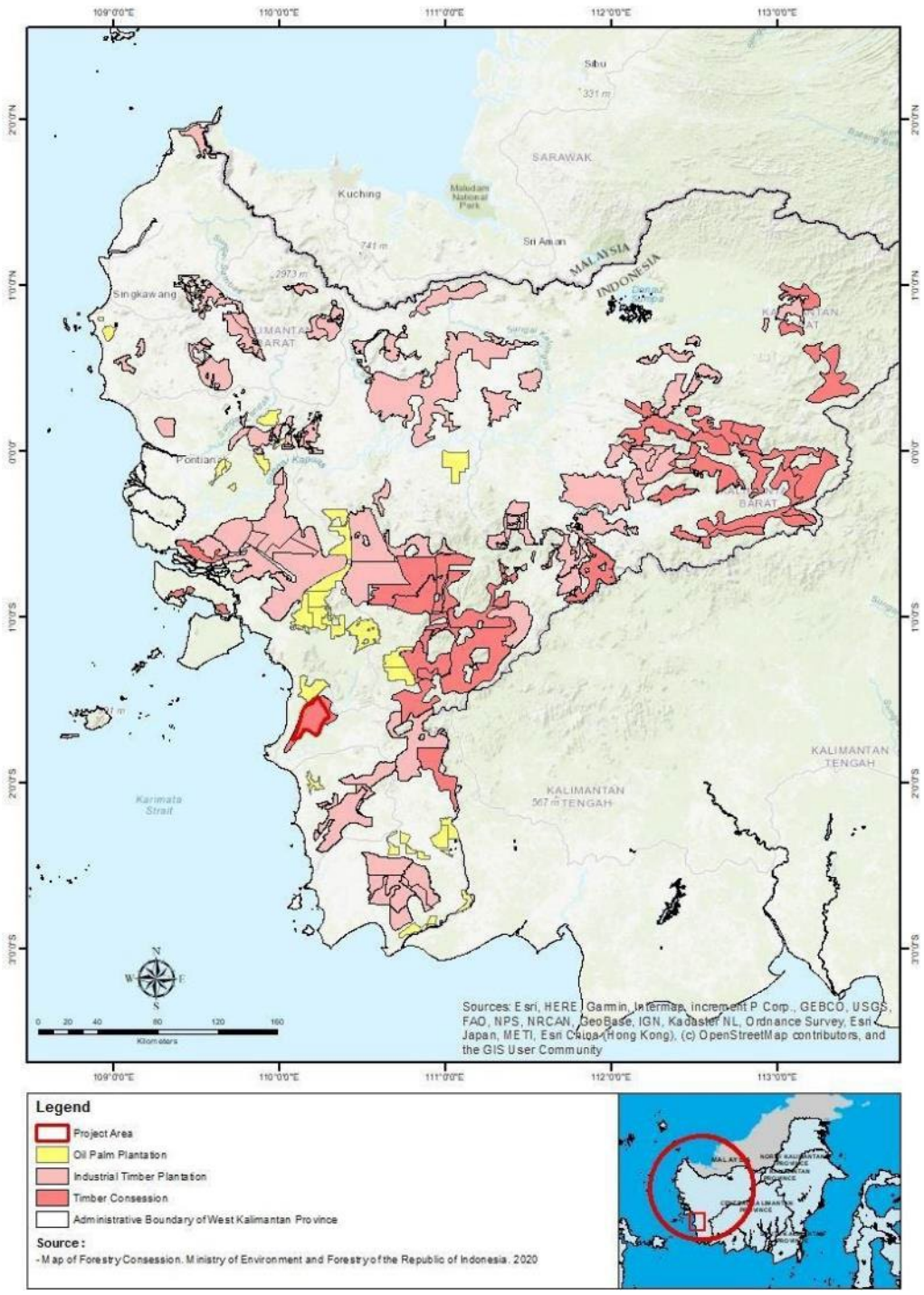


Figure 14. Map of timber concession, industrial timber plantation, and oil palm plantation in West Kalimantan

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

This step involves assessing the remaining six scenarios for compliance with relevant and mandatory legal and regulatory requirements (Table 9). Mandatory legal and regulatory requirements related to the forestry sector, nature conservation and peatland management are listed in Section 2.5.7 and Appendix 5. Based on this sub-step, only industrial tree plantation and selective logging comply with all mandatory applicable legal and regulatory requirements. While commercial oil palm and smallholder agriculture are not legal, these practices still exist in the region where regulations are not effectively enforced, and so they are retained for now.

Table 9. List of credible alternative land use scenario with enforced mandatory applicable laws and regulations

Scenarios	Sub-step 1b
Industrial tree plantation (status quo)	This the legal and approved land use for c.60% of the project area based on the government approved management plan (RKU). The Indonesian Moratorium on new applications in peat and forest areas has never included the project area as the MPK license was issued in 2008 prior to the moratorium. Peat regulations issued in 2014 (revised in 2016) could theoretically impose restrictions on the drainage depth permissible within tree plantations on peat, however drainage is still allowed, and a strict interpretation of the regulations was seldom enforced at the time, including within the project area, as demonstrated by the government's approval of MPK's management plan in 2016 and the company's creation of primary drainage canals in early 2017.
Commercial oil palm plantation	Not legal, as the project area lies entirely within the production forest estate. However, there are cases of oil palm plantation being illegally established within forest estate areas, either via local government licenses or smallholders/community plantations.
Selective logging (status quo)	Legal and approved on c.40% of Project Area based on the government approved management plan (RKU). The Indonesian Moratorium on new applications in peat and forest areas has never included the project area as the MPK license was issued in 2008 prior to the moratorium (started in 2011). Peat regulations issued in 2014 (revised in 2016) could theoretically impose restrictions on the drainage depth permissible within selective logging concession on peat, however drainage is still allowed, and a strict interpretation of the regulations was seldom enforced at the time, including within the project area, as demonstrated by the government's approval of MPKs management plan in 2016 and the company's creation of primary drainage canals by early 2017.
Unprotected forest	Not legally possible without a revocation of the existing license.

Scenarios	Sub-step 1b
Protected forest (project)	Not legally possible without a revocation of the existing license.
Smallholder agriculture	Not legal, but very common in the region due to a lack of effective law enforcement.

Sub-step 1c. Selection of the baseline scenario

Based on the above steps, a continuation of the existing pre-project land use of industrial tree plantation (c. 60% of the project area) and selective logging (c. 40% of the project area) is selected as the baseline scenario, corresponding to the approved management plan underway at the time. Two other scenarios, commercial oil palm and smallholder agriculture, are also retained for consideration under the barrier analysis (Step 3) as while not legally permissible, they are still prevalent due to ineffective law enforcement.

Step 2. Investment analysis

Investment analysis was performed in addition to Barrier Analysis (Step 3) for completeness, despite the tool proposing them as alternatives.

Sub-step 2a. Determine appropriate analysis method

Per the tool, as the VCS AFOLU project generates no financial or economic benefits other than VCS related income, the simple cost analysis approach was selected (Option I).

Sub-step 2b: Apply simple cost analysis / benchmark analysis

As demonstrated by project budget and financial forecasts made available to the auditors (see Sections 2.1.22and 2.4.5), the Mayas project has no source of revenue other than VCS related income. In comparison, the baseline activity is predicted to be a profitable venture, as demonstrated by documentation made available to the auditors as part of the NPV comparison presented in support of the Non-Permanence Risk Assessment (Internal Risk/Opportunity Cost).

Step 3. Barrier analysis

As stated above, four scenarios were entered into the barrier analysis: the existing pre-project land use of industrial tree plantation and selective logging (identified as the baseline scenario) together with commercial oil palm and smallholder agriculture.

Sub-step 3a. Identification of barriers that would prevent the implementation of at least one alternative land use scenarios

Barriers which prevent the various scenarios taking place in the project area are listed below in Table 10.

Table 10. Identification of barrier in alternative land use scenario

Scenarios	Sub Step 2a
Industrial tree plantation (status quo)	There are no financial barriers for this scenario. MPK had raised sufficient finance and had begun to implement their approved plan through canal construction. There are no institutional barriers. Government policies supported the delivery of land use plans per license terms allowing baseline scenario to proceed legally. The creation of the peat regulations in 2014 (revised in 2016) did create some policy challenges, but the practices of industrial tree plantation on peat were still allowed with some adjustments. There are no technological barriers to implementing a tree plantation or conducting selective logging in the project area, as there are multiple precedents in West Kalimantan and across Indonesia, both on and off peatland. There are no barriers based on local traditional use. The majority of the area is not under any local traditional use, and such use if it did occur creates no impediment to the establishment of a legally sanctioned plantation. There are no barriers based on prevailing practice. The baseline scenario is common practice in Indonesia. There are no barriers based on ecological conditions. The baseline scenario is commonly practiced on peatland across Kalimantan and Sumatra. There are no barriers based on social conditions. The project area has no permanent settlements within it and is not utilized as farmland. There are no barriers associated with land tenure. The project area is state land, designated as production forest, and licensed to MPK since 2008.
Commercial oil palm plantation	The primary barrier to this scenario is legal as the project area is on forest estate and therefore not eligible for an agricultural plantation. In the case of this project area, the site is also currently licensed to MPK, which would prevent it being licenced to another company, even if permitted by law. There would also be financial barriers to this scenario at a large commercial scale, as raising conventional investment finance for an illegal activity would not be viable. There are also ecological barriers to establishing oil palm on peat soils, as it requires deep drainage and the growing trees are prone to lodging. Tree crops such as acacia are more suited.

Scenarios	Sub Step 2a
Selective logging (status quo)	As per industrial tree plantation above.
Protected forest (project)	There are considerable financial barriers to implementing the project activity – forest protection and restoration – in the absence of carbon finance. Managing a site of this size effectively for the remaining period of the license term and beyond requires financing beyond the limits of available philanthropic donations. While some funding may be available initially such high levels of funding are rarely sustainable. There are also institutional barriers; the project area is licensed for production and lies within the production forest estate. Its intended purpose is to raise revenue and economic benefit to the state. Obtaining long-term management right to the area without a valid business plan is unlikely to obtain government support – indeed presenting that business plan is a requirement of the licensing terms.
Smallholder agriculture	The main barriers to this scenario are legal and land tenure related: this scenario can only exist if the current license was being neglected, however at the project start date activity was already underway to drain, convert and log the Project Area. There are also investment and technological barriers for smallholder agriculture within the Project Area, as to be productively cultivated peatland must be heavily fertilized and the water table lowered through extensive drainage. Both require substantial investment capital and technological knowledge.

Sub-step 3b. Show that the identified barriers would not prevent the implementation of at least one of the alternative land use scenarios (except the proposed project activity)

Based on the analysis above (Sub-step 3b) both commercial oil palm plantation and smallholder agriculture are prevented by one or more identified barriers. Therefore, a continuation of the existing pre-project land use of industrial tree plantation (c. 60% of the project area) and selective logging (c. 40% of the project area) is identified as the project baseline.

Step 4. Common practice analysis

Effective management of intact peatland forest on land designated for production and held under license by an active plantation and logging company is not common practice in Indonesia. Outside of legally designated protected areas, and without the prospect of revenues from carbon finance, few examples exist. Those that do tend to be small projects backed by philanthropic donors, and

even in these cases, the projects can lead to conflict with local government or communities as the areas are perceived as making no financial contribution to the state, despite being designated for production. Other examples include other forms of offset projects whereby large corporates are paying management costs of the site as reparations for areas damaged as part of their operations elsewhere. These are rare and typically very small in extent. Based on this analysis the project activity is considered additional.

3.1.5.2.1 Detailed description of the baseline management

At the time of the project start date MPK was operating to an approved management plan (Figure 15), a copy of which is available to auditors on request. This management plan forms the basis for the project baseline, and the basis for the spatial separation of areas designated as REDD-APDeg and REDD-APD (see Figure 15), and for the planned activities that were to have occurred there. Similarly, the management plan details the drainage plans across the concession area, which are used as the basis for the WRC baseline. In the following sections the baseline activity drawn from this management plan, as applicable to the spatially explicit areas (REDD, WRC) are described in turn.

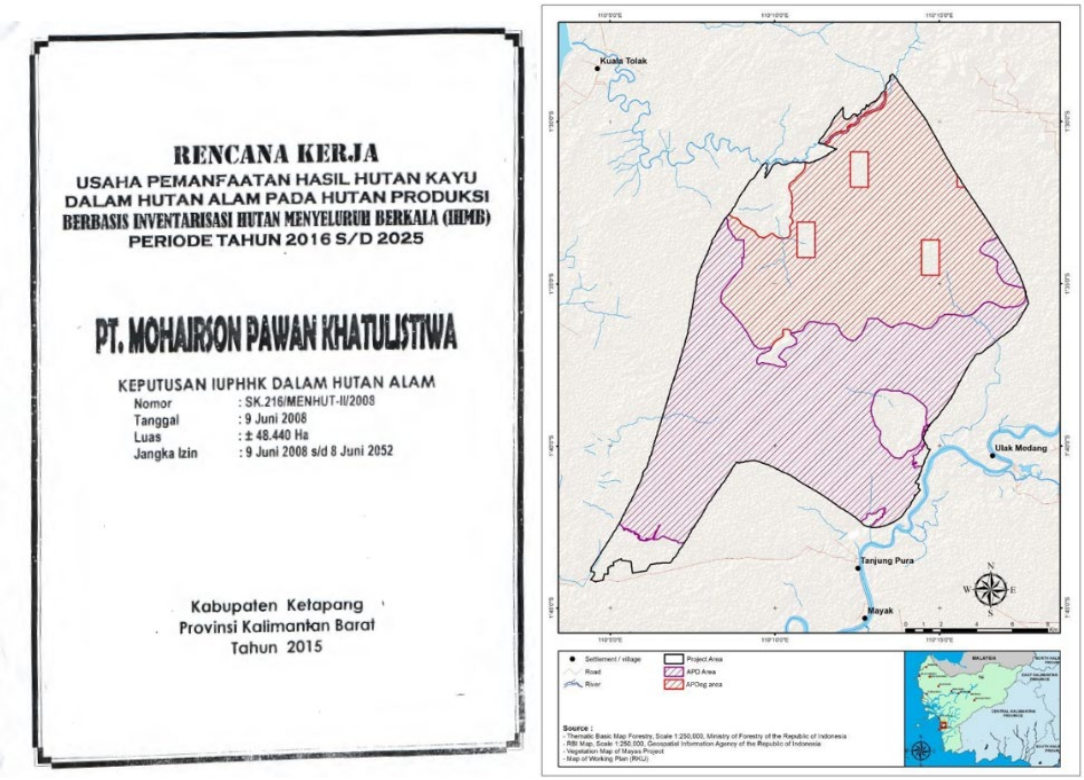


Figure 15. MPK's approved management plan (left), The project area showing spatial separation of APDeg and APD areas based on the approved management plan (right)

3.1.5.2.2 Baseline management of REDD-Avoiding Planned Degradation (APDeg) area

The approved management plan provides a detailed timber harvest plan for the planned logging activities. This was developed based on a forest inventory and resulted in the designation of the 15,338.93 ha area into three zones: non-productive area (1,266.32 ha), protected area (711.59 ha), and timber logging area (13,361.02 ha), shown in Figure 16. Within the management plan these areas are further broken down by use, as shown in Table 11. The approved management plan details the timber harvest plan within the designated logging area. This shows which blocks would be harvested in which years, as shown below in Figure 16 and Table 12. The approved management plan also provides details of the cut limits, logging method and rotation (see below).

Table 11. The areas according to the spatial zonation of logging area

No	Zonation	Area (ha)		%
A	Non-productive area		1,266.32	8.26%
1	Other protected areas (DPSL)	243.36		
2	Germplasm conservation area	408.78		
3	Permanent plot	300		
4	Seed bank area	314.18		
B	Protected area		711.59	4.64%
1	Swamp	194.08		
2	Swamp banks	463.70		
3	Riverbanks	53.81		
C	Timber logging area		13,361.02	87.11%
1	Non-productive (Non-Forest, not logged)	97.30		
2	Forest (logged)	13,084.39		
3	Infrastructure	179.33		
	Grand Total		15,338.93	100.00%

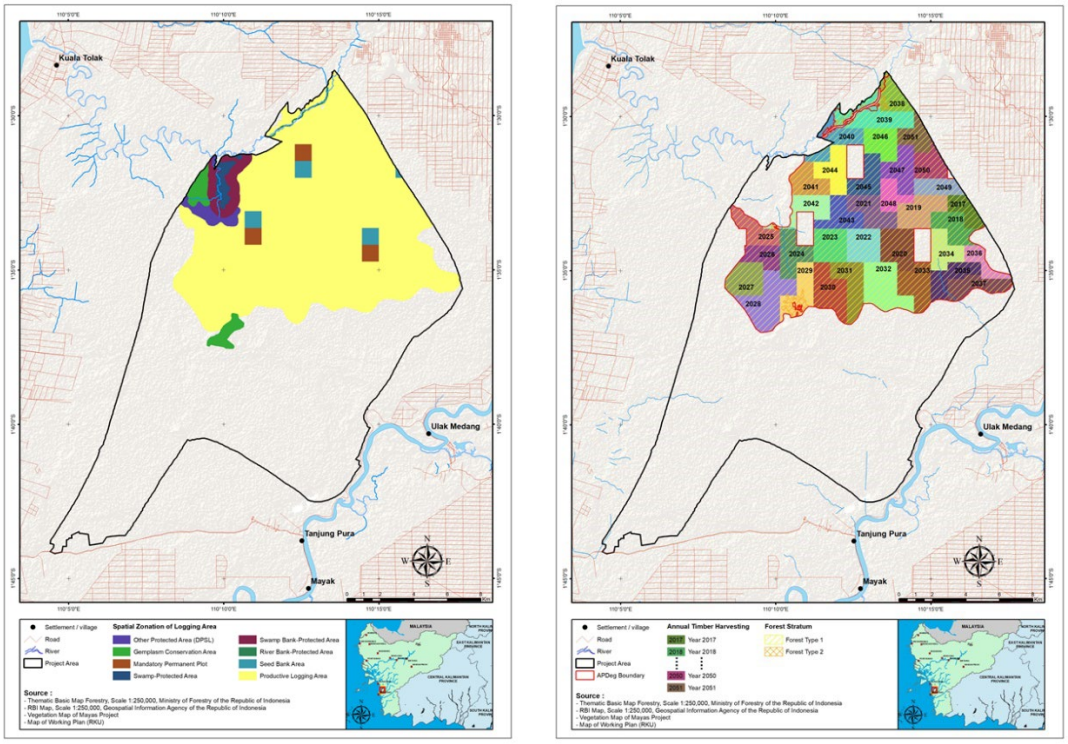


Figure 16. Zonation within the planned logging area (left), Timber harvest plan from approved management plan (right)

Table 12. Timber harvest plan from approved management plan by area

Year (t)	Total (ha)	Year (t)	Total (ha)
2017	244.90	2035	350.32
2018	338.28	2036	222.08
2019	442.79	2037	358.13
2020	442.54	2038	282.94
2021	395.98	2039	529.84
2022	394.05	2040	314.37
2023	396.01	2041	337.39
2024	396.00	2042	336.86
2025	337.29	2043	349.44
2026	264.21	2044	395.66
2027	402.51	2045	347.34

Year (t)	Total (ha)
2028	661.40
2029	400.16
2030	490.80
2031	427.10
2032	620.26
2033	429.63
2034	344.54

Year (t)	Total (ha)
2046	345.94
2047	395.78
2048	244.29
2049	271.80
2050	301.33
2051	272.42
Total	13,084.39

Per Ministerial Decree No. 65/2014, the timber harvesting applies a selected logging system with the diameter limit of 30 cm and a logging rotation of 40 years. Following the regulation, tree species listed under protection status are not logged. Timber harvest is restricted to commercial tree species that are classified into two main classes namely dipterocarp and 'other commercial tree species'. Annual timber production must follow the Annual Allowable Cut (AAC) determined by the RKU, which is determined primarily based on a timber inventory and the logging rotation length. Based on the RKU, the Working Area under Management (Penataan Areal Kerja – PAK) and pre-logging inventory are carried out prior to logging. Infrastructure construction is done at the same time as logging.

The RKU describes the use of a railway system (using the so-called "kuda-kuda" system; a traditional skidding and hauling technique widely used in peat forest systems) to transport logs from logging blocks to the main canal (Figure 17) and sets out the format for the railway network that is designed based on the layout of the logging blocks and canal network.

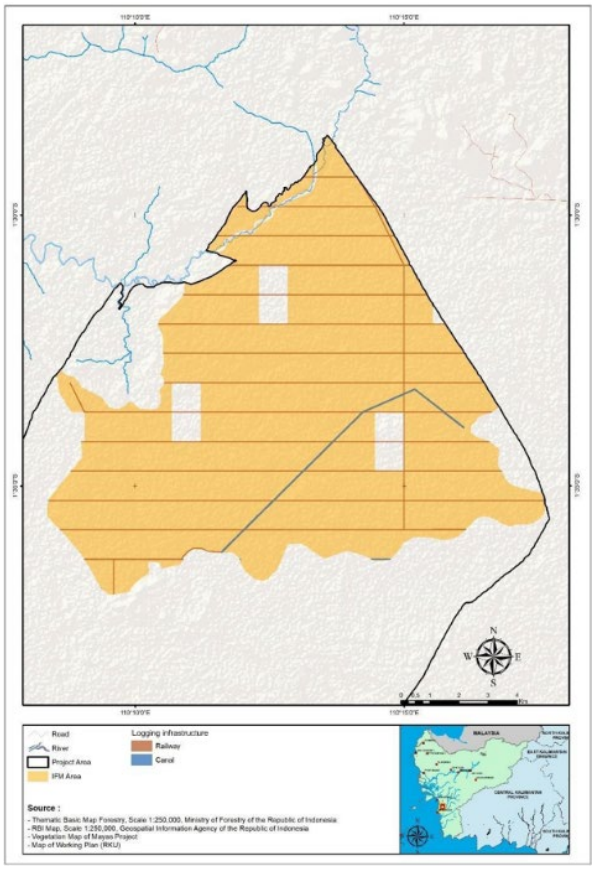


Figure 17. Infrastructure constructed in planned logging area in the baseline scenario

3.1.5.2.3 Baseline management of REDD-Avoiding Planned Deforestation (APD) area

The conversion plan, as prescribed by the approved management plan, demonstrates there is a site-specific threat of deforestation in the project area. According to this document, the area to be managed as a timber plantation is 18,408 ha. However, in order to comply with existing regulations, 893 ha of the areas surrounding swamp is set aside for protection. Within the plantation area of 17,515 ha, some 884 Ha identified as Non-Forest. The remaining 16,631 ha of forested areas would be converted into a timber plantation. Referring to the RKU, Acacia timber (*Acacia crassicarpa*) will be processed further for construction-based products. Meanwhile for Jabon (*Anthocephalus cadamba*), the timber will be used for energy production. The spatial designation of plantation areas as prescribed by the RKU is shown by Figure 18.

Of the 16,631 ha designated for timber plantation, 15,870 ha of forested areas will be converted into Acacia plantation and 357 ha for Jabon plantation. To support plantation operations, the remaining areas of 404 ha will be converted into canal/ infrastructures.

The RKU details the method for forest conversion over a defined period of time that is then broken-down into annual forest clearance plans in the baseline scenario. Following the RKU's

annual conversion plan, the deforestation in the baseline scenario is projected to have started in 2017 and been fully completed in 2023 as shown by Figure 18 and Table 13.

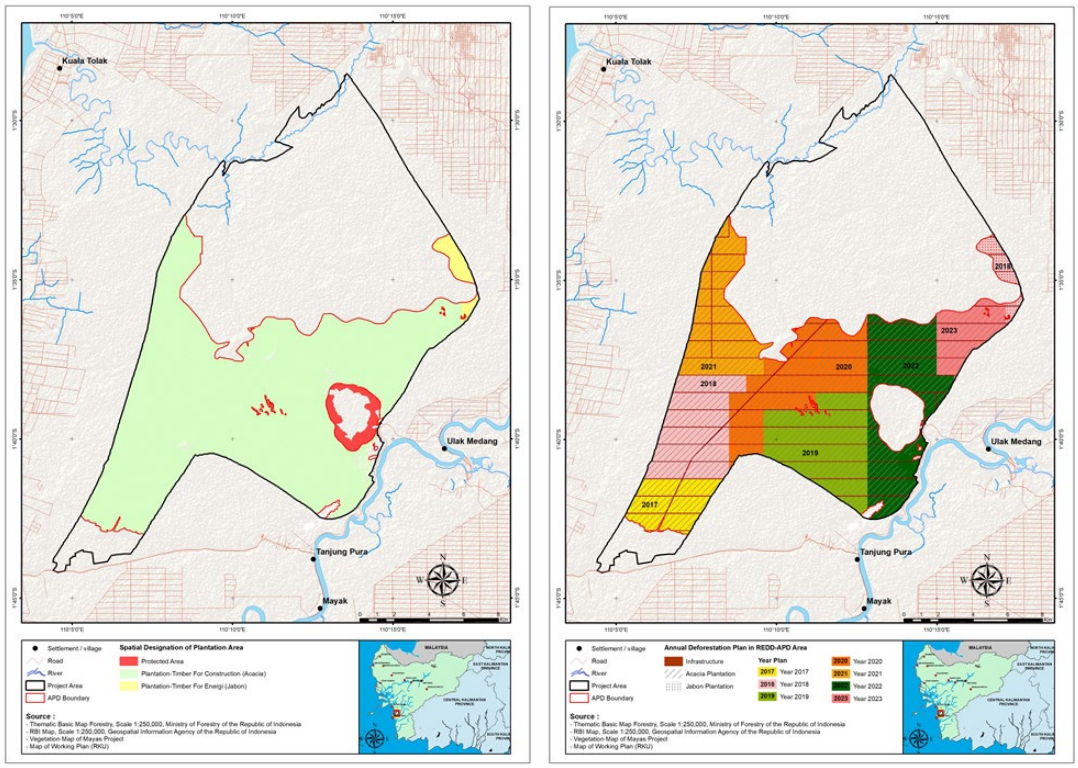


Figure 18. Spatial designation of the plantation areas (left), Spatial/temporal plan of the conversion in the baseline scenario (right)

Table 13. Annual conversion in the baseline scenario

Year	Forest conversion (ha) into			
	Infrastructure	Jabon plantation	Acacia plantation	Total
2017	33.17		1,222.04	1,255.20
2018	74.14	357.44	2,367.25	2,798.83
2019	63.19		2,811.87	2,875.07
2020	88.09		3,096.26	3,184.35
2021	60.75		2,313.97	2,374.72
2022	62.31		2,964.28	3,026.59
2023	22.54		1,094.03	1,116.57
Total	404.18	357.44	15,869.71	16,631.33

3.1.5.2.4 Baseline management of WRC area

The approved management plan for the project area identifies three significant land uses that represent differences in WRC emission characteristics as shown Table 14 and Figure 19. Differences in GHG emission characteristics are mainly attributed to differences in likely water table depths. This spatial stratification was developed by referencing the management plan (RKU). The actual onset of the drainage would vary in time, as the RKU shows, with drainage canal constructions, tree removals and plantings broken down into series of annual implementations.

Table 14. Stratification of the project area in baseline scenario based on GHG emission characteristics

Land-use	Most likely WTD (m)	Area (ha)	Description
Plantation	0.85	17,515.1	Clear cut and replanted with Acacia or Jabon. Intensive drainage including primary, secondary and tertiary canals
Logging	0.60	13,973.5	Rotational cut. Affected by drainage of primary canals
Conservation zone (CZ)	0.22	2,256.9	No deforestation but may or may not be affected by nearby drainage canals. Conservatively assumed only affec ted by primary canals

Drainage and canal construction within the REDD area

This project area is situated in one of coastal tropical peatlands of Indonesia and is characterized by its low elevation, flat topography, and high annual rainfall (c.a. 3,475 mm per year based on the Ketapang Airport Station record between 1987 - 2020); which is naturally subject to seasonal flooding, waterlogging, and shallow water tables. Only plant species adapted to such conditions (especially local species) can grow in this area. Unlike local species, primary plant species that would be planted in HTI stratum of this project area, i.e., *Acacia crassicarpa*, and Jabon, are introduced species that are intolerant to waterlogged soils and shallow water tables, thus require land reclamation (artificial drainage) to grow properly under such conditions.

Land reclamations in Indonesia usually involve the application of surface drainage systems, consisting of a series of open channels including primary, secondary, and tertiary canals. Primary canals discharge drained water to natural water bodies such as rivers or the sea; secondary canals collect water from tertiary canals and deliver it to primary canals; and tertiary canals collect drained water from land and deliver it to the secondary canals. Primary canals need to be large enough (deep and wide) to achieve the required discharge capacity (usually ≥4 meters deep, ≥10 meters wide). They also need to be low enough in the hydraulic head to collect drained water from

secondary canals. Similarly, secondary canals require certain physical dimensions to sufficiently collect water from tertiary canals and channel it to primary canals (usually ≥3 meters deep, ≥5 meters wide). Physical dimensions of tertiary canals vary, usually 2 – 4 meters deep, 3 – 8 meters wide, depending on local conditions (variability of climate, soil and topography).

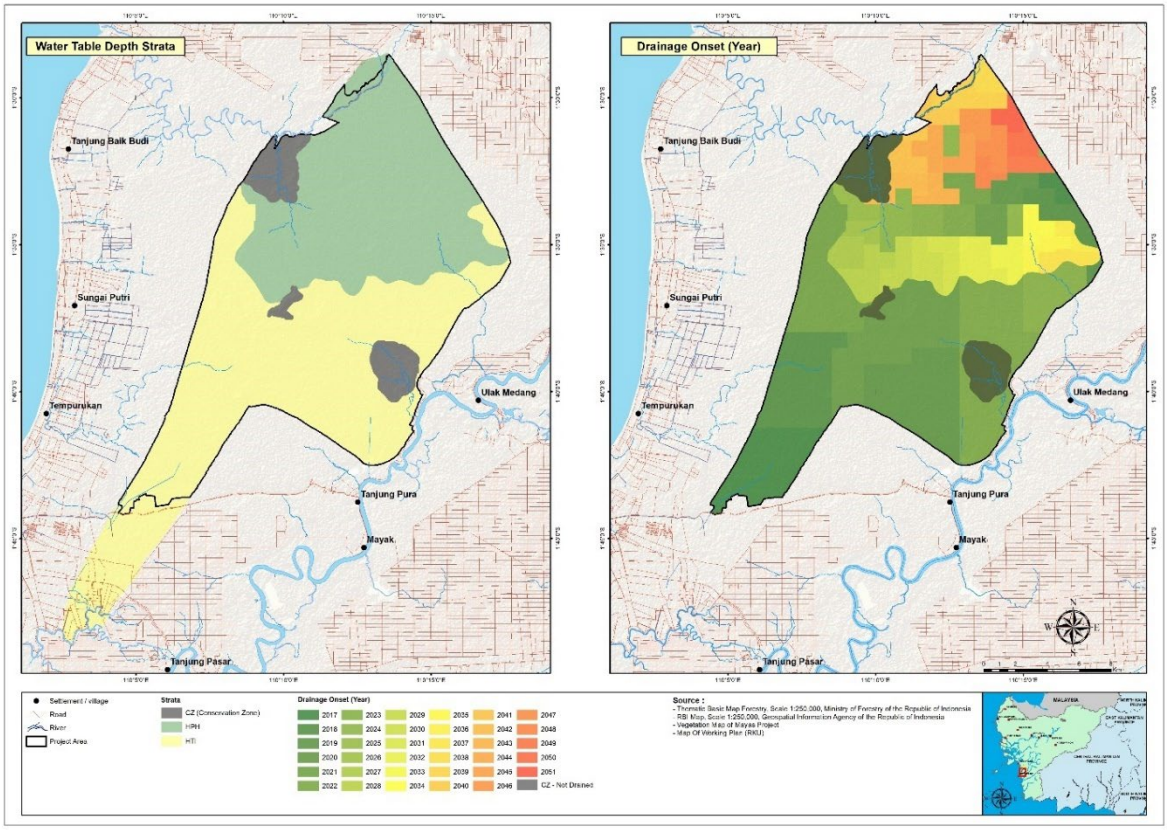


Figure 19. Stratification map of the project area in the baseline scenario based on GHG emission characteristics: Water table depth strata (left) and drainage onsets (right)

In the presence of drainage canals water tables would drop from an average 20 cm below soil surface (natural water table depth) to about 85 cm below soil surface. Spatial and temporal water table distributions vary based on climate, topography, drainage layout and characteristics, and physical soil properties. The deeper the drainage canals and freeboard (vertical distance between water surface in canal and surrounding land surface) the deeper water table depths would be. The baseline agent would maintain water table depths by maintaining water levels in drainage canals. In wet seasons, when excessive water input occurs, canals would discharge water to their full volumetric potential. In dry seasons, canal water levels may drop too low and cause extreme dryness in soils, posing a danger of wilting to plants. This can be prevented by installing water regulation structures, such as stop gates, to reduce outflow in dry seasons.

Lowering water table depth increases the aerobic condition in the upper layer of peat soils, which in turn accelerates microbial oxidation in the upper layer of peat soils. This would be the main cause of GHG emissions from the drained peats soils in this project area. GHG release from upper

peat soils would also be attributed to mass loss of the peat soils. Gradual mass loss of peat soils over time manifests as subsidence, which eventually reduces the depth of the aerobic zone for plant roots. The baseline agent would overcome this problem by conducting regular dredging and restoring water table depth to previous levels. This process repeats in cycles, until the peat soils disappear or the drainage limit of the location is reached.

Drainage and canal construction with logging/APDeg area

Timber transportation in the baseline scenario would be conducted in two ways: railways and transportation canal, as shown in Figure 17. Railways can be implemented in areas of flat topography, but their construction on peat soils requires consideration of the soil's physical properties, subsidence, local relief and climate. Peat soils are low in bearing capacity which means heavy loads may easily deform this type of soil. Engineers and practitioners would need to increase the bearing capacity of peat soils before and/or during railway construction. One way of achieving this is by inducing primary consolidation and shrinkage, achieved by constructing side canals at one side or both sides of railways. Excavated materials from the side canals can also be used to elevate the base of railways. Side canals can also act as interceptors for lateral overland flow that would otherwise flood the railways in wet seasons. Drainage canals for railway operation would eventually lead to GHG emissions and subsidence, and the baseline agent would overcome this by performing regular dredging.

3.1.6 Methodology Deviations (VCS, 3.20)

No methodology deviation is found in the application of VM0007 for the Mayas Project.

3.2 Quantification of Estimated GHG Emission Reductions and Removals

3.2.1 Baseline Emissions (VCS, 3.15)

This section describes baseline emissions for each of the three spatially explicit project GHG accounting strata: APDeg, APD and WRC (see Section 3.1.3.1). This section starts by describing stratification of above ground vegetation, which is common to both APDeg and APD areas. This is followed by the stratification of below ground biomass, as applicable to WRC areas, and then a Project Area-wide assessment of baseline fire impact. Finally, baseline emissions are considered for each spatially explicit area in turn, following the corresponding methodology modules.

3.2.1.1 Stratification of AGB

Stratification of above ground biomass in the project followed VMD0016 (X- STR - Version 1.3). This module provides guidance on stratifying the project area into discrete, relatively homogeneous units to improve accuracy and precision of the carbon stock, carbon stock change and GHG emission estimates. Following X-STR when using remote sensing, the data was georeferenced into a common geodetic system. As mandated by the module, the project adopts GOFC-GOLD (2009) to apply best-practice methods in remote sensing.

A land cover map derived from Sentinel 2 images was used as a proxy to stratify above ground biomass within the project area due to a strong correlation between land cover class and carbon density (per X-STR) that is required for the REDD-APD to quantify carbon stock and GHG emission from planned deforestation. Land cover also has correlation with timber volume (m^3) that can be used for APDeg project to estimate timber potential and GHG emission from planned forest degradation.

The stratification process comprised five stages: 1) data collection and pre-procession, 2) Forest-non forest classification, 3) Re-classification of forest strata, 4) validation using field data, and 5) finalization of AGB stratification map. Figure 20 illustrates the process followed to stratify AGB within project area.

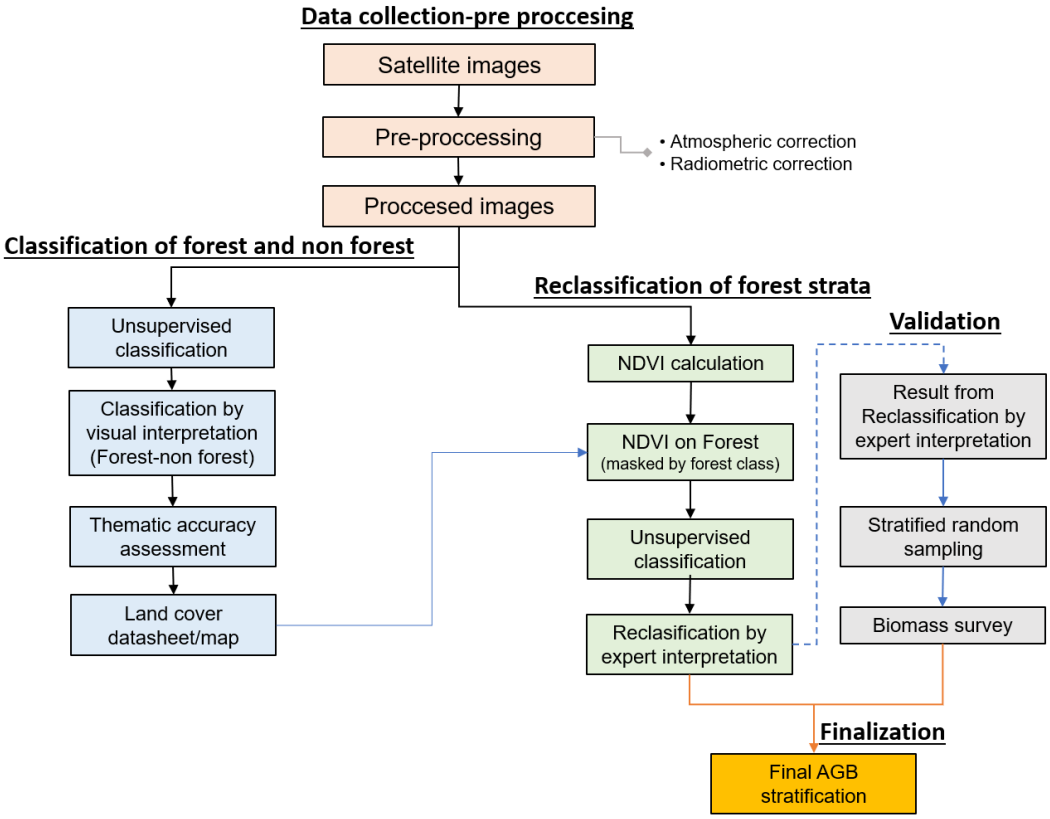


Figure 20. Flow chart showing the AGB stratification process

Data collection and image processing

AGB stratification was initiated by the collection of satellite images. Sentinel 2 images with 10 m x 10 m resolution were used as basis for a land cover classification. Three images were used to cover the whole area for the year 2017, as listed in Table 15. The Sentinel 2 images were considered adequate to stratify the project area per band, as summarized in Table 16.

Table 15. List of images used for AGB stratification

No	Image id/tile	Date acquisition	% cloud cover
1	S2A_MSIL1C_20181024T024751_N0206 _R132_T49MCU_20181024T080547	24 October 2018	7.20
2	S2A_MSIL1C_20181024T024751_N0206 _R132_T49MDU_20181024T080547	24 October 2018	4.58
3	S2A_MSIL1C_20190810T024551_N0208 _R132_T49MCU_20190810T062215	10 August 2019	0.43
4	S2A_MSIL1C_20190810T024551_N0208 _R132_T49MDU_20190810T062215	10 August 2019	5.48

Table 16. Specification of Sentinel 2 image

Band number	Band name	Sentinel-2A		Resolution (meters)
		Central wavelength (nm)	Bandwidth (nm)	
1	Coastal aerosol	443.9	20	60
2	Blue	496.6	65	10
3	Green	560	35	10
4	Red	664.5	30	10
5	Vegetation Red Edge	703.9	15	20
6	Vegetation Red Edge	740.2	15	20
7	Vegetation Red Edge	782.5	20	20
8	NIR	835.1	115	10
9	Narrow NIR	864.8	20	20
10	Water vapour	945	20	60
11	SWIR – Cirrus	1373.5	30	60
12	SWIR	1613.7	90	20
13	SWIR	2202.4	180	20

Pre-processing

Since Sentinel 2 images were used, these had already been corrected when the images were acquired and therefore did not require geometric correction. Radiometric and atmospheric correction was done in one step by assigning semi-automatic classification plug-ins. In running the pre-processing tool, the software performed "automatic computing" on the image so the haze and other atmospheric noises were reduced. A composite band tool was used to create a single raster dataset from multiple bands. For the purpose of vegetation analysis, the band of 4,8, and 11 were used.

Two images were required to fully cover the project area. Therefore, a mosaic was compiled to combine two images into one. This process also aimed to balance the digital properties of two images (hue, texture, brightness and colour) to avoid misinterpretation during the classification process. Following the mosaic construction process the images were ready for classification.

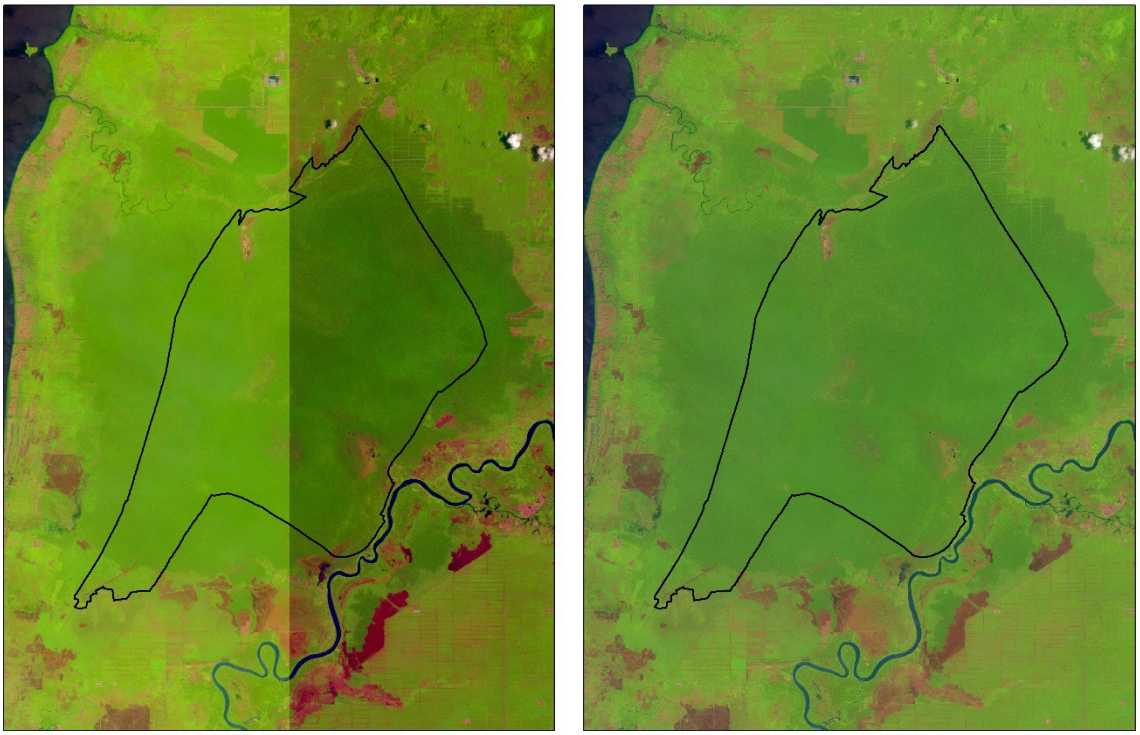


Figure 21. The image before (left) and after (right) the processing

Classification of Forest and Non-Forest

Classification of forest and non-forest was undertaken following an unsupervised classification method. ARC-GIS 10.6 was used to automatically identify and cluster units with homogenous properties detected in the image. This process resulted a raster image containing 20 homogenous classes based on their digital signature (surface reflectance value).

Using the result of the unsupervised classification, further analysis was undertaken to group the 20 classes down to two classes: forest and non-forest, based on texture, color, hue, shape, and association. Figure 21 shows the initial classification result of forest and non-forest. This process

classified 32,026.29 hectares of the project area as forest and 1,720.98 hectares as non-forest (Figure 22).

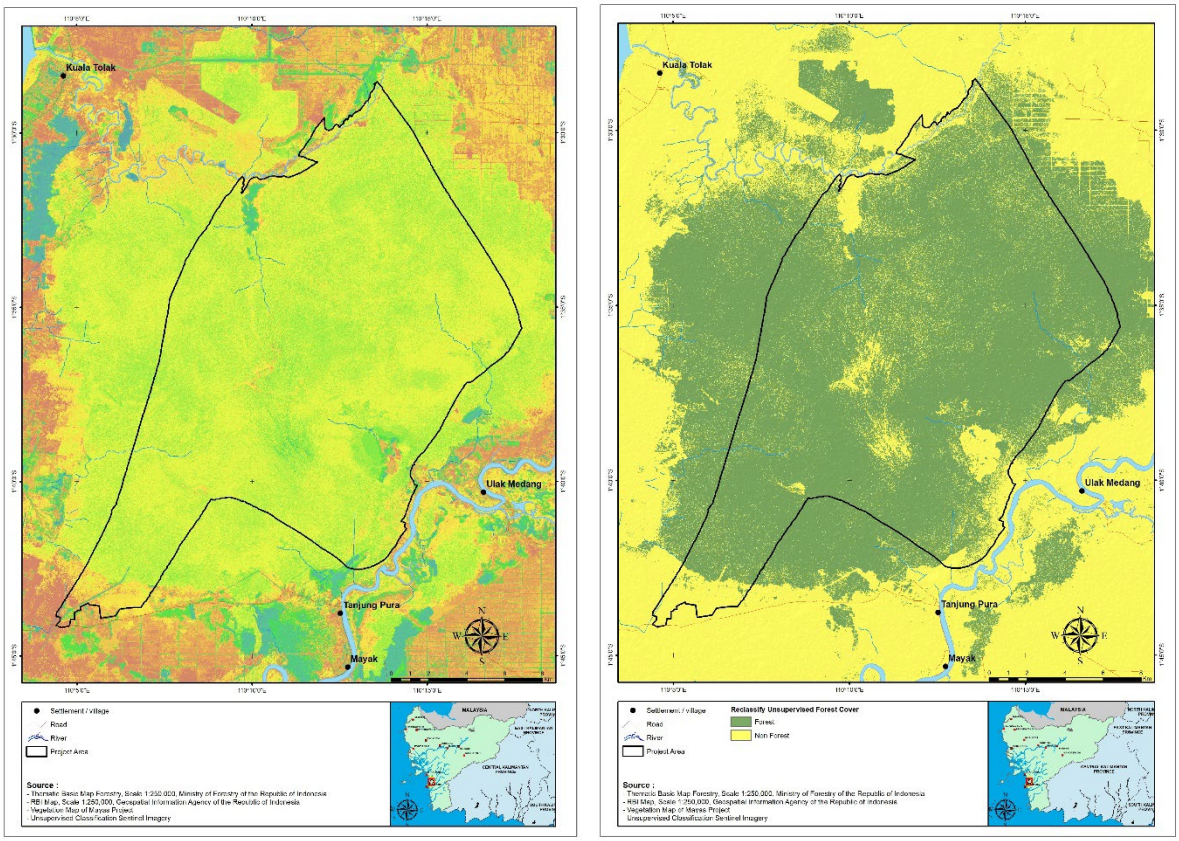


Figure 22. Raster image with homogenous classes derived from unsupervised classification (left), Initial analysis result from unsupervised classification (right)

An accuracy assessment was then performed, per the methodological guidance of the module. 125 random points were automatically assigned within project area representing both forest and non-forest. Using the high-resolution maps from 2016-2018 (Pleiades image with 0.5 m resolution, Spot Image with 1.5 m resolution, Google Earth Image) and applying a confusion matrix, the accuracy of the forest and non-forest map was identified as 93%, passing the threshold value accepted by GOFC-GOLD (2009).

Re-classification of forest strata

In the next stage of the analysis, the classification for the previous step was then to re-classified into forest strata derived from the previous step (Figure 22), applying NDVI (Normalized Difference Vegetation Index) as the basis for the analysis. NDVI is a common approach used stratify peatland forest which works by calculating the difference between near-infrared (which vegetation strongly reflects) and red light (which vegetation absorbs) using the following equation:

$$\text{NDVI} = \frac{NIR-RED}{NIR+RED}$$

Where:

NIR = Near-Infrared Radiation

RED = Red light

By applying equation above, the ARC-GIS (using raster calculator tool) automatically identified NDVI values ranging from 0.245 – 0.784. With further classification process applying Natural Breaks and Class Breaks approach, three NDVI classes were identified (Figure 23).

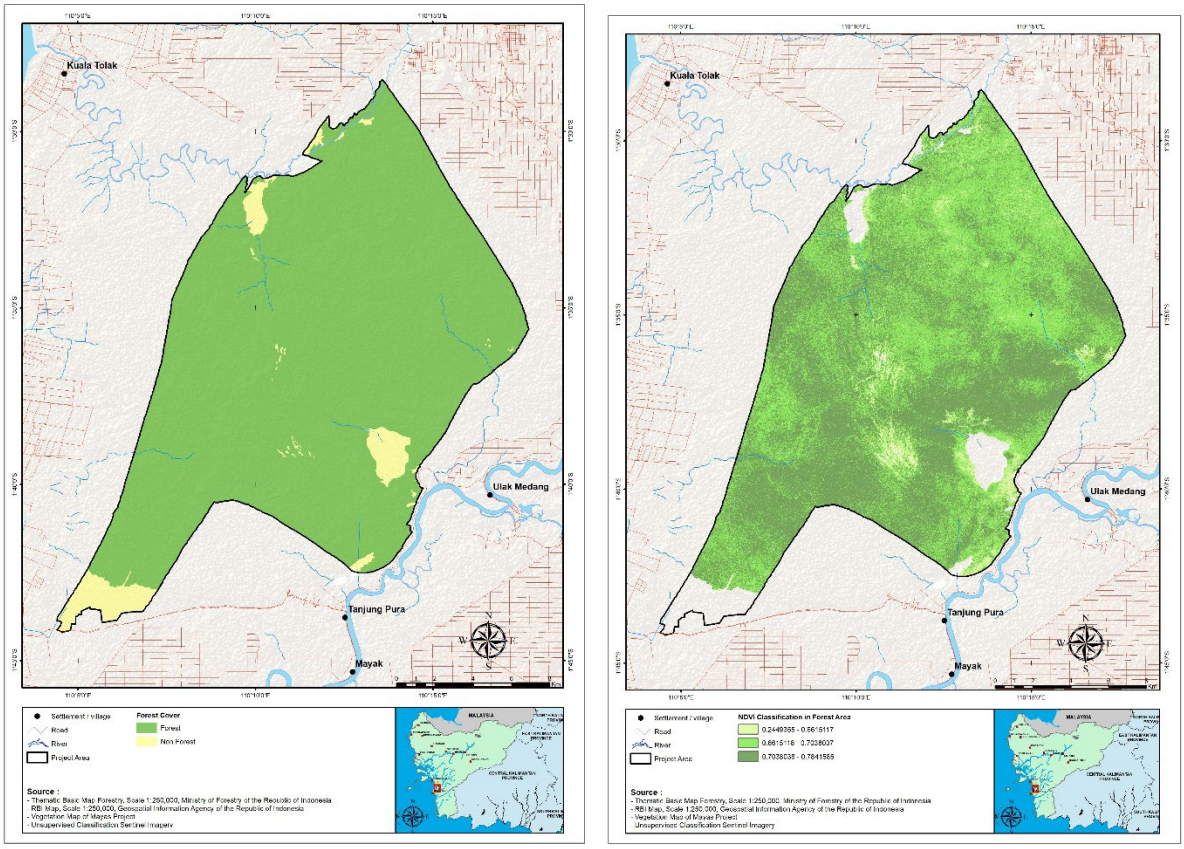


Figure 23. Forest and non-forest map of the project area based on visual interpretation (left), NDVI classes identified in the forest strata (right)

Using the initial results from the NDVI classes as a basis, the image properties (i.e. texture, colour, hue, shape, and association) were used to delineate three forest classes. This process concluded that the forest strata of 32,026.29 hectares is comprised of three different classes, as shown in Figure 24 and Table 17.

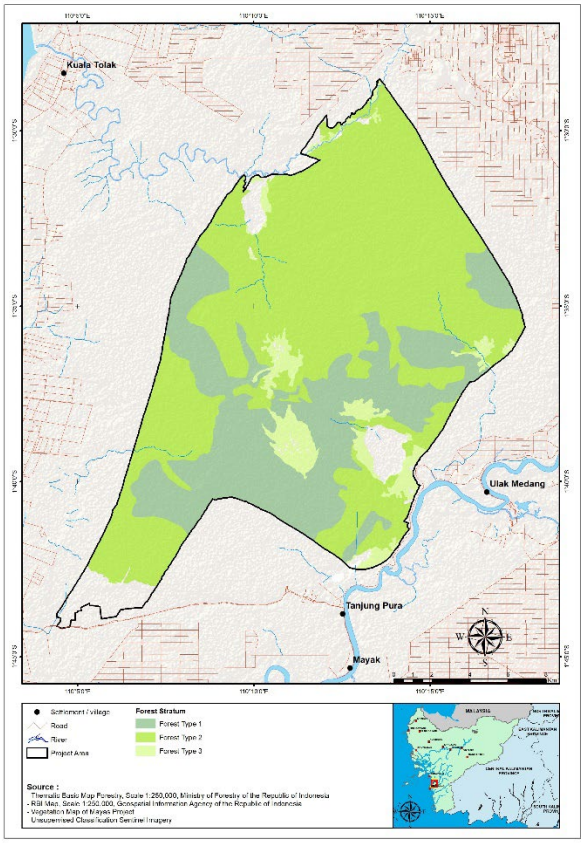


Figure 24. Three forest classes identified in the forest area (left),

Table 17. Forest stratum based on forest re-classification

No	Forest strata	Avg NDVI	Hectares	%	Remarks
1	Forest stratum 1	0.74	9,740.40	30.41	Indicated as high-density forest
2	Forest stratum 2	0.68	20,338.61	63.51	Indicated as medium density forest
3	Forest stratum 3	0.45	1,947.28	6.08%	Indicated as low-density forest
	Total		32,026.29	100%	

Validation

The project conducted a field survey to validate and finalize the forest strata determined through the remote sensing approach described above. A stratified random sampling grid was applied to determine the location of plots to be surveyed in order to validate (ground-truth) the forest strata. As suggested by VCS module, the project used Winrock's calculator (adopting the CDM tool for the calculation of the minimum number of sample plots for CDM projects) to determine the number of plots that would be statistically representative of the three strata. Based on this, it was determined that 36 Permanent Sample Plots (PSP) within the project's forested area would be

proportionally representative of the three forest strata (plot locations shown in Figure 25). In addition to this, the project also established 5 plots representing non-forest. The biomass survey was done by applying the Standard Operating Procedure /SOP (available in Annexes in Bahasa Indonesia) and the training was done prior to the survey implementation.

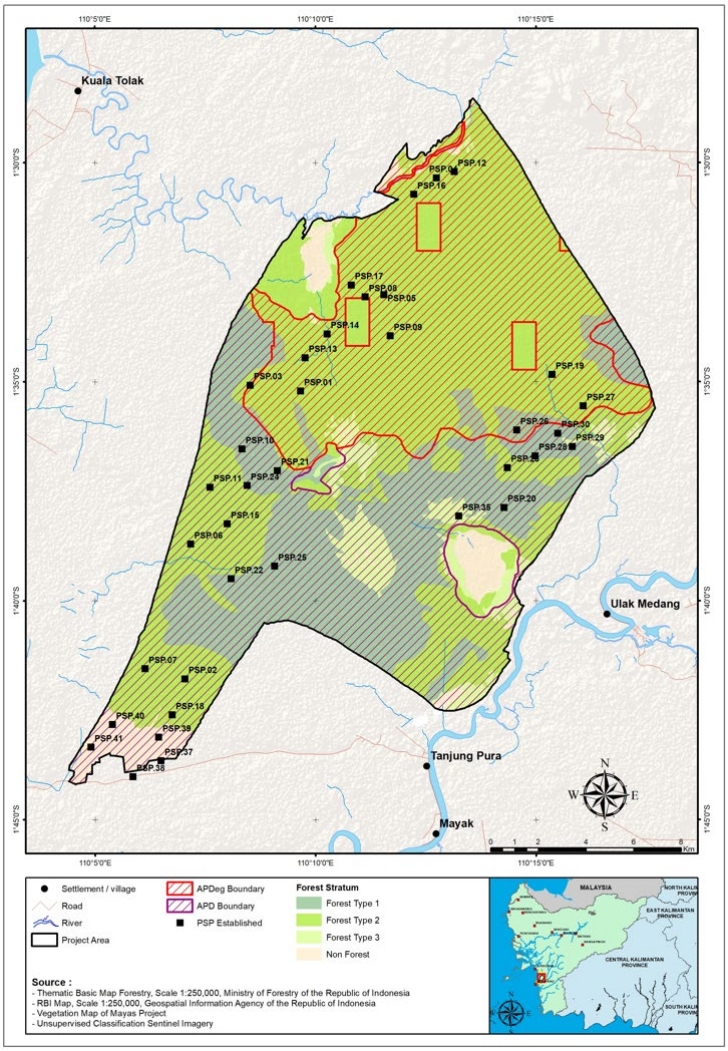


Figure 25. PSPs distributed in the project area

Finalization

Data from field survey confirmed that forest type 1 is high-density forest, with an average C stock of 170.02 tC/ha. Meanwhile for the forest type 2 and 3, the field data strongly indicate medium and low-density forest with the C stock of 135 tC/ha and 53.83 C/ha respectively. Due to this insignificant difference (<5%), as suggested by X-STR module, and further confirmed by the statistical analysis, the forest type 1 and 2 were merged into one (average carbon stock: 147.11 tC/ha). Combining the map with non-forest, the final AGB stratification map consists of the three strata shown in Figure 26 and Table 18.

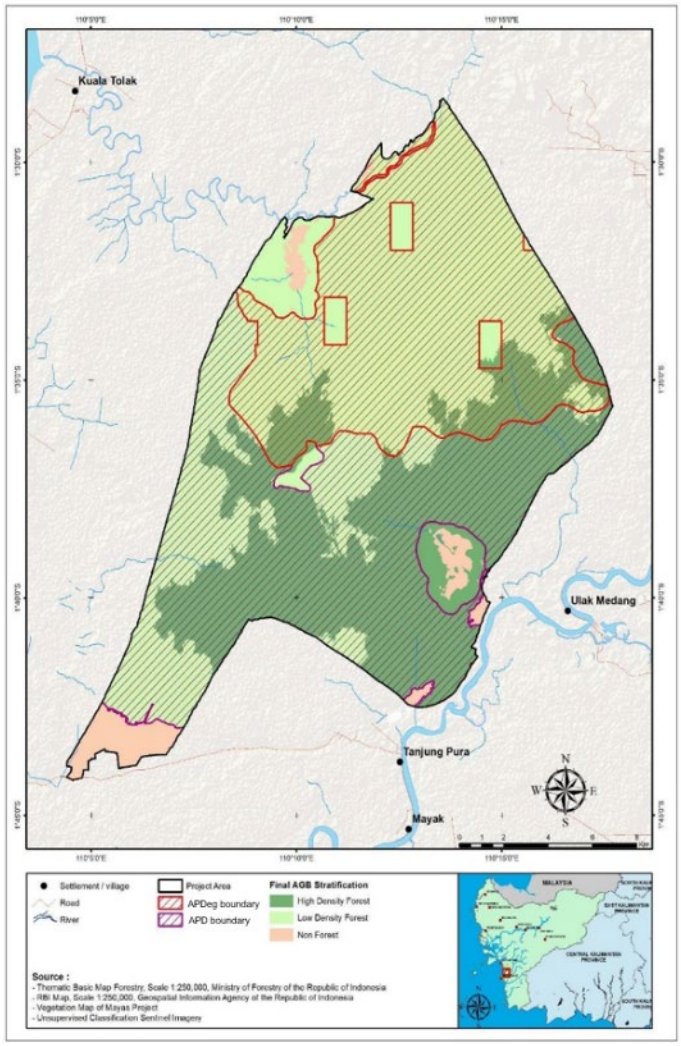


Figure 26. The final AGB stratification map

Table 18. The final AGB strata of project area

No	Strata	Description	APDeg (ha)	APD (ha)	Protected areas (ha)	Total (ha)
1	Non-Forest	Non forested area	97.90	883.82	739.26	1,720.98
2	Forest Stratum 1	High-Density Forest	13,052.87	15,261.14	1,765.00	30,079.01
3	Forest Stratum 2	Low- Density forest	210.25	1,370.19	366.83	1,947.28
	Total		13,361.02	17,515.15	2,871.10	33,747.27

Based on the averaged C stock per stratum derived from PSP data, total carbon stock stored within the living tree biomass in project area estimated to be 4,550,289.69 tC. From this amount, some 4,424,992.62 tC (97.25%) was stored in the forest stratum 1, 104,826.51 tC (2.30%) in the forest stratum 2, and 20,470.56 tC (0.45%) in the Non-Forest.

3.2.1.2 Peat soil stratification

Peat soils in the Project Area were stratified following field methods set out in section 5.3.2 of VMD0016. Data from direct field measurements (conducted in 2017 and 2019) and from secondary source (collected by FFI in 2016) were used to develop a peat soils distribution map. Sampling transects were arranged in such a way that each individual transect crosses the expected natural gradations/thickness contour lines of the peatland. More details on peat thickness modelling are described in Annex 2 of the Annexes, and the result is shown Figure 27 below. 97 percent (32,729.8 hectares) of the project area was determined to be covered by peat deposits, with 93% (30,294.0 hectares) being at least 3 meters thick. Peat thickness distributions are summarized in Table 19 below.

Table 19. Peat thickness distributions summary of the project area

Peat thickness (m)	Area (ha)
Non peatland (<0.4)	1.017,46
0.4 – 1	379,87
1 – 2	774,00
2 – 3	1.281,97
3 – 4	2.367,42
4 – 5	3.084,97
5 – 6	3.948,60
6 – 7	4.096,88
7 – 8	4.642,49
8 – 9	6.700,28
9 – 10	3.867,73
10 – 11	1.095,73
11 – 12	240,80
12 – 13	221,17

Peat thickness (m)	Area (ha)
13 – 14	27,91
Peatland	32.729,82
Total	33.747,28

Carbon stock of peat soils were mapped using the peat thickness distribution data and parameters Carbon content (Cc) and bulk density (BD) of peat soils. Carbon content of the peat soils was estimated as 0.5 (Page, et.al., 2004). Average Bulk Density was estimated based on surveyed values conducted in 2019, as shown in Annex 6 of the Annexes (Bulk density of peat soils), was calculated at 0.11 g/cm3 (SD and SE 0.033 and 0.005 g/cm3 respectively). Using these values, carbon stock distributions of peat soils at the project start date were calculated spatially by using formula:

$$C_i = D_i \times C_c \times BD \times 10000$$

Where:

Ci : Peat carbon stock per area at location i (tC/ha)

Di : Peat thickness at location i (m)

Cc : Carbon content of peat soil (kg/kg)

BD : Average Bulk Density of peat (g/cm3)

From the above equation, total stock can be mapped by multiplying C stock distribution by area:

$$CStock_i = C_i \times A_i$$

Where:

CStocki : Peat carbon stock at location i (tC)

Ai : Area at location i (ha)

The total carbon stored in peat soils (thickness >0.4 m) of the project area at the project start date was estimated at 124,119,464.58 tC, with average stock of 3,792.24 tC/ha. Spatial distributions of the carbon stock in peat soil in the Project Area are shown in Figure 27.

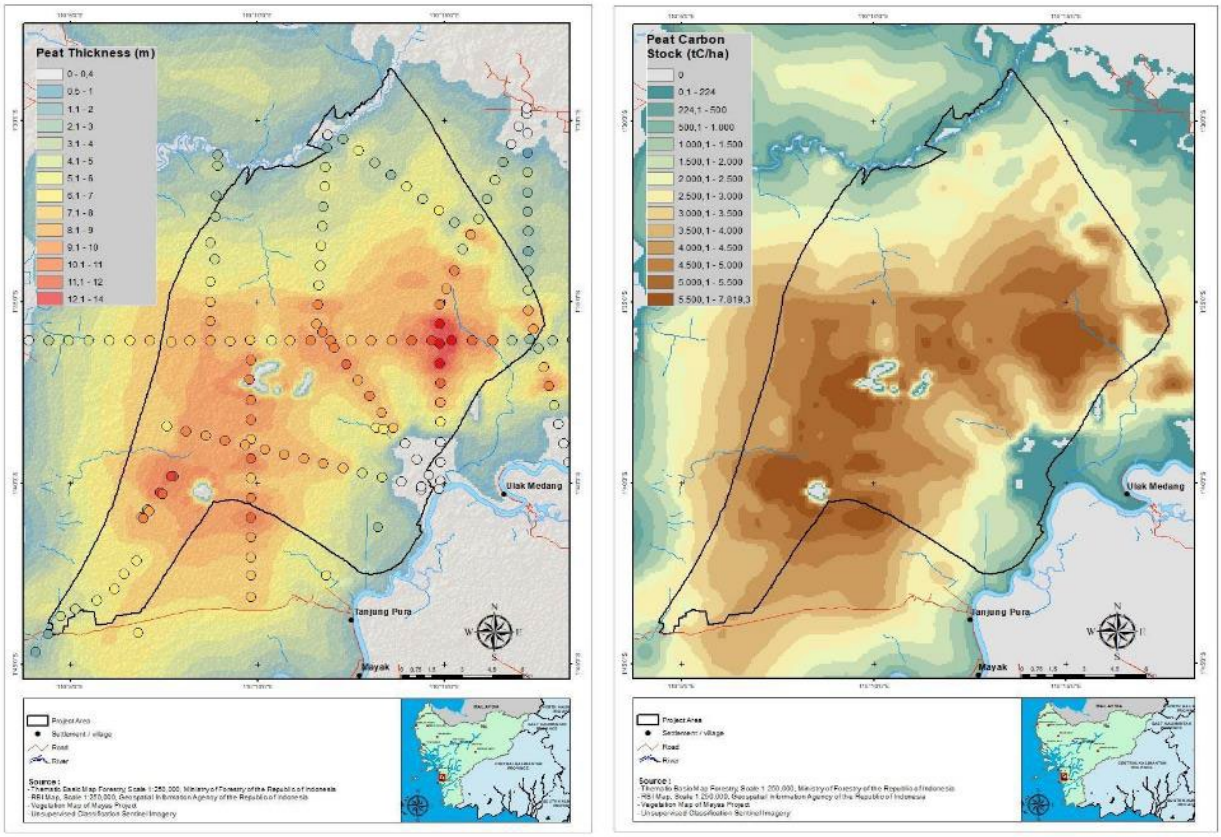


Figure 27. Peat thickness distribution (left) and Peat carbon stock distributions in the project area (right)

3.2.1.3 Baseline Fire Modelling

From an analysis of MODIS and VIIRS fire hotspot data (2007 - 2016) over a 1,017,780 hectare proxy area, a value of 4% was derived for annual percentage of area burnt (AAB%). Baseline fire events were then simulated using a spatially-distributed stochastic model (shown in Annex 4 the Annexes). As describe in Annnex 4, the project area was divided into parcels of about 1 hectare size. All drained parcels (depending on timing and land use scenario of individual parcels) have equal probability of being impacted by fire. Maximum burnt areas per year were set to be proportional to the total drained area of the corresponding year according the following formula:

$$A_{burn-BSL,t} \approx AAB\% \times \sum_{i=1}^{M}\sum_{j=1}^{N} A_{drain-BSL,i,j,t}$$

Where:

Aburn-BSL,t : Area burnt in baseline in year t (ha)

Adrain-BSL,i,j,t : Area drained in baseline in stratum i parcel j year t (ha)

AAB% : Annual percentage of area burnt (%)

Every fire incident in individual parcels was recorded during the baseline period. Every time the same parcel was burnt it added to its cumulative count, and the burn scar depth parameter value for the respective parcel was updated accordingly. Conservatively, no peat combustion was assumed to take place wherever and whenever the parcel water table depths were less than 0.4 m-ss, or peat thickness was less than 0.2 meter.

3.2.1.4 Baseline Avoiding Planned Degradation (APDeg) Emission Calculation

The calculation of baseline emission resulted from commercial logging follows VMD 0006-BL-PL (estimation of baseline carbon stock changes and GHG emissions from planned deforestation / forest degradation and planned wetland degradation). However, since this module does not provide detailed calculations in the context of degradation through logging, the steps of IFM methodology (VM0010 -LtPF) were adopted. The parameters and data required to calculate baseline emission from logging are described below.

Merchantable volume

Using field data collected in February 2020, the mean volume of timber extracted per unit area (VEX,j,i) was calculated. Referring to the legalized planning document (RKU), all commercial trees with DBH greater than 30 cm were included. Meanwhile all protected tree species prohibited from logging were excluded from the calculation. The tree species were classified into two tree classes (j): dipterocarp and other commercial tree species. Table 20 summarizes the mean volume of timber extracted in the Project Area.

Table 20. Mean volume of extracted timber per unit area (VEX,j,i)

Timber class/j	**V_EX,j,i_BSL (m3/ha)**	
	Stratum 1	Stratum 2
Dipterocarp	37.20	3.03
Other Commercial	51.05	25.24

Using the mean volume of extracted timber per unit area, the carbon stock of timber harvested per unit area for species j in stratum i was then calculated by applying following equation:

$$C_{HB.j.i|BSL} = (V_{EX.j.i|BSL} * BCEF_R * CF_j) \times \frac{44}{12}$$

Where:

CHB.j.i|BSL	Mean carbon stock of harvested biomass per unit area for tree class j in stratum i, tCO2-e·ha-1;
VEX.j.BSL	Mean volume of extracted timber per unit area for tree class j in stratum i, m3·ha-1;
$BCEF_R$	Biomass conversion and expansion factor applicable to wood removals in the project area, t.d.m m-3;
CF_j	Carbon fraction of biomass for tree class j, tC t d.m.-1;
i	1,2,3 … M strata; and
j	1,2,3 … J tree class

Carbon stock of extracted timber

The mean carbon stock of extracted timber per unit area for species j in stratum i was calculated by using following equation:

$$C_{EX.j.i|BSL} = (V_{EX.j.i|BSL}) * D_j * CF_j \times \frac{44}{12}$$

Where:

$C_{EX.j.i\|BSL}$	Mean carbon stock of extracted timber per unit area for tree class j in stratum i, tCO2-e·ha-1;
VEX.j.i|BSL	Mean volume of extracted timber per unit area for tree class j in stratum i, m3·ha-1;
D_j	Basic wood density of tree class j; t d.m. m-3;
CF_j	Carbon fraction of biomass for tree class j, tCt d.m.-1;
I	1,2,3 … M strata; and

J	1,2,3 … J tree class

Carbon stock of Dead Wood (DW) generated in the process of timber harvest

CDW include the carbon carbon stock in timber from residual stand damage (CDWRSD) and carbon stock of dead wood left as logging slash resulting from timber harvest (CDWSLASH). The factor for residual stand damage (FRSD|BSL) applied in the calculation is 2.3 (Pinard and Putz, 1996 in VM0010).

$$\Delta C_{DWSLASH,i,p|BSL} = \left[\sum_{j=1}^{J}\left(C_{HB,j,i|BSL} - C_{EX,j,i|BSL}\right)\right]$$

Where:

$\Delta C_{DWSLASH,i,p\|BSL}$	Change in carbon stock of dead wood as logging slash resulting from timber harvest per unit area in stratum I in land parcel p, in tCO2-e ha-1
$C_{HB,j,i\|BSL}$	Mean carbon stock of harvested biomass per unit area for tree class j in stratum i, tCO2e ·ha-1;
$C_{EX,j,i\|BSL}$	Mean carbon stock of extracted timber per unit area for tree class j in stratum i, tCO2e · ha-1;
i	1,2,3 … M strata; and
j	1,2,3 … J tree class
p	1,2,3 … P land parcels

The mean carbon stock in timber from residual stand damage (CRSD, j,i|BSL) is calculated as follows:

$$C_{RSD,j,i|BSL} = C_{EX,j,i|BSL} * F_{RSD|BSL}$$

Where:

$C_{RSD,j,i\|BSL}$	Mean carbon stock in timber from residual stand damage per unit area for tree class j in stratum i, tCO2e ha-1;
$C_{EX,j,i\|BSL}$	Mean carbon stock of extracted timber per unit area for tree class j in stratum i, tCO2e · ha-1;
$F_{RSD\|BSL}$	Factor for residual stand damage, dimensionless;
i	1,2,3 … M strata; and
j	1,2,3 … J tree class

Carbon sequestered in wood products

In all cases where wood is harvested for conversion to wood products, the carbon stock in the wood products pool (k) must be included in the baseline case. Based on discussions with experts and common practices in West Kalimantan province, dipterocarp tree species are typically used for sawn wood and other commercial trees for wood-based panels. In accordance with the VCS AFOLU Requirements, the amount of carbon stored in wood products that would decay within three years after harvest (i.e., the Wood Waste (WW) and the Short-Lived Fraction (SLF)), are assumed to be emitted at the time of harvest.

Wood products that are retired between three and 100 years after harvest (i.e., the Additional Oxidized Fraction, OF), must be accounted according to a 20-year linear decay function. This decay function is applied when the net GHG emissions/removals are calculated on an annual basis in the equations below. All other wood product pools are considered to permanently store carbon. Therefore, the carbon stock of extracted timber that is immediately emitted to the atmosphere at the time of harvest is calculated as:

$$C_{WPO|BSL} = \sum_{k} C_{EX,i,k|BSL} * (WW_k + SLF_k)$$

Where:

$C_{WPO,i\|BSL}$	Carbon stock of extracted timber from stratum i that is assumed to be emitted immediately at the time of harvest, in tCO2-e· ha-1
$C_{EX,i,k\|BSL}$	Mean carbon stock of extracted timber per unit area in stratum i, for wood product type k, tC· ha-1

WW_K	Fraction of biomass carbon from wood waste that is assumed to be emitted to the atmosphere immediately at the time of harvest for wood product k, dimensionless;
SLF_k	Fraction of biomass carbon from the short-lived wood product pool that is assumed to be emitted to the atmosphere immediately at the time of harvest for wood product k, dimensionless
i	1,2,3 … M strata; and
k	Wood products (sawn wood), wood base products, etc.)

As Indonesia is listed as a developing country, the default value for Wood Waste Fraction (WW) used in the calculation is 24% (Winjum, et al. 1998, in VM0010). Meanwhile for the Short-Lived Fraction (SLF), the default value was chosen based on the wood product types, as shown in Table 21.

Table 21. SLF default value applied in the calculation

Tree class (j)	Product type	SLF
Dipterocarp	Sawn wood	0.12
Other Commercial	Wood base panel	0.06

The amount of extracted carbon stock that is assumed to enter the wood products pool that is not immediately emitted at harvest is calculated as per equation below:

$$C_{WPi|BSL} = \sum_{k} C_{EX,i,k|BSL} - C_{WPO,i|BSL}$$

Where:

$C_{WPi|BSL}$	Carbon stock of extracted timber from stratum i that is assumed to enter the wood products pool that is not immediately emitted at the time of harvest, in tCO2-e· ha-1
$C_{EX,i,k|BSL}$	Mean carbon stock of extracted timber per unit area in stratum i, for wood product type k, tC· ha-1
$C_{WPO,i|BSL}$	Carbon stock of extracted timber from stratum i that I assumed to be emitted immediately at the time of harvest, tC· ha-1

i	1,2,3 … M strata; and
k	Wood products (sawn wood), wood base products, etc)

Therefore, the carbon stock of wood products assumed to be retired between 3-100 years following harvest is calculated as:

$$C_{WP100,i|BSL} = C_{WP,i|BSL} * OF_k$$

Where:

$C_{WP100,i\|BSL}$	Carbon stored in wood products that are assumed to be retired between 3 – 100 years after harvest from stratum I in land parcel p, tCO2-e · ha-1
$C_{WP,i\|BSL}$	Carbon stock of extracted timber from stratum i that is assumed to enter the wood products pool that is not immediately emitted at the time of harvest, in tC· ha-1
OF_k	Fraction of biomass carbon for wood product type k that is assumed to be emitted to the atmosphere between 3 and 100 years of timber harvest, dimensionless; and
i	1,2,3 … M strata

The default value of Additional Oxidized Fraction (OF) for the calculation referred to Winjum et al. (1988), taking into account the wood product type and country's climatic factor as shown in Table 22.

Table 22. The default value of Additional Oxidized Fraction (OF) used for calculation

Tree class (j)	Product type	OF
Dipterocarp	Sawn wood	0.86
Other Commercial	Wood base panel	0.98

Note:

In the APDeg area, the construction of railway infrastructure would involve forest clearance. For this reason, GHG emissions from infrastructure construction are excluded from APDeg calculation and integrated into the APD calculation.

Calculation of baseline carbon stocks change from planned degradation

As prescribed by VM0007, the emission resulting from planned degradation are calculated by the following equation.

$$\Delta C_{BSL,i,t} = AA_{planned,i,t} \times \left(\Delta C_{ABtree,i} - \Delta C_{WP,i} + \Delta C_{ABnon-tree} + \Delta C_{LI,i}\right) + \left(\sum_{t-10}^{t} AA_{planned}\right)\left(\Delta C_{BBtree,i} + \Delta C_{BBnon-tree,i} + \Delta C_{DW,i}\right) * \left(\frac{1}{10}\right) + \left(\sum_{t-20}^{t} AA_{planned,i,t}\right) \times \left(C_{WP100,i}\right) * \left(\frac{1}{20}\right)$$

$\Delta C_{BSL,i,t}$	Sum of the baseline carbon stock change in all terrestrial pools in stratum i in year t, tCO2e
$AA_{planned,i,t}$	Annual area of baseline planned degradation for stratum i in year t; ha
$\Delta C_{ABtree,i}$	Baseline carbon stock change in aboveground tree biomass in stratum i; tCO2e ha-1
$\Delta C_{WP,i}$	Baseline carbon stock change in wood products in stratum i; tCO2e ha-1
$\Delta C_{ABnon-tree}$	Baseline carbon stock change in aboveground non-tree biomass in stratum i; tCO2e ha-1
$\Delta C_{LI,i}$	Baseline carbon stock change in litter in stratum i; tCO2e ha-1
$\Delta C_{BBtree,i}$	Baseline carbon stock change in belowground tree biomass in stratum i; tCO2e ha-1
$\Delta C_{BBnon-tree,i}$	Baseline carbon stock change in belowground non-tree biomass in stratum i; tCO2e ha-1
$\Delta C_{DW,i}$	Baseline carbon stock change in dead wood in stratum i; tCO2e ha-1

$C_{WP100,i}$	Carbon stock entering the wood products pool at the time of deforestation that is expected to be emitted over 100-years from stratum i; tCO2e ha-1
I	1, 2, 3, … M strata
T	1, 2, 3, … t* years elapsed since the projected start of the project activity

The equation above basically provides the general principle of carbon stock change/GHG emission calculation for logging/timber harvest. However, in order to accommodate the whole quantification process in the logging activity, some adjustments were made based on the carbon cycle of timber logging/harvest. Among other available IFM methodologies, the VCS methodology of Improved Forest Management-Logged to Protected Forest (VM0010) considered the most appropriate one for Mayas project as the project aimed to fully avoid the planned logging and conserve the forests. The following are the main adjustments for the calculation of carbon stock change from commercial logging.

As explained by Table 5 (selected carbon pools); the below ground tree biomass (CBBtree), above ground of non-tree biomass (CABnon-tree), below ground of non-tree biomass (CBBnon-tree), and the litters (CLI,) are excluded in the calculation.

Baseline carbon stock change in aboveground tree biomass ($\Delta C_{BSL,i,t}$) refers to the carbon stock emitted in the year of logging (CWPO).

Baseline carbon stock change in dead wood (ΔC_{DW}) includes the carbon stock change in timber from residual stand damage (CDWRSD) and carbon stock change of logging slash resulting from timber harvest (CDWSLASH). In the calculation, as prescribed by equation above, the Dead Wood emitted within 10 years with the decay function.

Carbon stock entering the wood products pool at the time of degradation that is expected to be emitted over 100-years from stratum (CWP100) is emitted within 20 years.

The baseline emission calculation of avoiding planned degradation refered to the plan of logging plan as prescribed by ten yearly working plan (RKU or Rencana Karya Umum). To be in line with the project start date, the emission from planned degradation under baseline scenario was calculated from 2019.

Based on calculation, the net carbon stock change from commercial logging in the baseline scenario estimated to be 5,396,018 tCO2-e within the project period as shown by Table 23.

Table 23. The net carbon stock change in the baseline scenario (tCO2-e) due to logging

Year(t)	A_plannedDeg (ha)		Cstock change (tCO2-e)		
	Stratum 1	Stratum 2	Stratum 1	Stratum 2	Total
2019	442.79	-	56,123.96	-	56,123.96
2020	442.54	-	73,760.86	-	73,760.86
2021	395.98	-	87,950.06	-	87,950.06
2022	394.05	-	103,595.78	-	103,595.78
2023	396.01	-	119,453.86	-	119,453.86
2024	396.00	-	135,243.50	-	135,243.50
2025	335.34	1.95	146,530.02	51.28	146,581.30
2026	264.21	-	154,621.19	34.48	154,655.67
2027	402.51	-	165,658.13	34.48	165,692.60
2028	660.81	0.59	187,394.11	50.00	187,444.10
2029	291.78	108.38	169,923.13	2,894.88	172,818.01
2030	490.80	-	179,916.13	1,961.10	181,877.23
2031	427.10	-	180,069.37	1,961.10	182,030.47
2032	620.26	-	196,821.93	1,961.10	198,783.02
2033	429.63	-	192,712.58	1,961.10	194,673.68
2034	344.54	-	188,838.04	1,961.10	190,799.13
2035	350.32	-	190,566.07	1,928.30	192,494.37
2036	222.08	-	185,214.09	1,928.30	187,142.39
2037	358.13	-	189,238.26	1,928.30	191,166.56
2038	240.83	42.11	170,298.67	3,025.71	173,324.38
2039	495.76	34.08	186,772.25	1,736.25	188,508.50
2040	300.69	13.68	172,622.82	1,802.46	174,425.28
2041	336.34	1.05	170,315.32	1,712.23	172,027.56
2042	330.86	6.01	159,216.40	1,861.10	161,077.50

Year(t)	A_plannedDeg (ha)		Cstock change (tCO2-e)		
	Stratum 1	Stratum 2	Stratum 1	Stratum 2	Total
2043	349.44	-	156,751.02	1,809.35	158,560.38
2044	395.66	-	160,234.67	1,809.35	162,044.02
2045	347.34	-	158,496.64	1,807.67	160,304.31
2046	345.94	-	163,270.57	1,807.67	165,078.24
2047	395.78	-	166,360.72	1,807.67	168,168.40
2048	244.29	-	160,125.92	1,098.94	161,224.86
2049	271.80	-	152,707.66	432.38	153,140.05
2050	301.33	-	153,219.98	202.25	153,422.23
2051	272.42	-	149,425.50	184.55	149,610.05
2052			126,067.66	83.54	126,151.21
2053			46,629.71	34.81	46,664.52
	12,293.36	207.86	5,356,146.60	39,871.43	5,396,018.03

3.2.1.5 Baseline Avoiding Planned Deforestation (APD) GHG Emission Calculation

The baseline emission calculation of avoiding planned deforestation referred to the plan of forest conversion into plantation (deforestation plan) as prescribed by ten yearly working plan (RKU or Rencana Karya Umum). To be in line with the project start date, the emission from planned deforestation under baseline scenario was calculated from 2019.

For the purpose of GHG emissions calculations, the deforestation plan was overlaid with the AGB stratification map to produce the annual area of baseline planned deforestation for all strata and years (AAplanned,i,t), as detailed in Table 24.

Table 24. The annual area of baseline planned deforestation for all strata i and year t (AAplanned,I,t)

Year/t	Planned deforestation activity	Area (ha)		
		Stratum 1	Stratum 2	Total
2019	Infrastructure	57.45	5.74	63.19
	Acacia plantation	2,530.26	281.61	2,811.87

Year/t	Planned deforestation activity	Area (ha)		
		Stratum 1	Stratum 2	Total
2020	Infrastructure	74.43	13.66	88.09
	Acacia plantation	2,608.68	487.58	3,096.26
2021	Infrastructure	60.75	-	60.75
	Acacia plantation	2,313.97	-	2,313.97
2022	Infrastructure	53.99	8.32	62.31
	Acacia plantation	2,545.10	419.18	2,964.28
2023	Infrastructure	18.35	4.19	22.54
	Acacia plantation	966.02	128.01	1,094.03
Total		11,228.99	1,348.30	12,577.29

Carbon stock change from planned deforestation in the baseline scenario

The net carbon stock changes in the baseline are equal to the baseline pre-deforestation stock minus the long-term carbon stock after deforestation as shown by the equation below.

$$\Delta C_{AB_{tree},i} = C_{AB_{tree_{bsl}},i} - C_{AB_{tree_{post}},i}$$

Where:

$\Delta C_{AB_{tree},i}$	Baseline carbon stock change in aboveground tree biomass in stratum i; t CO2e ha-1
$C_{AB_{tree_{bsl}},i}$	Forest carbon stock in aboveground tree biomass in stratum i; t CO2e ha-1
$C_{AB_{tree_{post}},i}$	Post-deforestation carbon stock in above ground tree biomass in stratum i; t CO2e ha-1

Per BL-PL, post-deforestation carbon stocks are the long-term average stocks on the land following deforestation. Since the plantation applies C stocks in a cycle, the mean stock across the cycle is used in the calculation. This gives the value of 31.61 tC/ha for Acacia plantation (8 years cycle) and 20.87 tC/ha for Jabon plantation (3 years cycle).

The inclusion or exclusion of carbon pools for C stock and GHG calculation was analysed by using the tools T-SIG, BL-PL and REDD+ MF. Based on this, the calculation only includes aboveground

tree biomass (CAB). Taking into account the selected carbon pools explained above, the baseline stock changes were calculated by multiplying the annual area of baseline planned deforestation and baseline carbon stock change in above ground tree biomass:

$$\Delta C_{BSL,i,t} = AA_{planned,i,t} * (\Delta C_{AB_{tree},i})$$

Where:

$\Delta C_{BSL,i,t}$	Sum of the baseline carbon stock change in all terrestrial pools in stratum i in year t, t CO2e
$AA_{planned,i,t}$	Annual area of baseline planned deforestation for stratum i in year t; ha
$\Delta C_{AB_{tree},i}$	Baseline carbon stock change in above ground tree biomass in stratum i; t CO2e ha-1
i	1,2,3, … M strata
T	1,2,3, … t* years elapsed since the projected start of the project activity

The GHG emissions in the baseline within the project boundary (GHGBSL,E,i.t) are conservatively excluded in this calculation. Based on this, the net GHG emissions in the baseline scenario from planned deforestation (ΔCBSL,planned) are equal to the baseline carbon stock change in all terrestrial pools (ΔCBSL,I,t).

Based on these calculations, net carbon stock change in the baseline scenario from planned deforestation within the project area are estimated to be 5,433,647 tCO2-e as shown in Table 25.

Table 25. Carbon stock change in the baseline scenario from plantation establishment (tCO2-e)

t	Planned deforestation activity	Carbon stock change per strata i			Annual carbon stock change
		Stratum 1	Stratum 2	Total	
2019	Infrastructure	30,989.85	1,133.64	32,123.49	1,248,883.09
	Acacia plantation	1,181,571.88	35,187.73	1,216,759.60	
2020	Infrastructure	40,143.01	2,696.45	42,839.46	1,321,955.24
	Acacia plantation	1,218,192.56	60,923.21	1,279,115.78	
2021	Infrastructure	32,764.91	-	32,764.91	1,113,334.36

t	Planned deforestation activity	Carbon stock change per strata i			Annual carbon stock change
		Stratum 1	Stratum 2	Total	
	Acacia plantation	1,080,569.44	-	1,080,569.44	
2022	Infrastructure	29,121.37	1,642.64	30,764.01	1,271,645.53
	Acacia plantation	1,188,504.97	52,376.55	1,240,881.51	
2023	Infrastructure	9,895.83	827.36	10,723.20	477,828.86
	Acacia plantation	451,111.18	15,994.49	467,105.67	
Total		5,262,865.01	170,782.07	5,433,647.08	5,433,647.08

Carbon stock change from logging infrastructure construction in the baseline scenario

As described in the baseline scenario for logging, GHG emissions from infrastructure construction (see Figure 17 and Figure 28) are included in the REDD-APD calculation as the infrastructure construction involves forest clearing.

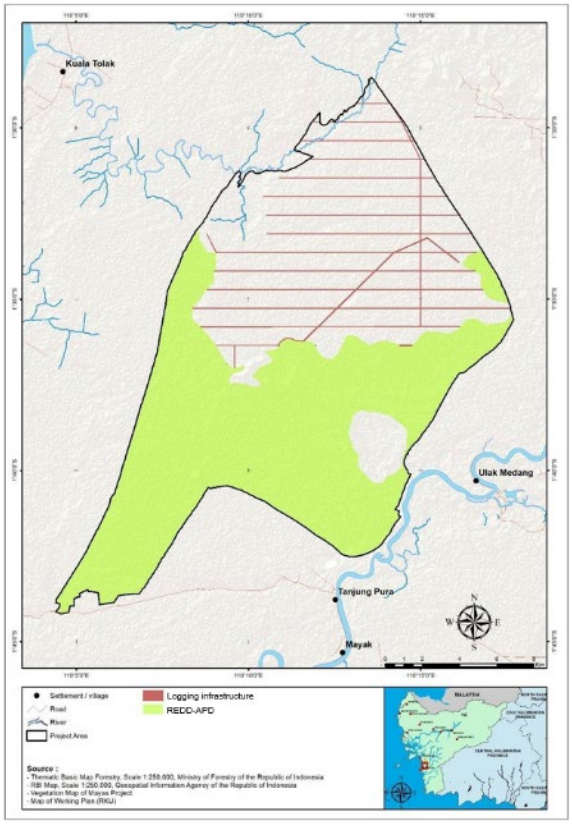


Figure 28. Infrastructure constructed in the logging area

According to approved plan in the RKU, the net carbon stock change resulted from infrastructure construction in the logging area estimated to be 81,819 tCO2-e as shown by Table 26.

Table 26. Net carbon stock change in the baseline from logging infrastructure construction (tCO2e)

Year (t)	Infrastructure (Ha)			Carbon stock change (tCO2-e)		
	Forest stratum 1	Forest stratum 2	Total	Forest stratum 1	Forest stratum 2	Total
2019	10.64	-	10.64	5,478.93	-	5,478.93
2020	11.00	-	11.00	5,741.98	-	5,741.98
2021	4.02	-	4.02	1,994.12	-	1,994.12
2022	5.95	-	5.95	3,038.41	-	3,038.41
2023	3.99	-	3.99	1,976.36	-	1,976.36
2024	4.00	-	4.00	1,982.05	-	1,982.05
2025	3.41	0.15	3.57	1,693.01	23.66	1,716.67
2026	2.80	-	2.80	1,388.06	-	1,388.06
2027	4.10	-	4.10	2,031.60	-	2,031.60
2028	7.02	0.06	7.09	3,482.40	9.67	3,492.07
2029	3.44	1.61	5.05	1,703.80	251.89	1,955.69
2030	10.15	-	10.15	5,276.12	-	5,276.12
2031	7.66	-	7.66	3,978.96	-	3,978.96
2032	7.39	-	7.39	3,770.83	-	3,770.83
2033	6.52	-	6.52	3,276.63	-	3,276.63
2034	4.71	-	4.71	2,336.82	-	2,336.82
2035	4.26	-	4.26	2,112.27	-	2,112.27
2036	2.32	-	2.32	1,153.16	-	1,153.16
2037	3.56	-	3.56	1,765.93	-	1,765.93
2038	3.58	-	3.58	1,773.61	-	1,773.61

Year (t)	Infrastructure (Ha)			Carbon stock change (tCO2-e)		
	Forest stratum 1	Forest stratum 2	Total	Forest stratum 1	Forest stratum 2	Total
2039	6.43	0.21	6.65	3,190.44	32.39	3,222.84
2040	3.52	0.21	3.73	1,745.43	32.84	1,778.27
2041	3.08	-	3.08	1,527.52	-	1,527.52
2042	3.71	0.15	3.86	1,837.75	22.90	1,860.65
2043	3.52	-	3.52	1,746.56	-	1,746.56
2044	4.34	-	4.34	2,149.39	-	2,149.39
2045	3.22	-	3.22	1,597.14	-	1,597.14
2046	3.50	-	3.50	1,735.30	-	1,735.30
2047	4.22	-	4.22	2,093.18	-	2,093.18
2048	2.28	-	2.28	1,129.40	-	1,129.40
2049	3.35	-	3.35	1,662.03	-	1,662.03
2050	5.07	-	5.07	2,514.10	-	2,514.10
2051	5.17	-	5.17	2,562.79	-	2,562.79
Total	161.93	2.40	164.33	81,446.08	373.36	81,819.44

Total Carbon stock change from the Avoiding Planned Deforestation (APD)

Based on calculation, the total carbon stock change from forest conversion into timber plantation and infrastructure construction in the logging area in the baseline scenario is estimated to be 5,515,466 tCO2-e as shown by Table 27.

Table 27. Carbon stock change from the baseline scenario (Avoiding Planned Deforestation-APD)

year	Carbon stock change (tCO2-e)		
	Timber plantation	Logging infrastructure	Total (ΔC_AB_tree,i,j)
2019	1,248,883.09	5,478.93	1,254,362.02
2020	1,321,955.24	5,741.98	1,327,697.22
2021	1,113,334.36	1,994.12	1,115,328.48

year	Carbon stock change (tCO2-e)		
	Timber plantation	Logging infrastructure	Total (ΔC_AB_tree,i,j)
2022	1,271,645.53	3,038.41	1,274,683.94
2023	477,828.86	1,976.36	479,805.23
2024		1,982.05	1,982.05
2025		1,716.67	1,716.67
2026		1,388.06	1,388.06
2027		2,031.60	2,031.60
2028		3,492.07	3,492.07
2029		1,955.69	1,955.69
2030		5,276.12	5,276.12
2031		3,978.96	3,978.96
2032		3,770.83	3,770.83
2033		3,276.63	3,276.63
2034		2,336.82	2,336.82
2035		2,112.27	2,112.27
2036		1,153.16	1,153.16
2037		1,765.93	1,765.93
2038		1,773.61	1,773.61
2039		3,222.84	3,222.84
2040		1,778.27	1,778.27
2041		1,527.52	1,527.52
2042		1,860.65	1,860.65
2043		1,746.56	1,746.56
2044		2,149.39	2,149.39
2045		1,597.14	1,597.14

year	Carbon stock change (tCO2-e)		
	Timber plantation	Logging infrastructure	Total (ΔC_AB_tree,i,j)
2046		1,735.30	1,735.30
2047		2,093.18	2,093.18
2048		1,129.40	1,129.40
2049		1,662.03	1,662.03
2050		2,514.10	2,514.10
2051		2,562.79	2,562.79
2052		-	-
2053		-	-
Total	5,433,647.08	81,819.44	5,515,466.51

3.2.1.6 Baseline Wetlands Restoration and Conservation (WRC) GHG Emissions calculations

Baseline calculation method

Using the GHG project boundary described in 3.1.3 and results of the stratification described in 3.2.1, the net baseline GHG emissions from peat soils were calculated by using equation (1) provided in VMD0042 (BL-PEAT), by omitting peat-ditch terms (give term here) from the equation:

$$GHG_{BSL-PEAT} = \sum_{t=1}^{t*}\sum_{i=1}^{M}\left(A_{peatsoil-BSL,i,t} \times GHG_{peatsoil-BSL,i,t} + A_{peatburn-BSL,i,t} \times GHG_{peatburn-BSL,i,t}\right)$$

Were

GHGBSL-PEAT : Net GHG emissions in the WRC baseline scenario on peatland up to year t* (tCO2e)

GHGpeatsoil-BSL,i,t : GHG emissions from the peat soil within the project boundary in the baseline scenario in stratum i at year t* (tCO2e ha-1 yr-1)

GHGpeatburn-BSL,i,t : GHG emissions from burning of peat in the base line scenario in stratum i at year t (t CO2e ha-1 yr-1)

Apeatsoil-BSL,i,t : Area of peatland (not open water, not burnt) in stratum i in year t in the baseline scenario (ha)

Apeatburn-BSL,i,t : Area of peat burnt in stratum i in year t in the baseline scenario (ha)

i : 1, 2, 3 …M strata in the baseline scenario (unitless)

t : 1, 2, 3, … t* times elapsed since the project start (yr)

Calculations were carried out in a spatially-explicit, dynamic fashion to ensuring the following restrictions in our model:

Carbon stock depletion is consistent with subsidence

Carbon stock is represented in tC/m2 as resulted from peat thickness (L in meter) multiplied by volumetric carbon density (Cvol in tC/m3) while carbon release rate (i.e., emissions) is in tCO2e/ha/yr. Stock depletion manifests as $\Delta L/\Delta t \times Cvol$ hence the conversion from tCO2e/ha/yr to $\Delta L/\Delta t$ (i.e., subsidence) must be correct and consistent.

Total carbon emissions do not exceed total carbon stock or total available stock for emission

Carbon stock may be depleted after prolonged emissions. Once this happens carbon emissions from peat oxidation are no longer possible. Peat depletion manifests as subsidence. Every time land subsides the soil surface gets closer to the peat base. In many cases peat bases are lower than the minimum possible drainage depth (i.e., Drainability Elevation Limit, DEL a.k.a. drainage base). Carbon stock below DEL is not available for emissions, unless the responsible baseline agent is proven to be able and intent to apply mechanical pumping for years in order to maintain water table levels well below the DEL. In this project we conservatively assumed that the baseline agent is not able or willing to apply mechanical pumping in the future.

For this calculation, the project area was partitioned into array of 100m by 100m (1 hectare) size parcels. At various locations parcels had to be further divided into smaller units in order to accommodate local features and variability such as canals and zone boundaries, depending on the corresponding designated land use stratum at the locations, i.e., based on baseline scenario map. Figure 29 below illustrates an array of square parcels further split by canals into smaller ones at certain locations.

By applying this partition scheme, we have actually divided each stratum into smaller units, bringing spatially-explicit distributions into the calculations. To using these units, we introduced another spatial index j into equations for specifying individual parcels that appears in later calculations, in addition to existing index i for strata.

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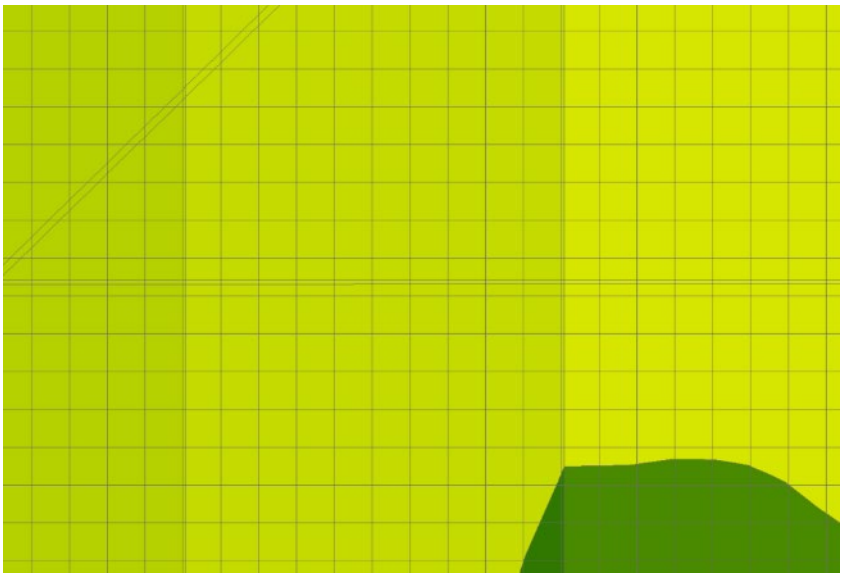


Figure 29. Illustration of partitioning of project area into 1 hectare parcels

Available stock for emissions in each parcel was determined based on corresponding surface elevation, DEL, and peat thickness. It is equivalent with the term depletable peat volume per unit area, or available peat thickness for subsidence, and can be written as follows:

$$L_{Avail,i,j} = Z_{Top0,i,j} - Z_{base,i,j}$$

Peat depletion base ZBase for each parcel was evaluated from the relative position of DEL to the basal contact elevation level of peat soils. Details on surface elevation and DEL mappings are given in Annex 3 of the Annexes. For each parcel, if DEL was at higher elevation than peat basal contact, then ZBase equals DEL

$$Z_{Base,i,j} = DEL_{i,j}$$

Otherwise:

$$Z_{Base,i,j} = Z_{Top0,i,j} - L_{Peat0,i,j}$$

Where:

LAvail,i,j : Available thickness of peat soils for subsidence in parcel j stratum i (m)

ZBase,i,j : Depletion base of peat soils in parcel j stratum i (m-msl)

ZTop0,i,j : Initial surface elevation of peat soils in parcel j stratum i at start date (m-msl)

LPeat0,i,j : Initial thickness of peat soils in parcel j stratum i at start date (m)

DEL,i,j : Drainability Elevation Limit in parcel j stratum i (m-msl)

Water table depth in parcels were inputed by referring to the designated average water table depths of the corresponding land use strata as given in Table 28. In order to achieve gradual water table transitions towards main canals, water table input values were weighted by the distance to, and the designed freeboard at, the nearest canals, taking into account long term climate characteristics, local topography and aquifer properties in the project area, as detailed in Annex 5 of the Annexes. Figure 30 provides a schematic of the vertical water table profiles within a plantation block in the baseline scenario.

Table 28. Water table depth (WTD) based on baseline land-use scenario

Land use	Average WTD (m-ss)	WTD range (m-ss)	Descriptions
HTI	0.85	0.61 – 1.28	Water table depths were modelled based on distance to the nearest canals: ca. 1.28 m-ss at 100 m from canals, and gradually rising to 0.61 m-ss in the middle of the block. Reference for WTD average value: Jauhiainen, et.al. (2012)
HPH	0.60	0.3 – 1.28	ca. 1.28 m-ss at 100 m from canals, and gradually rising to 0.3 m-ss at the middle of the block. Reference for WTD average value: Rais, et.al. (2020)
CZ	0.22	0 – 1.28	ca. 1.28 m-ss at 100 m from canals, and gradually rising to 0.11 m-ss at 500 m from canals, and can rise to 0 m-ss if it gets far enough from canals. Reference for WTD value: Wosten, et.al. (2006)

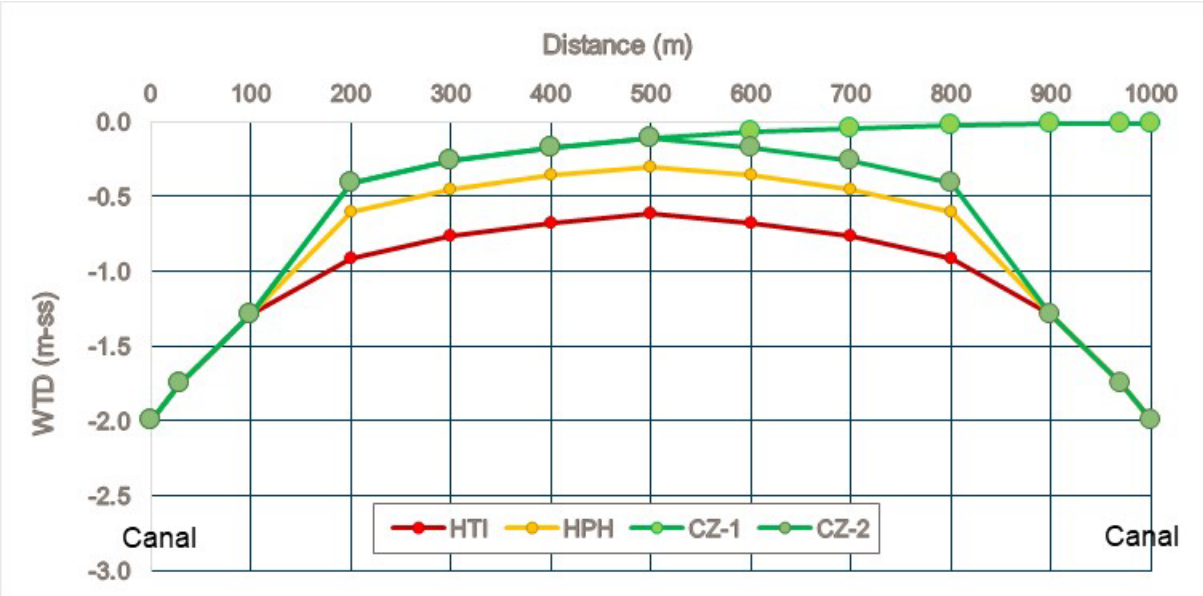


Figure 30. Schematics of water table depth distributions of three baseline land use scenarios (HTI, HPH, and CZ) in 1 km2 plantation block size

Note: CZ-1 illustrates a possible situation where water table depths in CZ stratum coverage to zero at positions far enough from canals. CZ-2 illustrates a possible situation where both the opposite ends of the CZ stratum are bounded by canals.

A general rule was applied for every parcel that wherever and whenever water table drop below DEL, water table at that position was reset to DEL (i.e., the lowest possible water table at a position respective to its surrounding natural drainage). Descriptions of DEL is given in Annex 3 of the Annexes.

Drainage and fires induce subsidence of the land surface. Subsidence attributed to drainage of peat soils comprises those associated with consolidation, shrinkage and peat oxidation. Fires also induce peat oxidation, but at a faster rate. Equivalent subsidence due to peat oxidation for each parcel was back-calculated using parameters bulk density and carbon content of peat soils upper layer using the following equation:

$$S_{Oxi-BSL,i,j,t} = \frac{GHG_{peatsoil-BSL,i,j,t}}{BD_{upper} \times C_c \times 10} \times \frac{12}{44}$$

Where:

SOxi-BSL,i,j,t : Subsidence due to oxidation of drained peat soils in parcel j stratum i at time t (m/yr)

GHGpeatsoil-BSL,i,j,t : CO2 emissions from the peat soil within the project boundary in the baseline scenario in parcel j stratum i at year t* (tCO2e ha-1 yr-1)

BDupper : Bulk density of upper layer of peat soils (kg/m3)

Cc : Carbon content of peat soils upper layer (g/g)

j : 1, 2, 3 … N parcel (unitless)

i : 1, 2, 3 … M Strata (unitless)

t : 1, 2, 3, … t* time elapsed since the start of the project activity (years)

Equivalent subsidence due to peat combustion for each parcel was directly derived from burn scar depth. Burn scar depths were set to be dependent on parcels' individual burning history as listed in Table 29.

With the application of drainage in the baseline scenario (as also applies to existing drained areas in the project scenario) peat soils were expected to undergo rapid initial subsidence in few weeks to few months after first drainage, and is considered as one-time event. This rapid subsidence was

assumed to complete within a year. The location and timing of parcels experiencing initial subsidence were set to match the time of the onset of drainage. Rapid initial subsidence comprised of consolidation and shrinkage. One-dimensional consolidation model from Terzaghi (Terzaghi, et.al., 1996; Verruijt, 2001) was used in modelling consolidations, while shrinkages were estimated using shrinkage proportion parameter. Combined consolidation and shrinkage formulae are given below:

$$S_{ini} = L_0 \times C_p \times (1 - n_0) \times log\ log\ \frac{P}{P_o} + f_s \times D_{upper}$$

Where:

Sini : Rapid initial subsidence upon first drainage application (m/yr)

L0 : Initial peat thickness before consolidation (m)

Cp : Primary consolidation index (m)

n0 : Initial porosity of peat soils (-)

P0 : Initial effective stress acting over the entire column of peat soils before drainage (pa)

P : Post-drainage effective stress acting over the entire column of peat soils (pa)

fs : Shrinkage proportion of the upper layer, i.e., 0.2 (unitless); conservative value taken from Razali, et.al. (2019)

Dupper : Upper layer of peat soils subject to shrinkage (m); conservatively assumed 0.4 m

Taking into account all the subsidence components, the total subsidence in each parcel equals the summation of the rapid initial subsidence, subsidence due to peat oxidation and burn scar depth:

$$Sub_{BSL,i,j,t} = S_{ini-BSL,i,j,t} + S_{Oxi-BSL,i,j,t} + D_{peatburn,i,j,t}$$

Where:

SubBSL,i,j,t : Subsidence in stratum i parcel j at time t (m/yr)

Sini-BSL,i,j,t : Rapid initial subsidence in stratum i parcel j at time t (m/yr); whose value > 0 at t = time of drainage onset, otherwise value = 0

SOxi-BSL,i,j,t : Subsidence due to oxidation of drained peat soils in stratum i parcel j at time t (m/yr)

Dpeatburn,i,j,t : Average fire scar depth in stratum i parcel j in year t (m)

j : 1, 2, 3 … N parcel (unitless)

i : 1, 2, 3 … M Strata (unitless)

t : 1, 2, 3, … t* time elapsed since the start of the project activity (years)

Peat thickness and topography in parcels were subsequently updated as the time advances in the calculation run:

$$Peat_{BSL,i,j,t+1} = Peat_{BSL,i,j,t} - Sub_{BSL,i,j,t}$$

$$Top_{BSL,i,j,t+1} = Top_{BSL,i,j,t} - Sub_{BSL,i,j,t}$$

Where:

PeatBSL,i,j,t : Peat thickness in stratum i parcel j at time t (m/yr)

TopBSL,i,j,t : Soil surface elevation in stratum i parcel j at time t (m/yr)

SubBSL,i,j,t : Subsidence in stratum i parcel j at time t (m/yr)

j : 1, 2, 3 … N parcel (unitless)

i : 1, 2, 3 … M Strata (unitless)

t : 1, 2, 3, … t* time elapsed since the start of the project activity (years)

Consolidation and shrinkage reduce peat soil volume without actually reducing soil mass. It causes increases in soil bulk density of peat soils, that can be calculated as:

$$BD_{lower-BSL,i,j,t} = BD_{init} \times \left(1 + \frac{\Delta L_{cons-BSL,i,j}}{L_{0-BSL,i,j,t-1}}\right)$$

$$BD_{upper-BSL,i,j.t} = BD_{lower-BSL,i,j,t-1} \times (1 + f_s)$$

Where:

BDlower-BSL,i,j,t : Bulk density of lower layer peat soils in baseline stratum i parcel j at time t (kg/m3)

BDlower-BSL,i,j,t-1 : Bulk density of lower layer peat soils in baseline stratum i parcel j at time t-1 (kg/m3)

BDupper-BSL,i,j,t : Bulk density of upper layer peat soils in baseline stratum i parcel j at time t (kg/m3)

BDinit : Initial bulk density of peat soils (kg/m3)

ΔLcons-BSL,i,j : Consolidation of peat soils in baseline stratum i parcel j (m)

L0-BSL,i,j,t-1 : Initial thickness of peat soils in baseline stratum i parcel j before consolidation at time t-1 (m)

fs : Shrinkage proportion of the upper layer, i.e., 0.2 (unitless); conservative value taken from Razali, et.al. (2019)

Baseline GHG Emissions from peat oxidation

GHG emissions from peat soils in this project area are defined as CO2 emissions resulting from the oxidation of drained peat soils, omitting other potential gases, as set out in the GHG accounting boundaries. This project adopted a water table proxy (Hooijer, et.al., 2006) for this calculation, as given below:

$$GHG_{peatsoil-BSL,i,j,t} = c \times WTD_{BSL,i,j,t}$$

Where:

GHGpeatsoil-BSL,i,j,t : CO2 emissions from the peat soil within the project boundary in the baseline scenario in stratum i parcel j at year t* (tCO2e ha-1 yr-1) calculated using a water table proxy up to 1-meter WTD; leveling off to 90 at 1 meter water table depth (Hooijer, et.al., 2006)

WTDBSL,i,j,t : Baseline water table depth in stratum i parcel j, at time t (m from soil surface)

c : Water table proxy constant, whose value approximately 90 tCO2e ha-1yr-1m-1 (tCO2e ha-1 yr-1 m-1)

Having a known water table depth for each parcel, CO2 emissions from peat oxidation were calculated by using a water table proxy. Peat oxidations were conservatively set to zero wherever and whenever water table has reached DEL or remaining peat thickness in the corresponding parcel became equal or less than 0.2 meters. Moreover, whenever and wherever parcel water table depth exceeded 1 meter, CO2 emissions from peat oxidation was capped to 90 tCO2-e/ha/y for the corresponding parcel.

Baseline GHG Emission from peat fires

GHG emissions from combustion of peat soils were calculated using equation (3) of module VMD0013 (E-BPB) as follows:

$$GHG_{peatburn-BSL,i,t} = \sum_{g=1}^{G} \left(P_{i,j,t} \times G_{g,j,i} \times 10^{-3} \times GWP_g\right)$$

Where:

GHGpeatburn-BSL,i,j,t : GHG emissions due to peat burning in the baseline scenario in stratum i parcel j in year t of each GHG (CO2, CH4, N2O) (t CO2e ha-1 yr-1)

Pi,j,t : Average mass of peat burnt in the baseline scenario in stratum i, parcel j year t (t d.m. ha-1)

Gg,I,j : Emission factor in stratum i parcel j for gas g (kg t-1 d.m. burnt)

GWPg : Global warming potential for gas g (t CO2/t g)

g : 1, 2, 3 ... G GHGs including carbon dioxide, methane and nitrous oxide (unitless)

i : 1, 2, 3 … M Strata (unitless)

j : 1, 2, 3 … N parcel (unitless)

t : 1, 2, 3, … t* Time elapsed since the start of the project activity (year)

The average mass of peat carbon burnt for a particular stratum was estimated based on burn scar depth (Table 29) as follows:

$$P_{i,t} = D_{peatburn,i,j,t} \times BD_{upper,i,j,t} \times 10^4$$

Where:

Pi,j,t : Average mass of peat burnt in stratum i parcel j year t (t d.m. ha-1)

Dpeatburn,i,j,t : Average fire scar depth in stratum i in year t (m)

BDupper,I,j,t : Bulk density of the upper peat in stratum i parcel j year t (g cm-3)

i : 1, 2, 3 … M strata

j : 1, 2, 3 … N parcel (unitless)

t : 1, 2, 3, … t* time elapsed since the start of the project activity (years)

Table 29. Combustion parameters used in calculating GHG emissions from combustion of peat soils

Parameters	Value	Unit	Source
1st burning burn scar depth	0.18	m	Page, et.al. (2014)

Parameters	Value	Unit	Source
2nd burning burn scar depth	0.14	m	Page, et.al. (2014)
>3rd burning burn scar depth	0.04	m	Page, et.al. (2014)
EF CO2 Peat combustion	1.703	g/g	Christian, et.al. (2003)
EF CH4 Peat combustion	0.0208	g/g	Christian, et.al. (2003)
EF N2O Peat combustion	0.00027	g/g	Hatano, et.al. (2016)
GWP CO2	1	-	IPCC Fifth Assessment Report, 2014 (AR5)
GWP CH4	28	-	IPCC Fifth Assessment Report, 2014 (AR5)
GWP N2O	265	-	IPCC Fifth Assessment Report, 2014 (AR5)

The baseline fire modelling follows steps and formula described in Section 3.2.1.3.

Summary of WRC baseline emissions

Calculated ex-ante GHG emissions in the baseline scenario per GHG source are shown in Table 30. Detailed emissions per GHG component and stratum are given in Appendix 7.

Table 30. GHG emissions in the baseline scenario in tCO2-e per year

Year	Peat Oxidation CO2	Fires CO2	Fires CH4	Fires N2O	Total
2019	850,715.45	114,306.49	39,091.08	4,802.48	1,008,915.49
2020	1,030,039.18	147,413.91	50,413.32	6,193.46	1,234,059.87
2021	1,241,498.12	187,368.72	64,077.25	7,872.13	1,500,816.22
2022	1,460,952.42	221,341.33	75,695.36	9,299.45	1,767,288.57
2023	1,552,984.53	227,137.51	77,677.57	9,542.98	1,867,364.90

Year	Peat Oxidation CO2	Fires CO2	Fires CH4	Fires N2O	Total
2024	1,678,580.86	248,313.53	84,919.44	10,432.67	2,022,246.51
2025	1,703,605.91	243,707.07	83,344.11	10,239.14	2,040,896.24
2026	1,719,212.25	233,188.01	79,746.74	9,797.19	2,041,944.19
2027	1,763,322.86	227,569.22	77,825.20	9,561.11	2,078,278.39
2028	1,799,146.63	239,561.24	81,926.30	10,064.95	2,130,699.12
2029	1,804,007.52	238,257.24	81,480.36	10,010.15	2,133,755.26
2030	1,811,115.18	223,968.25	76,593.74	9,409.81	2,121,086.98
2031	1,821,969.01	232,545.36	79,526.97	9,770.19	2,143,811.53
2032	1,845,741.98	234,373.36	80,152.13	9,847.00	2,170,114.46
2033	1,874,030.78	235,609.27	80,574.78	9,898.90	2,200,113.73
2034	1,884,877.32	231,822.60	79,279.80	9,739.81	2,205,719.54
2035	1,905,015.69	225,378.40	77,075.99	9,469.07	2,216,939.15
2036	1,920,485.46	228,317.50	78,081.10	9,592.56	2,236,476.61
2037	1,929,654.17	225,042.91	76,961.25	9,454.97	2,241,113.30
2038	1,953,801.01	221,612.32	75,788.05	9,310.82	2,260,512.20
2039	1,980,779.92	214,153.15	73,237.12	8,997.44	2,277,167.64
2040	2,036,450.70	211,045.77	72,174.43	8,866.89	2,328,537.79
2041	2,085,985.39	213,304.05	72,946.75	8,961.75	2,381,197.95
2042	2,104,711.98	206,182.43	70,511.26	8,662.57	2,390,068.24
2043	2,108,041.80	204,041.44	69,779.06	8,572.61	2,390,434.91
2044	2,111,397.39	203,257.64	69,511.02	8,539.67	2,392,705.71
2045	2,114,442.51	212,595.23	72,704.34	8,931.98	2,408,674.07
2046	2,116,611.39	205,262.78	70,196.74	8,623.92	2,400,694.83
2047	2,119,873.65	203,574.45	69,619.37	8,552.99	2,401,620.45

Year	Peat Oxidation CO2	Fires CO2	Fires CH4	Fires N2O	Total
2048	2,121,841.10	213,179.79	72,904.25	8,956.54	2,416,881.68
2049	2,128,392.24	212,509.47	72,674.99	8,928.37	2,422,505.07
2050	2,132,384.17	201,078.53	68,765.80	8,448.12	2,410,676.62
2051	2,133,189.39	195,436.34	66,836.26	8,211.06	2,403,673.05
2052	2,131,519.90	192,466.42	65,820.58	8,086.30	2,397,893.20
2053	887,084.05	75,913.22	25,961.17	3,189.41	992,147.85

3.2.2 Project Emissions (VCS, 3.15)

3.2.2.1 Project emissions from REDD-APDeg area

Project emission from APDeg area follows VMD0015 on the Methods for monitoring of GHG emissions and removals in REDD and CIW projects (M-REDD). The method specifically provides GHG removal or emission calculation from ongoing forest growth and forest disturbances (deforestation, forest degradation, and uncontrolled burning). GHG removal and emissions of the Mayas Project in the project scenario are described below.

Project emissions as a result of deforestation

With the project scenario it is assumed there is no deforestation occurring in APDeg area, therefore emission from deforestation set as zero.

Project emissions as a result of forest degradation

As remote sensing technology using optical sensors is not yet capable of direct measurements of biomass and changes, a ground-based method was adopted. A participatory rural appraisal (PRA) of the communities surrounding the project area shall be carried out to determine if there is a potential risk of illegal extraction of trees from the project area. If this assessment finds no potential pressure for these activities then illegal logging ($\Delta CP,DegW,I,t$) can be assumed to be zero and no monitoring is needed. The PRA will be repeated every 2 years.

If the results of the PRA suggest that there is a potential risk of illegal logging activities, then field sampling will be undertaken. The area that is potentially subject to degradation by logging ($ADegW,i$) uses the distance of illegal logging penetration from all access points (access buffer), such as roads and rivers or previously cleared areas, to the project area determined from the PRA with a width equal to the distance of degradation penetration.

ADegW,i must be sampled by surveying several transects of known length and width across the access buffer area (equal in area to at least 1% of ADegW,i) to determine the presence or absence of new tree stumps.

Where limited sampling provides evidence that trees are being removed in the buffer area, then systematic sampling will be implemented based on a detailed sampling plan. The sampling plan will be designed using plots systematically placed over the buffer zone so that they sample at least 3% of the area of the buffer zone (ADegW,i). The diameter of all tree stumps will be measured and conservatively assumed to be the same as the DBH. The same allometric equation used for baseline carbon stock calculation would be used to estimate the carbon stock loss due to logging.

The net carbon stock changes as a result of degradation is calculated as:

$$\Delta C_{P,DegW,i,t} = A_{DegW,i} * \frac{C_{DegW,i,t}}{AP_i}$$

Where:

$\Delta C_{P,DegW,i,t}$	Net carbon stock changes as a result of degradation in stratum i in the project area in year t; tCO2e
$A_{DegW,i}$	Area potentially impacted by degradation processes in stratum i; ha
$\Delta C_{DegW,i,t}$	Biomass carbon of trees cut and removed through degradation process from plots measured in stratum i in year t; tCO2e
AP_i	Total area of degradation sample plots in stratum i; ha
i	1, 2, 3, …M strata
T	1, 2, 3, … t* years elapsed since the start of the project activity

The Mayas Project is committed to implementing an intensive program to halt all illegal logging within the project area including through community development, ex-illegal logger employment and empowerment, and awareness raising. In this way, the project proponent is confident of halting all illegal logging within ten years of the project start date.

The calculation of ex-ante GHG emission from illegal logging is based on the assumption that the area potentially impacted by illegal logging (ADegW,i) is 1,000 ha for stratum 1 and 300 Ha for stratum 2. The value of ΔCP,DegW,I,t used in the calculation is shown by

Table 31.

Table 31. Estimated Biomass carbon of trees cut and removed through illegal logging (ΔCP,DegW,I,t)

Year (t)	ΔCP,DegW,I,t (tC/ha)	
	Stratum 1	Stratum 2
2019	10	8
2020	10	8
2021	8	4
2022	8	4
2023	5	1
2024	5	1
2025	2	0
2026	2	0
2027	1	0
2028	1	0
…	0	0
2053	0	0

Based on further calculation, the total GHG emissions resulting from illegal logging in the project scenario in ADeg area estimated to be 219,266 tCO2-e, which would be incurred between 2019 and 2028. Table 32 summarizes the annual GHG emission resulting from illegal logging over the project lifetime. In the calculation, the carbon emissions associated with the combustion of fossil fuels are conservatively excluded.

Table 32. GHG emission resulting from illegal logging in the project scenario in ADeg area

Year (t)	ΔCP,DegW,I,t (tCO2-e)		
	Stratum 1	Stratum 2	Total
2019	36,666.67	8,800.00	45,466.67
2020	36,666.67	8,800.00	45,466.67

Year (t)	ΔCP,DegW,I,t (tCO2-e)		
	Stratum 1	Stratum 2	Total
2021	29,333.33	4,400.00	33,733.33
2022	29,333.33	4,400.00	33,733.33
2023	18,333.33	1,100.00	19,433.33
2024	18,333.33	1,100.00	19,433.33
2025	7,333.33	-	7,333.33
2026	7,333.33	-	7,333.33
2027	3,666.67	-	3,666.67
2028	3,666.67	-	3,666.67
…			
2053	-	-	-
	190.666.67	28.600.00	219,266.67

Net carbon stock change as a result of natural disturbances

Uncontrolled burning is historically recorded in the project area, therefore must be anticipated in the project scenario. However, emissions resulting from uncontrolled burning is not reported in this document. Once the fire is occurred, this will be quantified and reported in the monitoring report.

Net GHG emissions in the project scenario

The net GHG emissions in the project scenario is the equal to the sum of stock changes due to deforestation, forest degradation, natural disturbance, and GHG emissions from deforestation and degradation activities as shown by equation below.

$$\Delta C_{WPS-REDD} = \sum_{t=1}^{t*} \sum_{i=1}^{M} \left(\Delta C_{P,DefPA,i,t} + \Delta C_{P,Deg,i,t} + \Delta C_{P,DistPA,i,t} + GHG_{P-E,i,t} - \Delta C_{P,Enh,i,t} \right)$$

Where:

$\Delta C_{WPS-REDDt}$	Net GHG emissions in the REDD project scenario up to year t*; tCO2-e
$\Delta C_{P,DefPA,i,t}$	Net carbon stock change as a result of deforestation in the project area in the project case in stratum i in year t; tCO2-e
$\Delta C_{P,Deg,i,t}$	Net carbon stock change as a result of degradation in the project area in the project case in stratum i in year t; tCO2-e

$\Delta C_{P,DistPA,i,t}$ Net carbon stock change as a result of natural disturbance in the project area in the project case in stratum i in year t; tCO2-e

$GHG_{P-E,it}$ GHG emissions as a result of deforestation and degradation activities within the project area in the project case in stratum i in year t; tCO2-e

Applying the equation above, the ex-ante net GHG emissions in the project scenario are estimated to be minus 219,266 tCO2-e as shown in Table 33.

Table 33. Ex-ante net GHG emissions in the project scenario since the start of the project activity in APDeg area (tCO2-e)

Year (t)	Net GHG emission in the project scenario in APDeg area (tCO2-e)			
	ΔCDefPA	ΔCP,DegW,I,t	ΔCP,dist,i,t	ΔCWPS,REDD-APDeg
2019	-	45,466.67	-	45,466.67
2020	-	45,466.67	-	45,466.67
2021	-	33,733.33	-	33,733.33
2022	-	33,733.33	-	33,733.33
2023	-	19,433.33	-	19,433.33
2024	-	19,433.33	-	19,433.33
2025	-	7,333.33	-	7,333.33
2026	-	7,333.33	-	7,333.33
2027	-	3,666.67	-	3,666.67
2028	-	3,666.67	-	3,666.67
...	-	-	-	-
2050	-	-	-	-
	-	219,266.67	-	219,266.67

3.2.2.2 Project emissions from REDD –APD area

GHG emissions from REDD-APD in the project scenario are estimated by applying module VMD0015 on Methods for monitoring of GHG emissions and removals in REDD and CIW projects (M-REDD-Version 2.2).

Project emissions as a result of deforestation

The emissions resulting from deforestation that occurs within the project area (ΔCP,DefPA,i,t) is equal to the area deforested multiplied by the emissions per unit area.

$$\Delta C_{P,DefPA,i,t} = \sum_{u=1}^{U} \left(A_{DefPA,u,i,t} * \Delta C_{pools,P,Def,u,i,t} \right)$$

Where:

$\Delta C_{P,DefPA,i,t}$	Net carbon stock change as a result of deforestation in the project scenario within the project area in stratum i in year t; tCO2-e
$A_{DefPA,u,i,t}$	Area of recorded deforestation in the project area stratum i converted to land use u in year t; ha
$\Delta C_{pools,P.Def,u,u,t}$	Net carbon stock changes in all pools in the project case in land use u in stratum i in year t; tCO2-e ha-1
u	1, 2, 3, ,…U post-deforestation land uses
i	1, 2, 3, …M strata
t	1, 2, 3, … t* years elapsed since the start of the project activity

In the project scenario, this is assumed that the areas deforested due to forest disturbance is reduced and fully stopped in 2028 as shown by Table 34.

Table 34. Projection of planned deforestation in the project area

Year	ADefPA,u,i (ha)		
(t)	Stratum 1	Stratum 2	Total
2019	80	56	24
2020	80	56	24
2021	70	49	21
2022	60	42	18
2023	50	35	15
2024	40	28	12

Year	ADefPA,u,i (ha)		
(t)	Stratum 1	Stratum 2	Total
2025	30	21	9
2026	20	14	6
2027	10	7	3
2028	0	0	0

Applying the equation above and projected deforestation in the project scenario, the total net carbon stock change as a result of deforestation in the project scenario is estimated to be 173,003.52 tCO2-e, as described in Table 35.

Table 35. Ex-ante net carbon stock change as a result of deforestation in the project scenario

Year	ΔC,P,Def,l,t (tCO2-e)		
(t)	Stratum 1	Stratum 2	Total
2019	27,764.68	3,690.51	31,455.19
2020	27,764.68	3,690.51	31,455.19
2021	24,294.10	3,229.19	27,523.29
2022	20,823.51	2,767.88	23,591.39
2023	17,352.93	2,306.57	19,659.49
2024	13,882.34	1,845.25	15,727.59
2025	10,411.76	1,383.94	11,795.69
2026	6,941.17	922.63	7,863.80
2027	3,470.59	461.31	3,931.90
…..			
2053	-	-	-
Total	152,705.74	20,297.78	173,003.52

Project emissions as a result of forest degradation

Per VMD0015-M-REDD, the project will carry out a participatory rural appraisal (PRA), limited sampling, delineation of degraded area (ADegW,i) based on access buffer, and systematic

sampling (at least 3% of degraded area). Further elaboration of calculation method refers to sub section of illegal logging in APDeg area (sub section 3.2.2.1).

The net carbon stock changes as a result of degradation is calculated as:

$$\Delta C_{P,DegW,i,t} = A_{DegW,i} * \frac{C_{DegW,i,t}}{AP_i}$$

Where:

$\Delta C_{P,DegW,i,t}$	Net carbon stock changes as a result of degradation in stratum i in the project area in year t; tCO2-e
$A_{DegW,i}$	Area potentially impacted by degradation processes in stratum i; ha
$\Delta C_{DegW,i,t}$	Biomass carbon of trees cut and removed through degradation process from plots measured in stratum i in year t; tCO2-e
AP_i	Total area of degradation sample plots in stratum i; ha
I	1, 2, 3, …M strata
T	1, 2, 3, … t* years elapsed since the start of the project activity

Under the project scenario, Mayas will implement a comprehensive program to control illegal logging within the project area. By implementing forest protection, community development, ex-illegal logger empowerment and awareness raising, the project is confident that illegal logging will be halted within ten years from the project start date.

The calculation of ex-ante GHG emissions resulting from illegal logging works on the assumption that the area potentially impacted by illegal logging (ADIST-IL) is 400 hectares for stratum 1 and 800 hectares for stratum 2. Meanwhile for CdegW,it, the value assumed in the ex-ante calculation is shown in Table 36.

Table 36. Estimated biomass carbon of trees cut and removed through illegal logging

Year (t)	C_degW,I,t (tC/ha)	
	Stratum 1	Stratum 2
2019	10	8
2020	10	8
2021	8	4
2022	8	4

Year (t)	C_degW,I,t (tC/ha)	
	Stratum 1	Stratum 2
2023	5	1
2024	5	1
2025	2	0
2026	2	0
2027	1	0
2028	1	0
…	0	0
2053	0	0

Applying the equation above, the total GHG emissions resulting from illegal logging in the project scenario in APD area estimated to be 152,533.33 tCO2-e within the project lifetime, as summarised in Table 37. The carbon emissions associated with the combustion of fossil fuels are conservatively excluded.

Table 37. Ex-ante GHG emissions resulting from illegal logging in the project scenario over the project lifetime

Year (t)	C_P_DegW,i,t(tCO2-e/ha)		ΔC_P_DegW,i,t(tCO2-e)		
	Stratum 1	Stratum 2	Stratum 1	Stratum 2	Total
2019	440.00	704.00	14,666.67	23,466.67	38,133.33
2020	440.00	704.00	14,666.67	23,466.67	38,133.33
2021	352.00	352.00	1,733.33	11,733.33	23,466.67
2022	352.00	352.00	11,733.33	11,733.33	23,466.67
2023	220.00	88.00	7,333.33	2,933.33	10,266.67
2024	220.00	88.00	7,333.33	2,933.33	10,266.67
2025	88.00	-	2,933.33	-	2,933.33
2026	88.00	-	2,933.33	-	2,933.33

Year (t)	C_P_DegW,i,t(tCO2-e/ha)		ΔC_P_DegW,i,t(tCO2-e)		
	Stratum 1	Stratum 2	Stratum 1	Stratum 2	Total
2027	44.00	-	1,466.67	-	1,466.67
2028	44.00	-	1,466.67	-	1,466.67
…					
2053	-	-	-	-	-
			76,266.67	76,266.67	152,533.33

Net carbon stock change as a result of natural disturbances

Based on historical hot spot analysis, uncontrolled burning is identified in the project area. However, emissions resulting from uncontrolled burning is not reported in this document. Once the fire has occurred, this will be quantified and reported in the monitoring report.

Net GHG emissions in the project scenario

The net GHG emissions in the project scenario are equal to the sum of stock changes due to deforestation, forest degradation, natural disturbance and GHG emissions from deforestation and degradation activities :

$$\Delta C_{WPS-REDD} = \sum_{t=1}^{t*} \sum_{i=1}^{M} \left(\Delta C_{P,DefPA,i,t} + \Delta C_{P,Deg,i,t} + \Delta C_{P,DistPA,i,t} + GHG_{P-E,i,t} - \Delta C_{P,Enh,i,t} \right)$$

Where:

$\Delta C_{WPS-REDDt}$	Net GHG emissions in the REDD project scenario up to year t*; tCO2e
$\Delta C_{P,DefPA,i,t}$	Net carbon stock change as a result of deforestation in the project area in the project case in stratum i in year t; tCO2e
$\Delta C_{P,Deg,i,t}$	Net carbon stock change as a result of degradation in the project area in the project case in stratum i in year t; tCO2e
$\Delta C_{P,DistPA,i,t}$	Net carbon stock change as a result of natural disturbance in the project area in the project case in stratum i in year t; tCO2e
$GHG_{P-E,it}$	GHG emissions as a result of deforestation and degradation activities within the project area in the project case in stratum i in year t; tCO2e

Applying the equation above, the net GHG emissions in the project scenario are estimated to be minus 325,536 tCO2-e, as shown in Table 38.

Table 38. Net GHG emissions in the project scenario in APD area

Year (t)	Net GHG emission in the project scenario in APD area (tCO2-e)		
	ΔCP,DefPA,i,t	ΔCP,Deg,i,t	ΔCP,Enh,i,t
2019	31,455.19	38,133.33	69,588.52
2020	31,455.19	38,133.33	69,588.52
2021	27,523.29	23,466.67	50,989.95
2022	23,591.39	23,466.67	47,058.06
2023	19,659.49	10,266.67	29,926.16
2024	15,727.59	10,266.67	25,994.26
2025	11,795.69	2,933.33	14,729.03
2026	7,863.80	2,933.33	10,797.13
2027	3,931.90	1,466.67	5,398.56
...	-	1,466.67	1,466.67
2053	-	-	-
Total	173,003.52	152,533.33	325,536.86

3.2.2.3 Project WRC GHG emissions calculations

Peatland Stratification in Project Scenario

A distinct stratification could not be delineated for the project scenario, since water table depth distributions were modelled as continuous and gradual while also subject to changes in the position and timing of rewetting interventions. This was not considered a problem as actual calculations were carried out in a spatially explicit schematization (described later in detail) using over 50,000 spatial units of 1 hectare size or finer, which implicitly served as the actual strata. In summary, the same spatial strata used in the baseline scenario were applied without implying any attribution to peat emissions characteristics.

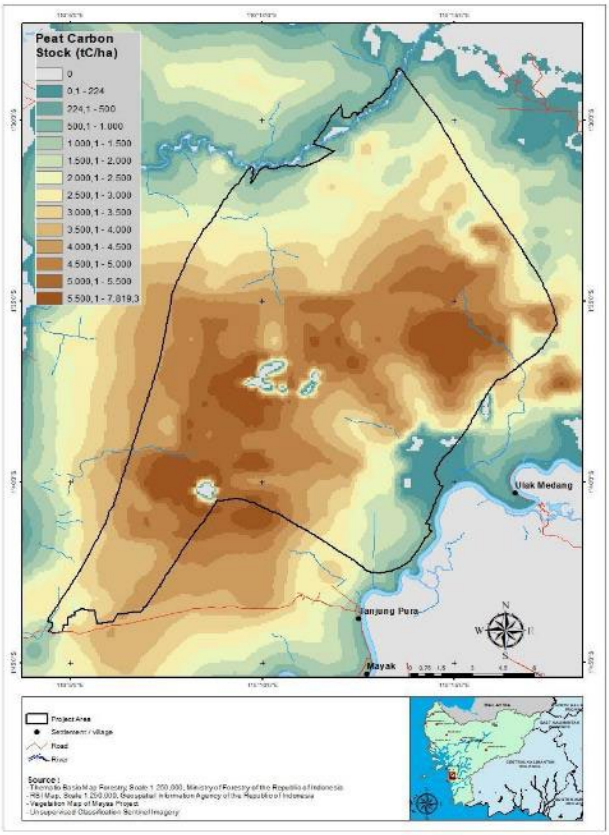


Figure 31. Peat carbon stock distributions in the project area

WPS calculation method

Using the GHG project boundary described in 3.1.1, the net project scenario GHG emissions from peat soils were calculated by using equation (1) provided in VMD004I (M-PEAT), by dropping peat-ditch terms from the equation:

$$GHG_{WPS-PEAT} = \sum_{t=1}^{t*} \sum_{i=1}^{M} \left(A_{peatsoil-WPS,i,t} \times GHG_{peatsoil-WPS,i,t} + A_{peatburn-WPS,i,t} \times GHG_{peatburn-WPS,i,t} \right)$$

Were:

GHGWPS-PEAT : Net GHG emissions in the WRC project scenario on peatland up to year t* (tCO2-e)

GHGpeatsoil-WPS,i,t : GHG emissions from microbial decomposition of the peat soil within the project boundary in the project scenario in stratum i in year t (tCO2-e ha-1 yr-1)

GHGpeatburn-WPS,i,t : GHG emissions from burning of peat within the project boundary in the project scenario in stratum i in year t (tCO2-e ha-1 yr-1)

Apeatsoil-WPS,i,t : Area of peatland (not open water, not burnt) in stratum i in year t in the project scenario (ha)

Apeatburn-WPS,i,t : Area of peat burnt in stratum i in year t in the project scenario (ha)

i : 1, 2, 3 …MWPS, Strata in the project scenario (unitless)

t : 1, 2, 3, … t*, Time elapsed since the project start (years)

In the project scenario, the calculation method and spatial partitioning scheme of the project area were similar to those used in the baseline case, therefore many of the details are not repeated here). For ex-ante calculations, water table depth distributions in the project area impacted by existing canals (i.e., parcels within a few hundred meters from existing canals, see Figure 32) were simulated using modelled values similar to those used for the HPH stratum in the baseline scenario, i.e., about 0.6 m average below soil surface. For the rest of the project area, water table depth distributions follow a pattern similar to that of the CZ (Conservation Zone) stratum in the baseline scenario, with approximate water table depth <0.22 m below the soil surface. Existing canals are planned to be blocked by 2023, and project emissions from peat soil oxidation are therefore expected to drop significantly from 2023 onwards. For ex-post calculations, water table depth distributions will be simulated using a hydrological modelling technique based on the actual water table, climate, and aquifer properties within the project area.

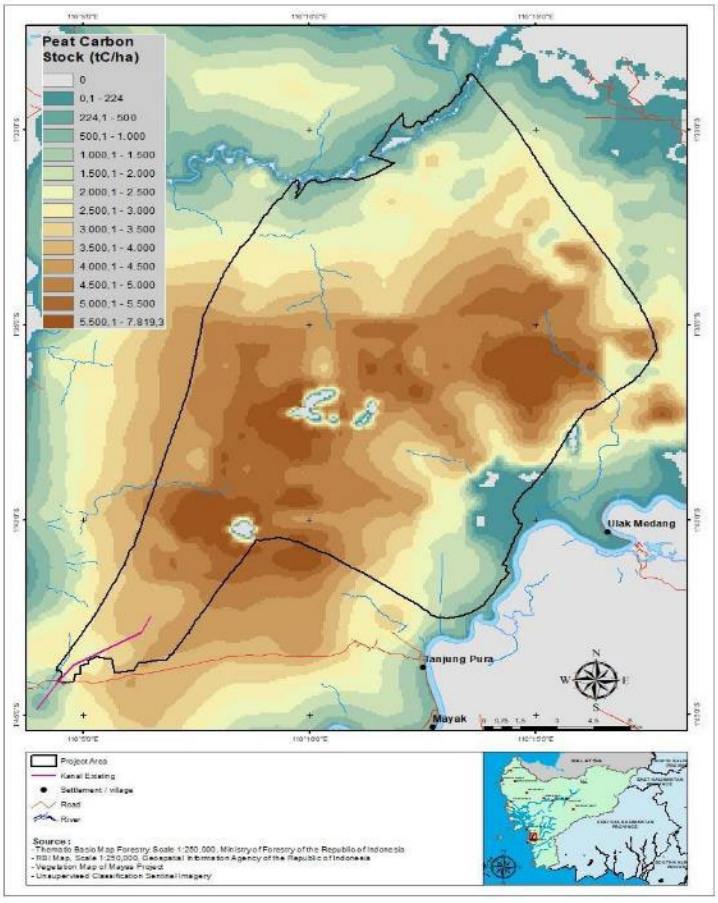


Figure 32. Existing canal (red line) at the start date in the project area

Project GHG emissions from peat oxidation

GHG emissions from peat soils primarily originate from the oxidation of drained peat soils. This project adopted a water table proxy (Hooijer, et.al., 2006) to perform the calculation below:

$$GHG_{peatsoil-WPS,i,j,t} = c \times WTD_{WPS,i,j,t}$$

Where

GHGpeatsoil-WPS,i,j,t : CO2 emissions from the peat soil within the project boundary in the project scenario in stratum i parcel j at year t* (tCO2e ha-1 yr-1) calculated using a water table proxy up to 1-meter WTD; which levels off to 90 at 1-meter water table depth (Hooijer, et.al., 2006)

WTDWPS,i,j,t : Water table depth in stratum i parcel j at time t in project scenario (meters from soil surface)

c : Water table proxy constant, whose value approximately 90 tCO2e ha-1yr-1m-1 (tCO2-e ha-1 yr-1 m-1)

Project GHG emissions from peat fires

GHG emissions from peat burning were assumed at zero in ex-ante calculations. For ex-post calculations actual emissions will be monitored. For each fire incident in the project area, all burn scar area will be mapped and their corresponding burn history will be tracked. GHG emissions from the combustion of peat soils in the project scenario were calculated using equation (3) in VMD0013 (E-BPB) as follows:

$$GHG_{peatburn-WPS,i,j,t} = \sum_{g=1}^{G} \left(P_{i,j,t} \times G_{g,i,j} \times 10^{-3} \times GWP_g\right)$$

Where:

GHGpeatburn-WPS,i,j,t : GHG emissions due to peat burning in stratum i parcel j in year t of each GHG (CO2, CH4, N2O) in the project scenario (tCO2-e ha-1 yr-1)

Pi,j,t : Average mass of peat burnt in the project scenario in stratum i, parcel j, year t (t d.m. ha-1)

Gg,I,j : Emission factor in stratum i parcel j for gas g (kg t-1 d.m. burnt)

GWPg : Global warming potential for gas g (t CO2/t g)

g : 1, 2, 3 ... GHGs including carbon dioxide, methane and nitrous oxide (unitless)

i : 1, 2, 3 … M Strata (unitless)

j : 1, 2, 3 … N Parcel (unitless)

t : 1, 2, 3, … t* Time elapsed since the start of the project activity (year)

The average mass of peat carbon burnt for a particular stratum is estimated as follows:

$$P_{i,j,t} = D_{peatburn,i,j,t} \times BD_{upper,i,j,t} \times 10^4$$

Where:

Pi,j,t : Average mass of peat burnt in stratum i in year t (t d.m. ha-1)

Dpeatburn,i,j,t : Average fire scar depth in stratum i in year t (m)

BDupper,I,j,t : Bulk density of the upper peat in stratum i (g cm-3)

i : 1, 2, 3 … M strata

j : 1, 2, 3 … N Parcel (unitless)

t : 1, 2, 3, … t* time elapsed since the start of the project activity (years)

Summary of WRC project emissions

Ex-ante GHG emissions in the project scenario per GHG source are shown in Table 39. Note that post 2021 ex ante emissions return zero, under the assumption that fires would be prevented successfully, and post-rewetting annual water table depth will be maintained at natural levels (c.a. 0.2 m-ss). Details of GHG emissions per stratum and GHG pool are given in Appendix 7.

Table 39. Ex-ante WRC GHG emissions in the project scenario in tCO2e per year

Year	Peat Oxidation CO2	Fires CO2	Fires CH4	Fires N2O	Total
2019	51,943.74	-	-	-	51,943.74
2020	51,913.22	-	-	-	51,913.22
2021	51,889.70	-	-	-	51,889.70
2022	-	-	-	-	-
2023	-	-	-	-	-

Year	Peat Oxidation CO2	Fires CO2	Fires CH4	Fires N2O	Total
….	….	….	….	….	….
….	….	….	….	….	….
2116	-	-	-	-	-
Total	155,746.66	-	-	-	155,746.66

3.2.3 Leakage Emissions (VCS 2.5, 3.2, 3.6, 3.15, 4.3)

Under the Mayas Project, the project proponent, MPK is also the baseline agent, albeit under different management. The proponent/baseline agent only has control over resource use in the project area (via the concession license) and has no access to other forest resources or licenses. Based on this, leakage is therefore deemed zero

3.2.4 Estimated GHG Emission Reductions and Carbon Dioxide Removals (VCS, 3.15, 4.1)

State the non-permanence risk rating (%)	12%
Has the non-permanence risk report been attached as either an appendix or a separate document?	☐ Yes ☐ No
State, in tCO2e, the expected total GHG benefit to date.	84,236,212 tCO2e

3.2.4.1 Ex-ante net GHG emission reductions from Avoiding Planned Degradation (APDeg)

Ex-ante total net GHG emission reductions from the Avoiding Planned Degradation are calculated as follows:

$$NERR_{REDD-APDeg} = \Delta C_{BSL-REDD-APDeg} - \Delta C_{WPS-REDD-APDeg} - \Delta C_{LK-REDD-APDeg}$$

Where:

$NER_{REDD-APDeg}$ Total net GHG emission reductions of the REDD-APDeg project activity up to year t* (tCO2-e)

$\Delta C_{BSL-REDD-APDeg}$ Net GHG emissions in the REDD-APDeg baseline scenario up to year t* (tCO2-e)

$\Delta C_{WPS-REDD-APDeg}$ Net GHG emissions in the REDD-APDeg project scenario up to year t* – from Module MREDD (tCO2-e)

$\Delta C_{LK-REDD-APDeg}$ Net GHG emissions due to leakage from the REDD-APDeg project activity up to year t* (tCO2-e)

Ex-ante GHG credits associated with the implementation of Avoiding Planned Degradation (APDeg) over the project lifetime are estimated to be 5,176,751 tCO2e as shown in Table 40.

Table 40. Ex-ante GHG credits associated with the implementation of APDeg activities

Year	Net GHG emissions in the REDD-APDeg baseline scenario (tCO2-e)	Net GHG emissions in the REDD-APDeg project scenario (tCO2-e)	Net GHG emissions due to leakage from the REDD-APDeg project activity (tCO2-e)	Total net GHG emission reductions of the REDD-APDeg project activity (tCO2-e)
2019	56,123.96	45,466.67	-	10,657.29
2020	73,760.86	45,466.67	-	28,294.19
2021	87,950.06	33,733.33	-	54,216.73
2022	103,595.78	33,733.33	-	69,862.45
2023	119,453.86	19,433.33	-	100,020.53
2024	135,243.50	19,433.33	-	115,810.17
2025	146,581.30	7,333.33	-	139,247.97
2026	154,655.67	7,333.33	-	147,322.34
2027	165,692.60	3,666.67	-	162,025.94
2028	187,444.10	3,666.67	-	183,777.44
2029	172,818.01	-	-	172,818.01
2030	181,877.23	-	-	181,877.23

Year	Net GHG emissions in the REDD-APDeg baseline scenario (tCO2-e)	Net GHG emissions in the REDD-APDeg project scenario (tCO2-e)	Net GHG emissions due to leakage from the REDD-APDeg project activity (tCO2-e)	Total net GHG emission reductions of the REDD-APDeg project activity (tCO2-e)
2031	182,030.47	-	-	182,030.47
2032	198,783.02	-	-	198,783.02
2033	194,673.68	-	-	194,673.68
2034	190,799.13	-	-	190,799.13
2035	192,494.37	-	-	192,494.37
2036	187,142.39	-	-	187,142.39
2037	191,166.56	-	-	191,166.56
2038	173,324.38	-	-	173,324.38
2039	188,508.50	-	-	188,508.50
2040	174,425.28	-	-	174,425.28
2041	172,027.56	-	-	172,027.56
2042	161,077.50	-	-	161,077.50
2043	158,560.38	-	-	158,560.38
2044	162,044.02	-	-	162,044.02
2045	160,304.31	-	-	160,304.31
2046	165,078.24	-	-	165,078.24
2047	168,168.40	-	-	168,168.40
2048	161,224.86	-	-	161,224.86
2049	153,140.05	-	-	153,140.05
2050	153,422.23	-	-	153,422.23

Year	Net GHG emissions in the REDD-APDeg baseline scenario (tCO2-e)	Net GHG emissions in the REDD-APDeg project scenario (tCO2-e)	Net GHG emissions due to leakage from the REDD-APDeg project activity (tCO2-e)	Total net GHG emission reductions of the REDD-APDeg project activity (tCO2-e)
2051	149,610.05	-	-	149,610.05
2052	126,151.21	-	-	126,151.21
2053	46,664.52	-	-	46,664.52
Total	5,396,018.03	219,266.67	-	5,176,751.36

3.2.4.2 Ex-ante GHG emission reductions from REDD-APD

Ex-ante total net GHG emission reductions from the REDD project activity are calculated as follows:

$$NERR_{REDD-APD} = \Delta C_{BSL-REDD-APD} - \Delta C_{WPS-REDD-APD} - \Delta C_{LK-REDD-APD}$$

Where:

$NER_{REDD-APD}$	Total net GHG emission reductions of the REDD-APD project activity up to year t* (tCO2-e)
$\Delta C_{BSL-REDD-APD}$	Net GHG emissions in the REDD-APD baseline scenario up to year t* (tCO2-e)
$\Delta C_{WPS-REDD-APD}$	Net GHG emissions in the REDD-APD project scenario up to year t* – from Module MREDD (tCO2-e)
$\Delta C_{LK-REDD-APD}$	Net GHG emissions due to leakage from the REDD-APD project activity up to year t* (tCO2-e)

Applying the equation above, ex-ante net GHG emission reductions from REDD-APD over the project lifetime are estimated to be 5,189,929 tCO2-e, as shown annually by Table 41.Table 41. Ex-ante GHG emission reductions from REDD-APD project within project period

Table 41. Ex-ante GHG emission reductions from REDD-APD project within project period

Year	Net GHG emissions in the REDD-APD baseline scenario (tCO2-e)	Net GHG emissions in the REDD-APD project scenario (tCO2-e)	Net GHG emissions due to leakage from the REDD-APD project activity (tCO2-e)	Total net GHG emission reductions of the REDD-APD project activity (tCO2-e)
2019	1,254,362.02	69,588.52	-	1,184,773.51
2020	1,327,697.22	69,588.52	-	1,258,108.70
2021	1,115,328.48	50,989.95	-	1,064,338.52
2022	1,274,683.94	47,058.06	-	1,227,625.88
2023	479,805.23	29,926.16	-	449,879.07
2024	1,982.05	25,994.26	-	-24,012.21
2025	1,716.67	14,729.03	-	-13,012.36
2026	1,388.06	10,797.13	-	-9,409.07
2027	2,031.60	5,398.56	-	-3,366.97
2028	3,492.07	1,466.67	-	2,025.40
2029	1,955.69		-	1,955.69
2030	5,276.12		-	5,276.12
2031	3,978.96		-	3,978.96
2032	3,770.83		-	3,770.83
2033	3,276.63		-	3,276.63
2034	2,336.82		-	2,336.82
2035	2,112.27		-	2,112.27
2036	1,153.16		-	1,153.16
2037	1,765.93		-	1,765.93
2038	1,773.61		-	1,773.61
2039	3,222.84		-	3,222.84
2040	1,778.27		-	1,778.27

Year	Net GHG emissions in the REDD-APD baseline scenario (tCO2-e)	Net GHG emissions in the REDD-APD project scenario (tCO2-e)	Net GHG emissions due to leakage from the REDD-APD project activity (tCO2-e)	Total net GHG emission reductions of the REDD-APD project activity (tCO2-e)
2041	1,527.52		-	1,527.52
2042	1,860.65		-	1,860.65
2043	1,746.56		-	1,746.56
2044	2,149.39		-	2,149.39
2045	1,597.14		-	1,597.14
2046	1,735.30		-	1,735.30
2047	2,093.18		-	2,093.18
2048	1,129.40		-	1,129.40
2049	1,662.03		-	1,662.03
2050	2,514.10		-	2,514.10
2051	2,562.79		-	2,562.79
2052	-		-	-
2053	-		-	-
Total	5,515,466.51	325,536.86	-	5,189,929.66

3.2.4.3 GHG emission reductions from WRC activity

GHG emission reductions are summarized in Table 42 below. Details of GHG emissions per stratum and GHG pool are given in Appendix 7.

Table 42. Ex-ante GHG emission reductions in tCO2-e per year

Years	Estimated baseline emissions from peat oxidation(tCO2-e)	Estimated baseline emissions (tCO2-e) Peat FIRE	Estimated ex-ante project emissions from peat oxidation (tCO2-e)	Estimated ex-ante project emissions (tCO2-e) from Peat FIRE	Estimated leakage emissions (tCO2-e)	Estimated ex-ante net GHG emission reductions (tCO2-e)
2019	850,715.45	158,200.05	51,943.74	-	-	956,971.76
2020	1,030,039.18	204,020.70	51,913.22	-	-	1,182,146.65
2021	1,241,498.12	259,318.10	51,889.70	-	-	1,448,926.52
2022	1,460,952.42	306,336.14	-	-	-	1,767,288.57
2023	1,552,984.53	314,358.06	-	-	-	1,867,342.59
2024	1,678,561.15	343,665.65	-	-	-	2,022,226.79
2025	1,703,566.11	337,290.32	-	-	-	2,040,856.43
2026	1,719,128.29	322,731.94	-	-	-	2,041,860.23
2027	1,763,184.09	314,955.54	-	-	-	2,078,139.62
2028	1,798,991.52	331,552.49	-	-	-	2,130,544.01
2029	1,803,822.82	329,747.74	-	-	-	2,133,570.56
2030	1,810,973.02	309,971.80	-	-	-	2,120,944.82
2031	1,821,799.19	321,842.52	-	-	-	2,143,641.71
2032	1,845,472.51	324,372.49	-	-	-	2,169,845.00
2033	1,873,707.56	326,082.95	-	-	-	2,199,790.51
2034	1,884,496.67	320,842.22	-	-	-	2,205,338.89
2035	1,904,677.23	311,923.46	-	-	-	2,216,600.70
2036	1,920,120.40	315,991.16	-	-	-	2,236,111.56
2037	1,929,259.46	311,459.13	-	-	-	2,240,718.59
2038	1,953,412.61	306,711.19	-	-	-	2,260,123.80
2039	1,980,341.47	296,387.72	-	-	-	2,276,729.19

Years	Estimated baseline emissions from peat oxidation(tCO2-e)	Estimated baseline emissions (tCO2-e) Peat FIRE	Estimated ex-ante project emissions from peat oxidation (tCO2-e)	Estimated ex-ante project emissions (tCO2-e) from Peat FIRE	Estimated leakage emissions (tCO2-e)	Estimated ex-ante net GHG emission reductions (tCO2-e)
2040	2,035,988.30	292,087.09	-	-	-	2,328,075.40
2041	2,085,540.42	295,212.56	-	-	-	2,380,752.98
2042	2,104,271.20	285,356.26	-	-	-	2,389,627.46
2043	2,107,553.12	282,393.11	-	-	-	2,389,946.23
2044	2,110,834.67	281,308.32	-	-	-	2,392,143.00
2045	2,113,787.44	294,231.56	-	-	-	2,408,019.00
2046	2,115,998.78	284,083.45	-	-	-	2,400,082.23
2047	2,119,275.98	281,746.80	-	-	-	2,401,022.78
2048	2,121,175.56	295,040.58	-	-	-	2,416,216.14
2049	2,127,642.00	294,112.83	-	-	-	2,421,754.83
2050	2,131,640.52	278,292.45	-	-	-	2,409,932.97
2051	2,132,505.38	270,483.66	-	-	-	2,402,989.04
2052	2,130,746.56	266,373.30	-	-	-	2,397,119.86
2053	887,084.05	105,063.80	-	-	-	992,147.85
Total	63,851,747.77	10,173,547.14	155,746.66			73,869,548.25

3.2.4.4 Calculation of the VCS Non-Permanence Risk Buffer Withholding

As described in sub section 2.1.18, the total Project Non-Permanence Risk Buffer is 12%. Therefore, as described in VM0007 REDD-MF, the annual non-permeance risk buffer withholding does not include leakage and fossil fuel combustion, as presented in Table 43Table 43 VCUs for non-permanence risk buffer withholding.

Table 43 VCUs for non-permanence risk buffer withholding

Vintage period	Estimated baseline emissions (tCO2e)	Estimated project emissions (tCO2e)	Estimated leakage emissions (tCO2e)	Estimated buffer pool allocation (tCO2e)	Estimated reduction VCUs (tCO2e)	Estimated removal VCUs (tCO2e)	Estimated total VCU issuance (tCO2e)
01-January-2019 to 31-December-2019	2,319,401.48	166,998.92		258,288.31	1,894,113	-	1,894,113
01-January-2020 to 31-December-2020	2,635,517.96	166,968.41		296,225.95	2,172,323	-	2,172,323
01-January-2021 to 31-December-2021	2,704,094.76	136,612.99		308,097.81	2,259,383	-	2,259,383
01-January-2022 to 31-December-2022	3,145,568.29	80,791.39		367,773.23	2,697,002	-	2,697,002
01-January-2023 to 31-December-2023	2,466,601.68	49,359.49		290,069.06	2,127,172	-	2,127,172
01-January-2024 to 31-December-2024	2,159,452.34	45,427.59		253,682.97	1,860,341	-	1,860,341
01-January-2025 to 31-December-2025	2,189,154.41	22,062.36		260,051.05	1,907,040	-	1,907,040

Vintage period	Estimated baseline emissions (tCO2e)	Estimated project emissions (tCO2e)	Estimated leakage emissions (tCO2e)	Estimated buffer pool allocation (tCO2e)	Estimated reduction VCUs (tCO2e)	Estimated removal VCUs (tCO2e)	Estimated total VCU issuance (tCO2e)
01-January-2026 to 31-December-2026	2,197,903.96	18,130.46		261,572.82	1,918,200	-	1,918,200
01-January-2027 to 31-December-2027	2,245,863.83	9,065.23		268,415.83	1,968,382	-	1,968,382
01-January-2028 to 31-December-2028	2,321,480.18	5,133.33		277,961.62	2,038,384	-	2,038,384
01-January-2029 to 31-December-2029	2,308,344.26	-		277,001.31	2,031,342	-	2,031,342
01-January-2030 to 31-December-2030	2,308,098.16	-		276,971.78	2,031,126	-	2,031,126
01-January-2031 to 31-December-2031	2,329,651.14	-		279,558.14	2,050,092	-	2,050,092
01-January-2032 to 31-December-2032	2,372,398.85	-		284,687.86	2,087,710	-	2,087,710
01-January-2033 to 31-December-2033	2,397,740.81	-		287,728.90	2,110,011	-	2,110,011
01-January-2034 to 31-December-2034	2,398,474.84	-		287,816.98	2,110,657	-	2,110,657

Vintage period	Estimated baseline emissions (tCO2e)	Estimated project emissions (tCO2e)	Estimated leakage emissions (tCO2e)	Estimated buffer pool allocation (tCO2e)	Estimated reduction VCUs (tCO2e)	Estimated removal VCUs (tCO2e)	Estimated total VCU issuance (tCO2e)
01-January-2035 to 31-December-2035	2,411,207.34	-		289,344.88	2,121,862	-	2,121,862
01-January-2036 to 31-December-2036	2,424,407.11	-		290,928.85	2,133,478	-	2,133,478
01-January-2037 to 31-December-2037	2,433,651.08	-		292,038.13	2,141,612	-	2,141,612
01-January-2038 to 31-December-2038	2,435,221.79	-		292,226.61	2,142,994	-	2,142,994
01-January-2039 to 31-December-2039	2,468,460.53	-		296,215.26	2,172,244	-	2,172,244
01-January-2040 to 31-December-2040	2,504,278.94	-		300,513.47	2,203,764	-	2,203,764
01-January-2041 to 31-December-2041	2,554,308.06	-		306,516.97	2,247,791	-	2,247,791
01-January-2042 to 31-December-2042	2,552,565.61	-		306,307.87	2,246,257	-	2,246,257
01-January-2043 to 31-December-2043	2,550,253.16	-		306,030.38	2,244,222	-	2,244,222

Vintage period	Estimated baseline emissions (tCO2e)	Estimated project emissions (tCO2e)	Estimated leakage emissions (tCO2e)	Estimated buffer pool allocation (tCO2e)	Estimated reduction VCUs (tCO2e)	Estimated removal VCUs (tCO2e)	Estimated total VCU issuance (tCO2e)
01-January-2044 to 31-December-2044	2,556,336.41	-		306,760.37	2,249,575	-	2,249,575
01-January-2045 to 31-December-2045	2,569,920.45	-		308,390.45	2,261,529	-	2,261,529
01-January-2046 to 31-December-2046	2,566,895.76	-		308,027.49	2,258,867	-	2,258,867
01-January-2047 to 31-December-2047	2,571,284.36	-		308,554.12	2,262,729	-	2,262,729
01-January-2048 to 31-December-2048	2,578,570.40	-		309,428.45	2,269,141	-	2,269,141
01-January-2049 to 31-December-2049	2,576,556.91	-		309,186.83	2,267,369	-	2,267,369
01-January-2050 to 31-December-2050	2,565,869.30	-		307,904.32	2,257,964	-	2,257,964
01-January-2051 to 31-December-2051	2,555,161.87	-		306,619.42	2,248,541	-	2,248,541
01-January-2052 to 31-December-2052	2,523,271.07	-		302,792.53	2,220,478	-	2,220,478

Vintage period	Estimated baseline emissions (tCO2e)	Estimated project emissions (tCO2e)	Estimated leakage emissions (tCO2e)	Estimated buffer pool allocation (tCO2e)	Estimated reduction VCUs (tCO2e)	Estimated removal VCUs (tCO2e)	Estimated total VCU issuance (tCO2e)
01-January-2053 to 31-December-2053	1,038,812.37	-		124,657.48	914,154	-	914,154
Total	84,936,779.45	700,550.18	-	10,108,347.51	74,127,849	-	**74,127,849**

An uncertainty analysis was performed in accordance with the X-UNC module. The outcome of this analysis is an overall estimate of the uncertainty of the total net GHG emission reductions from REDD and WRC project activities. The allowable uncertainty under X-UNC module is +/- 15% of Total Estimated Emission Reduction at the 95% confidence level. Where this precision level is met, no deduction is required for uncertainty. Where uncertainty exceeds 15% of the Total Estimated Emission Reduction at the 95% confidence level, the deduction shall be equal to the amount that the uncertainty exceeds the allowable level. Following the calculations (see Annex 8 for detail of uncertainty calculation), the uncertainty was found to be below 15%, therefore no deduction was required.

3.3 Monitoring

3.3.1 Data and Parameters Available at Validation (VCS, 3.16)

The Data and Parameters available at Validation for REDD are presented in Appendix 6: Data and Parameters Available at Validation for REDD (APDeg and APD)

The Data and Parameters available at Validation for WRC are presented in Appendix 7: Data and Parameters Available at Validation for WRC

3.3.2 Data and Parameters Monitored (VCS, 3.16)

The Data and Parameters Monitored for REDD are presented in Appendix 8: Data and Parameters Available during Monitoring for REDD (APDeg-APD).

The Data and Parameters Monitored for WRC are presented in Appendix 9: Data and Parameters Available during Monitoring for WRC

3.3.3 Monitoring Plan (VCS, 3.16, 3.20)

3.3.3.1 Monitoring Plan of REDD (APDeg-APD)

Monitoring areas undergoing carbon stock enhancement

The Mayas Project contains forest areas that are both deforested in the baseline and assumed to be accumulating carbon in the project scenario. Geographic boundaries of the areas are identified to monitor any changes that occur in the forest strata Ten (10) yearly ground measurements will be carried out in all Permanent Sampling Plot that were established in field for the baseline renewal purpose. The same allometric equation (used by BSL biomass) will be used to generate biomass for monitoring. Using this data, the calculation of carbon stock enhancement will follow the procedures of VMD0015.

Monitoring forest degradation

As prescribed by VMD0015, the Mayas Project will perform a participatory rural appraisal (PRA) of the communities inside and surrounding the project area to determine if there is the potential for illegal logging to occur. If the results of the PRA suggest that there is a potential for degradation activities, then limited field sampling will be carried out.

The area that is potentially subject to degradation firstly needs to be delineated ($A_{Deg,i}$). An output of the PRA will be a distance of degradation penetration from all access points (access buffer), such as roads and rivers or previously cleared areas, to the project area. The area subject to degradation shall be delineated ($A_{DegW,i}$) based on an access buffer from all access points, such as roads and rivers or previously cleared areas, to the project area, with a width equal to the distance of degradation penetration. $A_{DegW,i}$ shall be sampled by surveying several transects of known length and width across the access-buffer area (equal in area to at least 1% of $A_{DegW,i}$) to check whether new tree stumps are evident or not.

If the limited sampling finds trees being removed in the buffer area, then a more systematic sampling will be implemented. The sampling plan will be designed using plots systematically placed over the buffer zone so that they sample at least 3% of the area of the buffer zone ($A_{DegW,i}$). The diameter of all tree stumps will be measured and conservatively assumed to be the same as the DBH.

The mean above ground carbon stock of the harvested trees will be conservatively estimated to be the total emissions and to all enter the atmosphere. This sampling procedure will be repeated every five years and the results annualized by dividing the total emissions by five.

Monitoring deforestation

The Mayas Project will collect satellite images regularly as the basis for monitoring deforestation. Pre-processing of the images will comprise geometric correction, geo-referencing, and cloud and shadow detection and removal. Guidance for the interpretation of remote sensing imagery is given in the GOFC-GOLD Sourcebook for REDD (2016) will be followed to map and calculate deforestation within project area.

Monitoring burnt areas

For every fire incident, the Mayas Project will map out the areas impacted by fire or burn scars. Pre delineation of burn scars shall be firstly spatially assessed using satellite images and hotspot data, mainly data from MODIS and NOAA. A field visit will be carried out to verify the burnt scar area and assess the impact of fire on biomass and peat soil. The Mayas Project shall provide a specific SOP as guidance to carry out monitoring of burnt areas.

3.3.3.2 WRC Monitoring plan

Water table depths are used as proxy for calculating GHG emissions in the project area, and will be monitored by using hydrological modelling approach. Model outputs include daily water table depth rasters. Model validity and accuracy will be assured in parameter calibration process by

using directly measured water table depth data. For this purpose, several dipwells will be installed in project area and will be measured by combining manual (weekly or two-weekly interval) and automatic methods (30-minutes interval) throughout the year. Daily rainfall will be measured using two automatic rainfall stations. Map of monitoring devices is shown in Figure 33. Physical parameters required for this modeling, namely Hydraulic conductivity and storage coefficient, will be measured at random locations, and will be determined later.

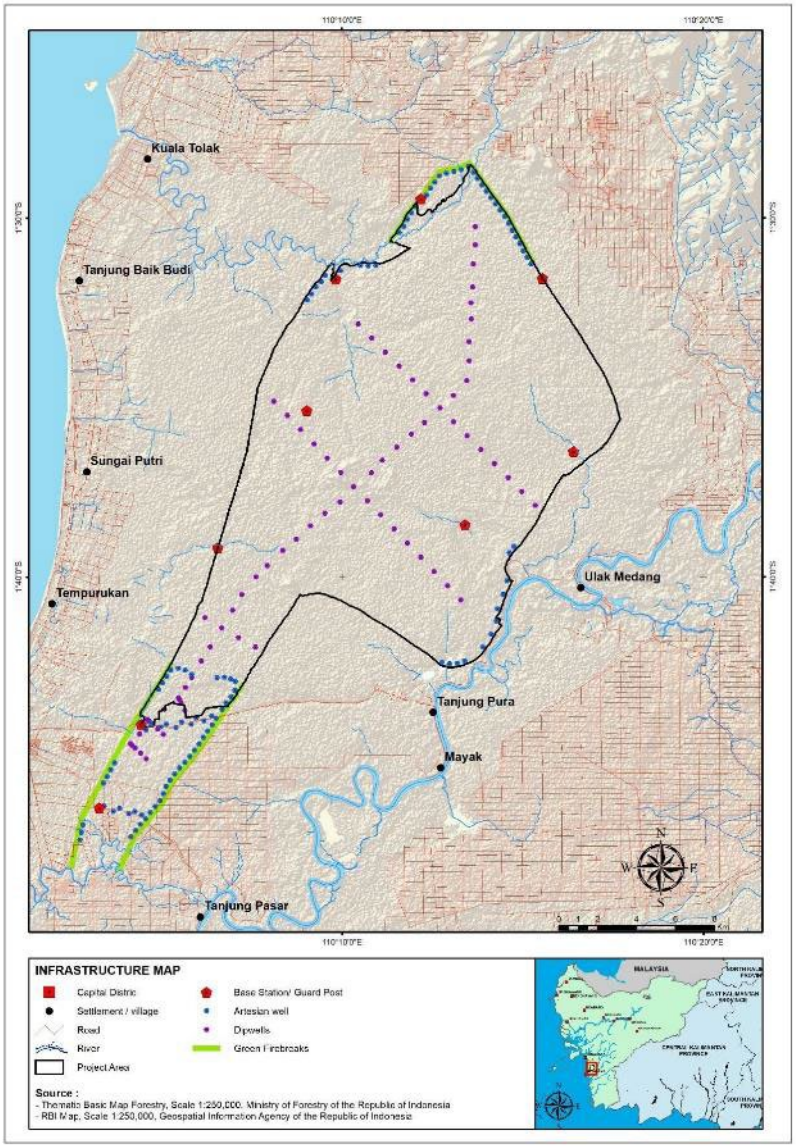


Figure 33. Location of various infrastructure and equipment installed in the Project Area, including those for monitoring WRC parameters

This hydrological model will be set-up in a spatially distributed dynamic schematization and will include water balance components: rainfall, evapotranspiration, groundwater flow, overland flow and open-channel flow. Peat thickness, DTM and rivers and canal networks will act as setup parameters. Canal water levels will be used as boundary conditions and will be measured using

water level measurement device (such as a staff gauge or AWLR) by combined manual (weekly/two-weekly interval) and automatic methods (30-minute interval).

Drainage network conditions in the Project Area will be monitored throughout the year. The presence or absence of new illegal canals will be mapped and remedied closure the usage of the canal by constructing canal blocking as soon as possible. Canal water levels of new illegal canals will also be monitored by installing appropriate water level measurement device.

Daily water table depth rasters resulting from this modelling will be averaged into yearly water table depths. From this result, yearly CO2 emissions from peat decomposition can be calculated by using the equation given in section 3.2.1.6.

3.3.4 Dissemination of Monitoring Plan and Results (VCS, 3.18; CCB, CL4.2)

The Mayas Project will establish a website during the validation and verification process that shows the status of implementation activities, milestones and estimated project benefits.

A summary of the PDD and monitoring reports will be prepared and distributed to stakeholders in the Project Zone during public consultation meetings and hard copies of the summary will be distributed (see Section 2.3.4 above).

3.4 Optional Criterion: Climate Change Adaptation Benefits

The project-zone communities are vulnerable to anticipated climate change impacts because their livelihoods and well-being are dependent on the healthy ecosystem of the surrounding peat swamp forest in the Project Area. Although some negative impacts from climate change are inevitable and beyond the control of the Mayas Project, we aim to strengthen community and biodiversity resilience by implementing adaptation options through various project activities. They include:

- Improved coastal protection through provision of training and equipment for mangrove restoration and conservation;
- Restoration of peat swamp ecosystems and reforestation;
- Planning and designing of climate resilient infrastructural development;
- Agroforestry capacity building;
- Adjustment of agricultural calendars, crop patterns and planting practices;
- Diversification of economic activities by introducing sustainable livelihood options;
- Capacity building for forest management and NTFP development;
- Integrated natural disaster management and prevention systems (e.g., early warning systems, monitoring protocols, and improved techniques and technologies);

- Disease prevention and control through early warning education and information dissemination;
- Improved access to clean water and sanitation facilities;
- Improved access to rain/river water collection systems.

3.4.1 Regional Climate Change Scenarios (CCB, GL1.1)

The shocks of climate change are already being felt in Indonesia, with more frequent droughts, heat waves and floods, and will pose an increasing threat to the country's development. A World Bank (2014) analysis ranked Indonesia 12th among 35 countries that face high mortality risks due to multiple hazards, including tsunamis, floods, landslides, droughts, and earthquakes. About 40% of Indonesia's population is at risk of such hazards, and their number will increase under climate change which is likely to exacerbate droughts on islands, floods and cyclone intensity across the country, and sea level rise effects in coastal areas. Food security and water availability will be heavily affected by temperature increase, shorter growing seasons, unpredictable rainfall, and salt-water intrusion. By 2100, climate change impacts will cost an estimated 2.5-7% of GDP (ADB 2015).

More locally, in West Kalimantan, a modelling study of the vulnerability of land and forest fires in the province showed that the land use has an impact of 24% on the vulnerability model (Jadmiko et al 2017). The results of the vulnerability model analysis show that plantations areas and secondary swamp forests are highly vulnerable, particularly on the peat area with depth about 50-200 cm. The analysis of land and forest fires risk found that the vulnerable areas have high risk which is largely unmanaged plantation areas and peatlands (such as the one covered by this project).

3.4.2 Climate Change Impacts (CCB, GL1.2)

The project zone is likely to exhibit various effects of climate change over the next 50 years with greater weather anomalies. Temperatures will increase consistently over the years, and there will be a considerable shift in precipitation patterns, evapotranspiration rates, humidity, surface runoff and soil moisture levels. Seasonal climate variability is expected to be greater, which suggests a substantial increase in rainfall and its intensity for the wet season (December to May), and warmer and longer dry months during the dry season (June to November). This is likely to increase fire risk in the dry season as well as present a high risk of floods, increased surface runoff, severe droughts and heat waves. Within these, the increased fire risk poses the most material threat to the project area. Because of climate variability and anomalies, it will be difficult to predict weather and seasons in the Project Zone. These extreme weather conditions are anticipated to present various impacts on the Project Zone's environment, economy and society, as shown in the table Table 44 below.

Table 44. Predicted climate impacts

Sector	Likely impacts
Environment	• Extended dry season conditions leading to increased fire risk • Loss of aquatic biodiversity and fish population • Damage to mangroves and peat swamp ecosystems • Forest degradation and biodiversity loss • Decreased quality and quantity of surface and ground water
Economic	• Loss of rural productivity and infrastructure • Loss of crop productivity and yields • Loss of economic activities from forest/non-timber forest products • Increased burden from disaster management
Social	• Spread of water and vector borne infectious diseases • Reduced food security and loss of incomes • Increased vulnerability to fire damage and smoke inhalation • Reduced quantity and quality of potable drinking water • Increased number of human injuries and deaths

3.4.3 Measures Needed and Designed for Adaptation (CCB, GL1.3)

Communities in the project zone are vulnerable to the impacts of climate change (described in the section above) because their livelihoods and well-being are dependent on the healthy ecosystem of the surrounding peat swamp forest in the project area, including through the provision of ecosystem services such as water cycling, soil health and pollination. Although some negative impacts of climate change are inevitable, and beyond the control of the Mayas Project, we aim to strengthen community and biodiversity resilience by implementing adaptation options through a variety of project activities. Those activities most relevant to climate change adaptation, and the causal relationship between the activity and the adaptation benefit, are summarised below.

Table 45. Description of adaptation benefits

Activity	Components	Adaptation benefits
Conservation and restoration of peat swamp ecosystem	• Avoided deforestation • Reforestation • Peatland rewetting & conservation • Fire prevention Habitat & species protection	Peatland forest ecosystems play a vital role in ensuring water supplies, reducing flooding risk, reducing fire risk and providing non-timber forest resources (in addition to carbon sequestration and storage). As a result, all measures taken by the project to protect and restore the peat swamp ecosystem will enhance resilience to potential climate

Activity	Components	Adaptation benefits
		change impacts, particularly those related to alterations in rainfall and flooding patterns.
Participatory planning	• Short and long-term village planning • Village-level plans coordinated with formal district and regional level plans	Participatory planning and mapping undertaken by the project will include the potential need for climate change risks to be reflected in infrastructure development plans, and the creation of management and monitoring systems to evaluate the need to implement climate change adaptation measures.
Community-based enterprise development	• Small business development advice and support • Development of sustainable livelihoods 1 Agriculture, agroforestry, fisheries and non-timber forest product management advice and support for diversification	The project will implement a comprehensive programme of support for enhancing and developing diversified alternative livelihoods. This includes support for improved agricultural, fisheries, agroforestry and NTFP based enterprise development, as well as diversification away from a traditional natural resources-based economy. These business development activities incorporate planning based on potential long-term climate change impacts (such as in changes in seasonal wet/dry patterns, crop/species selection, timing, etc.) to facilitate both resilience and the availability of alternative revenue sources in the case of affected industries.

4 COMMUNITY

4.1 Without-Project Community Scenario

4.1.1 Descriptions of Communities at Project Start (CCB, CM1.1)

The Project Zone encompasses 12 village communities and a population of 30,020 people (

Table 46) as outlined in Section 2.1.15. These villages are considered to be within the Project Zone because some of them have administrative areas which overlap with the Project Area; because some of the residents of these villages access and utilise natural resources from rivers and forests in the Project Area; and because others cultivate lands in areas adjacent to the Project Area. Where the Project Area has important subsistence, spiritual and economic value to communities, these have also been included as stakeholder communities. The twelve villages vary significantly in size from the smallest (Ulak Medang) of 667 people, to the largest (Kuala Tolak) of 4,280. Malay is the dominant ethnic group in the Project Zone. There are no settlements in the Project Area, but settlements in the Project Zone are comprised of simple houses built from timber, brick and corrugated iron. Livelihood activities of communities within the Project Zone – for both subsistence and income generation – are highly dependent on natural resources. The most important natural resource-dependent livelihoods activities are:

- rice cultivation and agriculture - for subsistence (rice) and some trade in local markets (vegetables);
- non-timber forest products - for subsistence, income generation, medicinal and cultural purposes;
- hunting - for subsistence and income generation;
- added-value processing of fish products - for subsistence and income generation;
- fishing and aquaculture - for subsistence and income generation;
- logging - for subsistence and income generation;

A small minority of people work as carpenters, tailors, barbers, chicken breeders or as entrepreneurs, civil servants or in the private sector.

Most villagers are fishers and farmers and historically very few have been involved in logging. From the late 1970s to the 90s several large logging companies operated in the area, but most of the workforce employed came from outside (Sambas District mainly). Some of the main land-uses around village settlements include rice cultivation, rubber cultivation, palm oil cultivation, mixed agroforestry, mixed vegetable gardens, abandoned (cleared) land and forested land.

Rice cultivation is practiced by the majority of households in the Project Zone villages and includes:

- Land clearance and preparation - which generally involves the use of a tractor and herbicides;
- Sowing – seedlings are planted immediately once the land has been cleared;
- Weeding – is carried out regularly to maintain the quality of the rice being planted, but also to protect the rice from rats and other pests; and
- Harvesting - rice ripens 100-120 days after planting and must be harvested immediately or the quality decreases. Generally, additional labourers are hired during the harvest season.

One to two cycles of rice are cultivated in project zone villages per year. Yields are often quite low so although widely practiced, rice cultivation is not considered a sufficient source of income and often just supplements other types of income generating activities.

Fishing (including crab fishing) is also widely practiced but mostly by older generations. It requires a large amount of capital, to either build or purchase (7-10,000,000 IDR) boats and fishing equipment. Younger generations are showing less interest in this livelihood strategy due to the barriers (large upfront investment) and modest earnings.

The great majority (>99%) of villagers belong to the Melayu ethnic group and are majority muslim with a small minority of Christians and Confucius followers (<1%). Villages are often divided into sub-villages or hamlets (*Dusun*), for example Sukamaju is divided into Dusun Teratai, Dusun Bujang Garang and Dusun Kalimantang. Children have access to primary and secondary education and literacy levels among the younger generations are high (80-90%). Access to healthcare is possible but is limited by the cost of treatments. About 1-2% of teenage girls drop out of school because of unplanned pregnancies.

Two types of community-level institutions play an important role in the lives of communities in the Project Zone: village government and customary institutions. Village government sits within the Government of Indonesia's official administrative structure and is led by the village Head (*Kepala Desa*).

Information on communities in the Project Zone is derived from participatory research carried out by YIARI community development staff as well as a conflict resolution specialist and advisors. This combination brought together a range of individuals and institutions with complementary skills, including those with in-depth understanding of local culture and practices; researchers formally trained in anthropological research methods and participatory rural appraisal techniques; and experts in rights-based approaches, sustainable livelihoods, and linkages between conservation and community wellbeing. YIARI conducted an initial phase of information collection and produced Participatory Rural Assessments for all 12 villages and participatory maps for three (Sungai Putri, Ulak Medang and Sungai Awan Kiri), which together overlap with the majority of the Project Area).

These studies describe the historical, socio-economic and cultural ties that communities have to the Project Zone/Area.

Researchers also carried out semi-structured key informant interviews. Unless cited otherwise, the community information contained in this PDD is derived from YIARI community development team reports. These documents contain rich and detailed information which has been summarised and condensed for the purposes of this PDD. Full versions of these reports (in *Bahasa Indonesia*) will be made available on request. The reports can also be translated into English upon request.

Table 46. Target villages and hamlets in the Project Zone

Village	Population	Women	Men
Sungai Awan Kiri	4,095	1,974	2,121
Tempurukan	2,318	1,189	1,129
Tanjungpura	902	492	410
Ulak Medang	667	319	348
Mayak	1,252	652	600
Sukamaju	2,071	1,019	1,052
Sungai Putri	3,183	1,805	1,378
Tanjug Baik Budi	3,830	1,892	1,938
Kuala Tolak	4,280	2,215	2,065
Dusun Manjau (Laman Satong Village)	3,208	1,518	1,690
Dusun Sepahan (Sungai Kelik Village)	1,628	814	1,543
Kuala Satong	2,586	1238	1348
Total	30,020		

4.1.2 Interactions between Communities and Community Groups (VCS, 3.19; CCB, CM1.1)

Covered under Section 4.1.1 above.

4.1.3 High Conservation Values (CCB, CM1.2)

HCV areas have been identified and are shown in the map in Section 2.1.15 above. Qualifying attributes, focal areas and potential negative impacts (as per Section 4.2.4) are shown below in

Table 47.

4.1.4 Without-Project Scenario: Community (CCB, CM1.3)

Project Mayas is centred around a logging concession which was destined to be partially selective logging and partially converted into a monoculture timber plantation. Logging and conversion into a plantation would have meant reduced food security through lack of access to fishing, likely reduced agricultural output through the breakdown of water regulation services and an increase in fires through the draining and drying out of the peat with associated drop in air quality and increased risk for respiratory disease. The baseline scenario would also have led to the loss of all non-timber forest products (NTFP) currently utilized by project-zone communities as well as an almost certain reduction in availability of fish through the draining of the peat and the degradation of freshwater ecosystems. Any hunting would have gradually ceased with ecosystems becoming increasingly degraded through logging or replaced by plantations and associated drastic reductions in species populations.

While regulations would compel a licence-holding plantation company to identify cultural areas and areas important for food security and ensure protection and access, this practice is widely ignored or only partially implemented, putting such areas at risk and communities would likely have lost places of cultural significance in the Project Area.

In the baseline scenario social capital would have been at risk. The typical response to the arrival of a large commercial exploiter is the erosion of social cohesion as benefits and costs become unequally distributed and factions form. Increased immigration and competition for scarce resources further creates opportunities for conflict.

In the baseline scenario, it is likely that commercial land-use designations would prevail over village-based claims. Commercial companies typically base their claims on centrally-created tenure maps and do not undergo lengthy participatory mapping to understand customary land-use and resource-use patterns in detail. Where conflicts exist the typical response is short-term payment at undervalued rates. It is possible that the three villages which started cultivating land in the southern portion of the concession would have been evicted. It is also likely that the baseline scenario would have led to a lack of inclusive participation of communities and a lack of transparency in decision-making, leading to an opportunity for elite capture in which dominant groups typically benefit disproportionately from company payouts, while hindering the flow of benefits to marginalized households.

In the baseline scenario the most likely form of engagement local communities could expect would be direct employment. There may be some communication with village-level institutions, but there is little precedence among plantation companies for active community engagement in operations or decision-making.

Finally, in the baseline scenario it is unlikely that community members would benefit from training and capacity building opportunities, beyond the potential for specific training given to employees of the plantation companies, linked solely to those activities. Local employment is likely to be predominantly of unskilled manual labourers.

Table 47. Community HCVs

High Conservation Value	Qualifying Attribute	Focal Area	Potential Negative Impacts
Areas with critical ecosystem services (HCV4): Water regulation (and related fire risk mitigation)	The Mayas Project area comprises a series of swamp and peat forests. The Mayas Project area plays a critical role in maintaining hydrological function and water supply, preventing erosion and subsidence risk from peat oxidation, and mitigating fire risk through maintained forest cover. The hydrology of the region is complex – peatlands regulate baseflow by slowly and steadily releasing rainfall water into blackwater streams as well as populated areas in the dry season. If all or parts of the forest area were drained and converted to agricultural uses there would be huge changes in water cycling and availability for this area negatively affecting local wellbeing. Water regulation is also particularly important to maintain the health of streams and aquatic wildlife on which communities depend for food.	The Project Zone as a whole since peat ecosystems are tightly interconnected systems and most of the Project Zone is situated on peat	None anticipated. The central objective of the Mayas Project is to protect and restore the core peat-dome and the natural forests and hydrological system it supports.

High Conservation Value	Qualifying Attribute	Focal Area	Potential Negative Impacts
Areas with critical ecosystem services (HCV4): Carbon storage (and related fire risk mitigation)	Peatlands are estimated to contain twice as much carbon as is contained in the entire global forest biomass. Were the Project Area to be logged and converted to plantation, this would require the construction of a vast network of drainage canals, which lower the water tables to around 80cm below the peat surface. As a result, the previously inundated, carbon-rich peat soils would oxidise and emit CO_2 at a rate that rivals emissions from many large electricity power stations in the developed world. Given the significant depth of the peat (97% of the project area is covered by peat deposits of 3 meters or deeper) the Project Area clearly plays a very important role in the storage of carbon. The persistence of healthy peatland ecosystems and their forests reduce the risk of fires, which cause serious respiratory diseases to resident communities.	The Project Zone as a whole	None anticipated. The central objective of the Mayas Project is to protect and restore core peat-dome and the natural forests it supports.
Areas fundamental to meeting the basic needs of local communities (HVC5):	The forests in the Mayas Project Zone are traditionally used by project-zone communities for the provision of numerous non-timber forest products, ranging from	All of the Project Area and the conservation (HL), production (HP) and conversion production	None anticipated. The central objective of the Mayas Project is based around the protection of the forest and enhancing the sustainable use of the products

High Conservation Value	Qualifying Attribute	Focal Area	Potential Negative Impacts
non-timber forest products	rattan, to Jelutong latex, to fish, shellfish, honey, other wildlife and medicinal plants.	forest (HPK) adjacent to the Project Area	and services it provides to Project Zone communities.
Areas critical for traditional identity of communities (HCV6): sites of cultural and religious importance	Through the participatory mapping and rural appraisal processes undertaken with project-zone communities, a number of small areas within the project zone have been identified as being of cultural or religious significance. These include ritual and ancestral sites.	Please refer to HCV map (Figure 7)	None anticipated. Within the Project Area, where the Mayas Project has legal mandate, areas contributing the cultural identity of local communities will be fully protected.

Table 48. Community Impacts

	Baseline condition	Short term Impact	Long-term Impact	Monitoring measure	Target #
Participation/ governance	Local communities would not have had the opportunity to participate in any natural resource management decisions in the project area under the baseline scenario	Under this project ongoing FPIC will allow local communities to provide input and suggestions while voicing complaints when necessary over how project activities are conducted.	Having clear channels to influence decision making in the project area will strengthen a sense of participation, engagement and wellbeing in local community members.	Number of village agreements	12

	Baseline condition	Short term Impact	Long-term Impact	Monitoring measure	Target #
Employment	It is likely that little or no employment would have been provided for local communities under the baseline scenario as the previous MPK owners had a track record of employing migrant workers from China	The project will provide employment opportunities in the form of village facilitators, as well as wildlife surveyors, trackers and fire prevention and firefighting staff.	Same as short-term impacts	Number of community members employed (annual full-time equivalent)	100
Training	It is likely that no training would have been provided	The project will seek to provide training and capacity building to communities across all impact indicators	Increased capacity and self-reliance, knowledge transfer	Number of community members participating in training or capacity building initiatives	5,000
Improved livelihoods	Non-timber forest product-based livelihoods and revenue streams would not have been protected under the baseline scenario where forest would have been logged and converted,	The project will provide tools, resources and capacity building opportunities for local communities to maintain,	The project will support livelihoods that incentivise a shift from extractive to sustainable uses of land.	Number of community members participating in livelihood enhancement initiatives	5,000

	Baseline condition	Short term Impact	Long-term Impact	Monitoring measure	Target #
	similarly livelihood derived from fishing would have been impacted. Fire risk would have been high, damaging agricultural livelihoods.	diversify and enhance agro-biodiversity based livelihoods.			
Education	Under the baseline scenario, no additional education opportunities would have been provided to community members	This project will support community members, especially younger generations to build their capacity through training opportunities and in some cases access scholarships to attend high-school and in some instances higher education, (typically to pursue careers in the service sector).	This project will support younger generations to pursue livelihoods opportunities in a wide variety of sectors, making the community more efficient when dependent on agro-biodiversity based livelihoods and overall less dependent on extractive uses of natural resources.	Number of community members benefiting from improved access to education	500

	Baseline condition	Short term Impact	Long-term Impact	Monitoring measure	Target #
Climate adaptation	The baseline scenario would have exacerbated the impacts of climate change through the logging and conversion of native vegetation, the breakdown of the peatland ecosystem and that of water regulation and fire prevention services.	Local communities will plant climate resilient crops, while maintaining local micro-climatic conditions, water regulation and fire-prevention services.	Same as short-term impacts	Additional yearly yields (kg) resulting from planting climate resilient crops per participating household (if used for food) and additional IDR earned from the sale of climate resilient crops planted through project activities	To be established through demonstration plots
Water	The baseline scenario would have resulted in a decrease in water quality in the project zone, through the breakdown of the peatland ecosystem	The project will protect and enhance the peatland ecosystem, contributing to the maintenance of existing access to clean water, streams and rivers in the project zone. In addition, one village will have	Same as short-term impacts	Number of community members benefiting from improved access to clean water (annual, cumulative)	220

	Baseline condition	Short term Impact	Long-term Impact	Monitoring measure	Target #
		improved access to clean water through the digging of a borehole in Kuala Tolak			

4.2 Net Positive Community Impacts

4.2.1 Expected Community Impacts (CCB, CM2.1)

Expected community impacts are shown in Table 48. This table lists:

- Well-being indicators: the broad focus areas in which the project will seek to generate positive impacts.
- Baseline condition: Without project scenario (as per Section 4.1.4 above)
- Anticipated Impact: Type of long-term and short-term benefit anticipated, including the nature of the impact (direct/indirect).
- Monitoring measure: The value used to monitor the projects impact against the given criteria.
- Target Values over project lifetime

4.2.2 Negative Community Impact Mitigation (VCS, 3.19; CCB, CM2.2)

An estimated 170 households are partially dependent on income from illegal logging within the concession. While the project is seeking to halt illegal logging activities, it is mitigating this impact by targeting these households for employment in other sectors and for involvement in sustainable agricultural activities to ensure the project results in net benefits for these families.

4.2.3 Net Positive Community Well-Being (VCS, 3.19; CCB, CM2.3, GL1.4)

Anticipated net well-being impacts of the Mayas Project are shown in Table 48, which include well-being impacts specific to Gold-level criteria, including climate change adaptation.

The baseline scenario which would have seen the degradation of all HCV attributes related to community wellbeing. Instead, the project will adopt measures consistent with the precautionary principle to ensure all participating communities will benefit from project participation substantially, mainly through the implementation of a large agro-biodiversity-based livelihoods programme. Because the project is based around protecting and restoring a natural peat swamp forest ecosystem and preserving the biodiversity it contains, HCV 4, 5 and 6 (as described in 4.1.3) will all be protected, maintained and enhanced for communities to continue benefiting long-term from hydrological cycle, carbon storage and reduced fire risk services, as well as continued access to non-timber forest products, fisheries and cultural sites of significance within the Project Area and as far as possible in the rest of the Project Zone as well.

4.2.4 High Conservation Values Protected (CCB, CM2.4)

Potential negative effects on HCVs related to community well-being are shown above in

Table 47. None are anticipated.

Based on an evaluation of all criteria and indicators, in no case are negative impacts anticipated, and therefore no mitigation measures are proposed as necessary. However, this will be monitored closely and if negative impacts are detected, immediate remedial actions will be taken.

HCV 4 - The central objective of the Mayas Project is to protect and restore the core peat-dome and the natural forests it supports.

HCV 5 - The central objective of the Mayas Project is the protection of the forest and enhancing the sustainable use of the products and services it provides to project-zone communities.

HCV 6 - Within the Project Area, where the Mayas Project has legal mandate, areas contributing the cultural identity of local communities will be fully protected.

4.3 Other Stakeholder Impacts

4.3.1 Impacts on Other Stakeholders (VCS, 3.18, 3.19; CCB, CM3.1)

No offsite stakeholder impacts are anticipated. During the design phase of the project potential offsite groups were considered (specifically communities living over 15km away from the concession's border), but none are considered likely to be impacted by the project – indeed, the Project Zone itself was designed to incorporate all those groups who were likely to be affected.

4.3.2 Mitigation of Negative Impacts on Other Stakeholders (VCS, 3.18, 3.19; CCB, CM3.2)

Project activities are specifically designed to ensure sustainable community benefits. Such activities are implemented in partnership with each community and focus on the development of enhanced and sustainable livelihoods: aiming to improve local economies relieves pressure on the adjacent natural ecosystem. In parallel, measures will be put in place to ensure a high-level of participation of both local communities and local government in project planning and operation, to ensure grievances are heard and addressed, and to ensure long-term benefit sharing.

4.3.3 Net Impacts on Other Stakeholders (VCS, 3.18, 3.19; CCB, CM3.3)

As described in 4.3.1, no offsite stakeholder impacts are anticipated. During the design phase of the project potential offsite groups were identified, but none are considered likely to be impacted by the project – indeed, the Project Zone itself was designed to incorporate all those groups who were likely to be affected.

4.4 Community Impact Monitoring

4.4.1 Community Monitoring Plan (CCB, CM4.1, CM4.2, GL1.4, GL2.2, GL2.3, GL2.5)

Monitoring criteria for each anticipated impact are shown in Table 48.

In addition to project activity tracking, supplementary data will also be collected through secondary sources (e.g., village and local government census data, third-party studies).

The Mayas Project will monitor and evaluate the effectiveness of measures taken to maintain or enhance HCV attributes through the community impact monitoring program. Ground-truthing of information and maps will also be conducted on a regular basis in order to assess the accuracy of spatial impacts on communities. Through community involvement in the identification of key HCV sites and species, MPK will ensure that project activities will not disturb or degrade ecosystem functions and cultural values of such areas

4.4.2 Monitoring Plan Dissemination (CCB, CM4.3)

See Section 2.3.1-5.

4.5 Optional Criterion: Exceptional Community Benefits

4.5.1 Exceptional Community Criteria (CCB, GL2.1)

The Human Development Index (HDI) classifies Indonesia as a Medium Human Development country, with a rank of 108 amongst 169 countries across the world. The Indonesian Bureau of Statistics (Badan Pusat Statistik) defines the national poverty line for West Kalimantan Province as the minimum purchasing power per capita to be able to afford staple food and non-food items, equivalent in cash terms to IDR 454,652 per month. The Mayas Project conducted a social survey which found that on average 64% of village households are made up of farmers earning approx. IDR 2,000,000 per month. West Kalimantan has an average household size of 4.6 people, making the income per capita IDR 434,782. Thus, the Project Zone qualifies as a rural area in which more than 50% of households are living under the national poverty line.

4.5.2 Short-term and Long-term Community Benefits (CCB, GL2.2)

Anticipated short- and long-term benefits are shown by category of impact in Table 48.

4.5.3 Community Participation Risks (CCB, GL2.3)

The Mayas Project seeks to benefit communities through a variety of socio-economic activities which also target the most vulnerable and marginalized community members. The project aims at reaching these poorer and marginalized communities through a variety of socio-economic programmes (see Appendix 2). Furthermore, the project is expected to create a multitude of positive economic effects from these programs, as they increase employment opportunities, crop

yields and access to markets. The success of community programs is largely dependent on participation, transparent decision-making processes based on mutual trust, and proper management of project activities. Three main potential barriers to community benefits in reaching the marginalized and/or vulnerable communities were identified, and mitigation measures are discussed below.

- **Lack of participation**: marginalized poorer communities tend to lack the means or time required to attend community meetings. Also, it is common for marginalized community members to avoid voicing their opinions in front of a large audience and especially in front of powerful groups or individuals. Unbalanced or misrepresented target groups for certain project activities could entail non-participation of the poorer and marginalized community members. The Mayas Project will encourage all community stakeholders, particularly the poorer and marginalized, to participate in project activities. Our participatory planning processes enable all project-zone communities to be involved in decision-making. Understanding barriers to meaningful participation to the project, socialization, information dissemination and community meetings take place at various locations and times by considering the needs of the marginalized. For example, women-only meetings are facilitated to encourage them to voice their opinions, and take place at their houses in the evening when they have finished their chores for the day. Community message boards, booklets, flyers and videos, and local radio programs will also be used to reach target audiences effectively.

- **Elite capture**: A lack of participation and transparency in decision-making processes generally creates an opportunity for elite capture. When making decisions regarding an infrastructural development project such as road construction, for example, community board members may choose a location based on their personal benefits, rather than communal benefits as a whole. Without transparent decision-making systems and well-represented board of communities in place, community programs may be manipulated to satisfy the personal interests of certain individuals and may not produce overall positive impacts on the marginalized households. In order to address the risk of elite capture, the Mayas Project will encourage the poorer and marginalized households to participate and aim to enhance the balance of community representation. To increase transparency in decision-making processes, meeting records and decisions will be maintained and made publicly available. Mixed representation of community members, including the marginalized groups, will be encouraged and reinforce more equitable and democratic distribution of benefits, thereby placing checks and balances on decision-making processes and safeguarding the interest of communities as a whole.

- **Inadequate management of project activities**: Another potential barrier to anticipated project benefit reaching target community members is inadequate management of project activities due to the lack of human and financial resources and effective monitoring and evaluation systems. The implementation and progress of project

activities should be regularly monitored in order to assess the impacts of these activities on marginalized households, to ensure appropriate allocation and use of community funds. Without a stringent system of checks and balances, the risk of the elite capture of benefits, ineffective performance and misappropriation of funds remains high. The Mayas Project seeks to remove this barrier by supporting to access appropriate resources and financial management training to carry out project activities. Community-based adaptive management plans will include processes to reinforce checks and balances on decision-making processes and lead to a form of democratic natural resources governance.

4.5.4 Marginalized and/or Vulnerable Community Groups (CCB, GL2.4)

The Mayas Project has identified two marginalized and/or vulnerable community groups: women and the poorest households in each community. The project will target these two groups to ensure their voices are heard and that they stand to benefit substantially from project activities. Project monitoring will attempt to disaggregate results by these groups whenever possible.

4.5.5 Net Impacts on Women (CCB, GL2.5)

Community impact monitoring will disaggregate results by gender.

As discussed in 4.2.1, women are responsible for many of the household chores, but rarely contribute financially to running households. As such, they are often excluded from decision-making, especially at the community level. In order to foster increased gender equality, this project will establish women's livelihoods groups where women will lead initiatives, drawing on existing and newly acquired knowledge. The project will support women to form sustainable livelihood groups that will focus on designing and leading on the management of multi-purpose tree species nurseries for agroforestry and other livelihoods initiatives. Women will also be encouraged to voice their opinions, needs and ambitions through focus group discussions, the results of which will be channeled back to the village government. In addition, at least 50% of all opportunities for further education provided through this project are offered to girls.

4.5.6 Benefit Sharing Mechanisms (CCB, GL2.6)

The Mayas Project defines benefit sharing as 'the intentional transfer of non-monetary benefits which improve local wellbeing and support project objectives'. These benefits consist mainly of opportunities around education, access to micro-loans, agricultural improvements, aquaculture, and other programmmes that aim for long-term improvements in local wellbeing. These community programmes are co-designed with the community to ensure long-term impacts, fairness and equity. Through regular engagement, benefits will be shared transparently. The sustainable livelihoods initiatives and other programmes will have clear monitoring and evaluation schedules that will ensure transparency and equity in the allocation of benefits.

4.5.7 Benefits, Costs, and Risks Communication (VCS, 3.18; CCB, GL2.7)

See Section 2.3.1-5.

4.5.8 Governance and Implementation Structures (CCB, GL2.8)

The Mayas project will support communities in developing skills and providing them with the tools to participate in decision-making more effectively through:

- Taking part in participatory mapping and land-use planning;
- An on-going Free Prior and Informed Consent process (FPIC), which will continue throughout the project to ensure community members have opportunities to voice views, wishes, hopes and ambitions regularly;
- Co-design the type of terms on which the relationship between the project and each community is established by providing input, views, and revisions of the MoUs signed with the project;
- Providing genuine opportunities for community feedback on project implementation barriers at regular community meetings;
- Providing genuine opportunities for complaints to be voiced and addressed through the grievance redress mechanism.

4.5.9 Smallholders/Community Members Capacity Development (CCB, GL2.9)

Project activities to enhance capacity are shown in Appendix 2. Capacity building in relation to project governance and participation are described in the section above, 4.5.8.

In addition, community members will be provided with opportunities to improve skills in five main areas:

- Sustainable agricultural practices
- Computer literacy
- English language
- Fire prevention and fire fighting
- Wildlife monitoring
- Mangrove ecotourism (only in relevant villages)

5 BIODIVERSITY

5.1 Without-Project Biodiversity Scenario

5.1.1 Existing Conditions (VCS, 3.19; CCB, B1.1)

The Project Zone is an essential part of the Sentap-Kancang lowland peat-swamp forest ecosystem, an area around 57,000 hectares. This region forms a vast landscape along with Gunung Palung National Park, Gunung Tarak Protection Forest (Hutan Lindung), and several conservation areas in surrounding palm oil plantations, which are disconnected from each other. These forest fragments are notable habitat patches for many threatened species such as the Bornean Orangutan (*Pongo pygmeaus*).

During initial assessments and surveys, the project identified 18 mammal species, 102 birds, 11 reptiles, 14 amphibians, and >45 plant species (67 floral species identified to genus level). These were identified during initial surveys in the Project Area. Using IUCN Red List (2017) data, three species are considered Critically Endangered, five are Endangered, and 15 are Vulnerable (YIARI report, 2019), 11 species (interim data) are endemic to Borneo, and 15 species are protected under Indonesian law (P106/2018, see Appendix 10). Further surveys are almost certain to identify more threatened species present at the site. Based on the habitat and nearby records this list is likely to expand to include any of the following:

- Sunda Pangolin (*Manis javanica*) – CR
- Kahui/Red Balau (*Shorea balangeran*) – CR
- Hairy-nosed Otter (*Lutra sumatrana*) – EN
- Bornean Clouded Leopard (*Neofelis diardi borneensis*) – EN
- Flat-headed Cat (*Prionailurus planiceps*) – EN
- Otter civet (*Cynogale bennettii*) – EN
- Storms Stork (*Ciconia stormi*) - EN
- White-rimmed Stingray (*Fluvitrygon signifier*) - EN
- Asian Arowana (*Scleropages formosus*) - EN
- Meranti Semut (*Shorea teysmaniana*) - EN

Based on survey work conducted in 2019 and 2020, we estimate the Bornean orangutan population size to be between 813-1,204 individuals (YIARI 2018, unpublished report) with density estimates of 2.14 – 3.4 individuals per square kilometre. This Bornean orangutan population is the biggest population outside conservation areas in West Kalimantan and represents between 1.5

and 2.3% of the remaining global population of this species, making the project area a Key Biodiversity Area by the A1 Threatened Biodiversity criterion alone.

Full details of the biodiversity assessment can be found in (YIARI 2019, unpublished report). Key species identified in the survey, including those considered of high conservation value, endangered, protected or endemic, are listed in Appendix 10. Measures implemented to protect and enhance the site's biodiversity are discussed further in relation to project activities in Sub-section 2.1.17, and in relation to the project's net positive biodiversity benefits in Section 5.2

5.1.2 High Conservation Values (CCB, B1.2)

A HCV assessment was conducted within the project area in collaboration with YIARI. Based on primary and secondary data that were collected during the identification process, we identified the entire Project Area as being HCV 1 (area with notable biodiversity concentration), HCV 2 (large landscape-level areas) and HCV 3 (rare and threatened habitats). In addition, several areas outside of the Project Area, but within the Project Zone were also identified as HCV 1-3. Each HCV value, its current condition, the baseline scenario, the project activity to maintain/enhance and the monitoring method and initial values are shown below in Table 49. A map showing HCV 1-3 areas within the Project Zone is included above in Section 2.1.16

5.1.3 Without-project Scenario: Biodiversity (CCB, B1.3)

The baseline scenario for the project, including commercial drainage, logging and land clearance for mono-culture plantation is described in detail in Section 3.1.4 above. The impact of this baseline scenario on HCV values and key/trigger species present is given in Table 49 below.

Beyond the baseline scenario, there is a latent background threat of increased development in the region. The provincial and district development plan (RTRWP/K 2015 - 2035) have designated the region as a strategically important one for economic growth. This includes Kuala Tolak and Kuala Satong. This potentially influences biodiversity conditions in the future due to the increase or expansion of settlements, roads, and plantations (Laurance et al 2009). The impact of road construction/development will intensify forest conversion and contribute to illegal hunting and wildlife trade, thus increase threats to biodiversity (Clements et al 2014). For instance, the construction of Ketapang-Tanjungpura road has already provided easy access for illegal loggers and poachers to the concession area.

Table 49. HCV values and trigger species, showing current condition, baseline scenario, project activity and monitoring metrics The column 'Initial value' refers to the methods used to monitor the HCV value or species. Numbers refer to methods described in Table 50 below.

HCV	Current condition/trend	Baseline scenario	Project activity & change	Initial Value
HCV 1: Species diversity	The project area meets the HCV criteria based on the presence of globally and regionally significant populations of at least 23 rare, threatened or endangered species (see Appendix 10).	Without the project, the forest within the project area would have been drained, logged and partially converted to monoculture plantation resulting in the local extinction of most threatened and endangered species, and irreversible damage to the natural peatland ecosystem. All key species are dependent on the presence of large blocks of undisturbed intact forest. The negative effect of these impacts in terms of biodiversity would be multiplied at the landscape level by the effects of habitat fragmentation. Unsustainable hunting in remaining forest patches would likely increase due to easier access, fuelled by the demand from traditional	Under the project scenario the entire project area will be protected, and any degraded areas will be restored. This will ensure the long-term survival of the habitat and the species supported by it. Outside of the core project area, activities will seek to protect remaining intact forest areas, reduce unsustainable hunting, and promote sustainable agricultural practices. As a result, the project anticipates providing net positive benefits to both project area and project zone.	Methods 1, 2 On Project Start Date: • 32,026 ha forest • 1,720 ha non-forest • 21,290.53 ha undrained peat • 11,445.14 ha drained peat In 2023 on Baseline Scenario: • 19,117 ha forest • 14,631 ha non-forest
HCV 2: Landscape-level ecosystems and mosaics	The project area contains one of the largest remaining continuous areas of coastal peat swamp forest outside of protected areas in Indonesia, which supports globally significant populations of the full range of species representative of this ecosystem type (see Appendix 10).			
HCV 3: Ecosystems and habitats	The project area contains one of the largest remaining continuous areas of coastal peat swamp forest outside of			

HCV	Current condition/trend	Baseline scenario	Project activity & change	Initial Value
	protected areas in Indonesia Intact, un-drained peat swamp forest is one of the most threatened habitats in Indonesia.	Chinese medicine markets, and by local demand for songbird and pet-trade markets.		• 11,444.37 ha undrained peat • 21,291.30 ha drained peat
Bornean Orangutan (*Pongo pygmaeus*; CR)	The current population of Bornean Orangutan within the project area is estimated to be between 813-1,204 individuals. This represents between 1.5% and 2.3% of the global population. The population is thought to be near carrying capacity.	Under the baseline scenario habitat loss, habitat degradation and dwindling food sources would lead to a rapid decline. This probable decline would reduce their size such that they may become vulnerable to stochastic threats and at risk of extinction. The remaining individuals would be under rising hunting pressure.	The project aims to maintain population densities. If deemed appropriate following further work, the project will encourage a slight increase through enrichment planting (of native and climate resilient fruit tree species that can provide additional food).	Methods 1, 3, 4, 5, 6, 7 813-1,204 individuals
Ramin (Gonystylus bancanus/ maingayi; CR)	Recorded as present during forest inventory monitoring. Likely to be widely distributed across the project area, particularly in remote areas far from access	This tree species is threatened by over-extraction, despite its protected status. Under the baseline scenario this species would likely be lost entirely through a	The project will protect the natural forest habitat of this species and work pro-actively with local communities to reduce illegal logging pressure.	Method 1 Present (no population data)

HCV	Current condition/trend	Baseline scenario	Project activity & change	Initial Value
		combination of legal clearance and illegal logging.		
Proboscis Monkey (*Nasalis larvatus*; EN)	Known to be widespread across the project area, particularly within riparian forest. No current estimate of density or distribution.	Under the baseline scenario habitat loss, habitat degradation and dwindling food sources would lead to a rapid decline. Remaining individuals would be under rising hunting pressure. A small minority of animals may be rescued, rehabilitated and released, but the majority would be lost.	The project will aim to maintain current population levels by protection of the forest habitat of both species, and in particular the riparian forests most important to Proboscis Monkey.	Method 1, 6 Present
Bornean White-bearded Gibbon (*Hylobates albibarbis*; EN)	Known to be widespread across the project area, through direct sighting and more commonly vocal records. No current estimate of density or distribution.			Method 1, 5, 6 Present
Spiny turtle (*Heosemys spinosa*; EN)	Spiny Turtle is a cryptic and secretive forest-living turtle species. It is known to be present in the project area, but nothing is yet known about is abundance or distribution.	Both endangered turtle species are habitat dependent and extremely vulnerable to hunting for the food and traditional Chinese medicine trade. Under the baseline scenario local populations likely be lost through a combination or irreversible habitat loss and increased hunting pressure resulting from increased access and an	The project will protect the critical habitat of both species, and will implement measures to reduce illegal hunting pressure; through a combination of monitoring and patrolling, and by working with local communities to educate people and to develop alternative livelihoods for	Method 6, 7, 8 Present
Malayan Giant Turtle (*Orlitia borneensis*; EN)	Malayan Giant Turtle is a large turtle species that inhabits forest rivers and streams, as with Spiny Turtle it is known to be present, but			

HCV	Current condition/trend	Baseline scenario	Project activity & change	Initial Value
	nothing is yet known about is abundance.	imported workforce supplementing their income.	people previously dependent on their trade.	

Table 50. Survey Methods employed by the Mayas Project. Reference numbers refer to Table 49

Ref.	Method	Target Metric	Approach	Frequency
1	Forest monitoring	Methods and metrics for forest monitoring are covered by the project's climate monitoring and described in detail in Section 3.	See Section 3; 3.1. Application and Methodology	See Section 3; 3.1.
2	Peat monitoring	Methods and metrics for forest monitoring are covered by the project's climate monitoring and described in detail in Section 3.	See Section 3; 3.1. Application and Methodology	See Section 3; 3.1.
3	Orangutan nest count	Orangutan nest count surveys are the most established and reliable approach for assessing both the density and distribution or orangutan, allowing accurate estimates of population size to be derived.	Nests will be surveyed along 30 km of transect lines distributed across the project area. Counting and analysis follows standard methods.	Every 5 years
4	Orangutan nest decay survey	Nest decay survey – used to calculate correct nest decay time (days) for future nest surveys analyses ('t' in the equation)	Consists of estimating the number of days it takes for nests to decay (one-off calibration survey)	Once in 2022

Ref.	Method	Target Metric	Approach	Frequency
5	Camera trapping	Camera trap surveys are a reliable method to assess the presence of a large range of small to large ground living animals – mainly mammals (including orangutan when venturing to the forest floor) and birds.	A large number of camera traps will be deployed in a systematic grid design. This approach allows information on distribution and relative density to be collected (using occupancy methods) in addition to presence/absence data.	Continual (moving grid)
6	Variable circular-plot count	Variable circular-plot (VCP) counts are an effective method to assess the presence/absence, distribution and abundance of visible and vocal species. They commonly used for bird surveys, but are also highly effective at surveying vocal mammal species such as gibbons.	VCP counts will be conducted in parallel to orangutan nest count surveys and may also be incorporated into camera trap deployment/retrieval trips. The method is highly suited to dense forest environments as the observe does not need to move while conducting the counts.	Variable Every 1 - 2 years
7	SMART Patrolling	This method is designed to incorporate systematic data recording into patrolling and other activities. By capturing all such 'incidental' sighting information to a GIS system, over time the data set contributes to the understanding of occurrence and distribution of both key species and threats.	Any relevant observation of biodiversity and or threats (such as snares, or traps) is recorded along with GPS position and the data recorded to a GIS.	Continual
8	Hunting offtake	This method is non-field based and designed to collect information on the level of hunting taking place within the project zone, allowing an assessment of offtake.	The method is based around targeted and random interviews within the community. Targeted interviews are aimed at those known to be engaged in hunting (or to have information on those that are) while random interviews are used for calibration. Interviews seek information on	Every 2 years

Ref.	Method	Target Metric	Approach	Frequency
			species hunted, locations, methods, and annual offtakes.	
9	Ad hoc/ specialist	Additional specific survey methods will be utilised as required. This could relate to specific species, or species group or to specific habitats.	Methods used will be determined by target species. Such methods will be required when any of the above methods is unable to collect sufficient information on the key species/group/habitat in question	As required

5.2 Net Positive Biodiversity Impacts

5.2.1 Expected Biodiversity Changes (VCS, 3.19; CCB, B2.1)

Project activities that are designed to enhance biodiversity, both in terms of HCV values and key/trigger species are shown in Table 49. This includes the baseline status (where known) the anticipated change and the monitoring approach adopted.

5.2.2 Mitigation Measures (VCS, 3.19; CCB, B2.3)

Project activities are designed to consistently protect and enhance HCV areas and so, as a result, no negative impacts are anticipated, and no mitigation measures are therefore thought to be needed. The impact of project activities on all HCV areas will be constantly monitored and if at any point negative impacts are detected then remedial action will immediately be taken.

Project measures to ensure the maintenance and enhancement of HCVs are described in 5.2.1. and Table 49. Project activities will focus on the protection of intact forest and measures targeted at reducing illegal and unsustainable hunting. Measures will also include restoration of degraded areas and reducing illegal and unsustainable timber extraction and unsustainable and/or illegal hunting in the wider Project Zone. Measures will also include mitigating any potential conflict between local communities and crop-raiding orangutan.

5.2.3 Net Positive Biodiversity Impacts (CCB, B2.2, GL1.4)

The project is anticipated to provide net positive benefits to all biodiversity HCVs and to all key/trigger species present. Anticipated project impacts against each of these criteria are shown in Table 49.

5.2.4 High Conservation Values Protected (CCB, B2.4)

As stated above (5.2.2.), no actions taken during the project will negatively affect HCVs in the project area, whereas all project activities are designed to enhance HCV values and to protect the population of key and trigger species present.

5.2.5 Species Used (VCS, 3.19; CCB, B2.5, B2.6)

Tree species anticipated to be used in reforestation and enrichment planting efforts are listed below in Table 51. All species are native to peat swamp forest in West Kalimantan and seeds/seedlings will be collected locally.

Table 51. Tree species anticipated to be used in reforestation and enrichment planting

Local name	Scientific name	Intervention
Gelam	Melaleuca cajuput	Reforestation

Local name	Scientific name	Intervention
Jelutung	Dyera polyphylla	Reforestation
Perepat darat	Combretocarpus rotundatus	Reforestation
Kandis hutan	Garcinia parvifolia	Reforestation
Medang perawas	Litsea elliptica	Reforestation
Ubah tembaga / Ki tembaga	Syzygium macrophillum	Reforestation
Gelam tikus/Meranti putih	Parashorea stellata	Reforestation
Terentang	Campnosperma coriaceum	Reforestation
Mengkajang/Pasang Kayang	Quercus pseudomullucca	Reforestation
Garung	Endospermum sp.	Reforestation
Mang batu	Alstonia spectabilis	Reforestation
Meranti batu	Shorea dasyphylla	Reforestation
Putat	Barringtonia acutangulata	Reforestation
Ubar merah/Kelat	Eugenia koordersiana	Reforestation
Medang lendir	Litsea sp.	Reforestation
Meranti bunga	Shorea parvifolia Dyer.	Reforestation
Manggis hutan	Diospyros malabarica	Reforestation
Kandis gelugur	Garcinia macrophylla	Reforestation
Medang keladi	Litsea brachystachya	Reforestation
Asam hutan/Membacang	Mangifera foetida Lour	Reforestation
Garung	Endospermum diadenum	Reforestation
Medang peregam	Cryptocarya palembanica	Reforestation
Meranti belangiran/Belangeran	Shorea balangeran	Reforestation
Mata nanar/Mata Kucing	Hopea sangal Korth	Reforestation
Simpur/Geriga	Dillenia borneensis Hoogl.	Reforestation
Kedondong Butong	Litsea cordata	Reforestation

Local name	Scientific name	Intervention
Laban	Vitex pubescens	Reforestation
Nuclea sp	Nauclea sp.	Reforestation
Selumar	Jackiopsis ornata	Reforestation
Pulai	Alstonia spatulata	Reforestation
Jihing	Dillenia exelsa	Reforestation
Mentangur/Bintangur	Calophyllum inophyllum	Enrichment planting
Nyatoh kelincir	Palaquium dasyphyllum	Enrichment planting
Mempening	Palaquium obovatum	Enrichment planting
Resak	Vatica spp.	Enrichment planting
Ramin biawak/Ramin batu	Gonystylus macrophyllus	Enrichment planting
Mentibu	Dactylocladus stenostachys	Enrichment planting
Menjalin	Xanthophyllum sp.	Enrichment planting
Menggeres/Menggilas/Benggaris	Koompassia malaccensis	Enrichment planting
Pasir-pasir	Drypetes sp.	Enrichment planting
Nyatoh ketio	Ganua motleyana	Enrichment planting
Nyatoh jangkar	Palaquium xantochymum	Enrichment planting
Nyatoh duduk	Ganua spp.	Enrichment planting
Ramin kawan/Ramin engket	Gonystylus velutinus	Enrichment planting
Meranti merah	Shorea acuminata Dyer	Enrichment planting
Nyatoh	Palaquium pseudocuneteum	Enrichment planting
Pelawan	Tristania spp.	Enrichment planting
Mempisang	Mezzettia herveyana	Enrichment planting
Rengas manuk/Rengas burung	Gluta wallichii	Enrichment planting
Keranji	Dialium dinklagei Harms	Enrichment planting

5.2.6 Invasive Species (VCS, 3.19; CCB, B2.5)

Only one species, *Calliandra calothyrsus,* is considered to be a potential problem. This South American species is widely planted for animal fodder in Indonesia and considered mildly invasive. It is found in the Project Zone and while active efforts to eradicate this species will not take place, the project will not plant any individuals of this species as part of its agroforestry and conservation agriculture programmes.

5.2.7 GMO Exclusion (CCB, B2.7)

No GMOs will be used in the project.

5.2.8 Inputs Justification (VCS, 3.19; CCB, B2.8)

The use of chemical fertilizers, pesticides and control agents is not anticipated in the project.

5.2.9 Waste Products (VCS, 3.19; CCB, B2.9)

The Mayas Project adopts the principles of Reduce, Reuse and Recycle. Organic waste will be separated and composted through village composting initiatives or disposed of through burial. Inorganic waste will be separated into recyclable components – which will enter into village- and local- government led recycling initiatives. Residual inorganic waste will be removed from the site and disposed of through government-run waste disposal facilities in Ketapang.

5.3 Offsite Biodiversity Impacts

5.3.1 Negative Offsite Biodiversity Impacts (CCB, B3.1) and Mitigation Measures (CCB, B3.2)

As noted above (5.2.2, 5.2.4), all project activities are designed to deliver positive biodiversity impacts, as such, none are anticipated to lead to negative impacts, either on site or off and therefore no mitigation measures are likely going to be needed. Increased protection of forest within the Project Area could potentially lead to displacement of activities offsite (leakage), however this risk is considered low; in part because the extent of HCV forest around the project area is limited, but mainly because the project is able to identify the participants of illegal logging and hunting, and this group is specifically targeted for support in developing sustainable livelihoods, rather than simply displacing their activity elsewhere.

5.3.2 Net Offsite Biodiversity Benefits (VCS, 3.19; CCB, B3.3)

As discussed in 5.3.1, offsite negative effects on biodiversity are anticipated to be extremely low, or non-existent. In contrast, positive biodiversity benefits within the Project Area and Project Zone

are anticipated to be highly significant. Such benefits are one of the key overarching objectives of the project.

5.4 Biodiversity Impact Monitoring

5.4.1 Biodiversity Monitoring Plan (CCB, B4.1, B4.2, GL1.4, GL3.4)

Monitoring criteria for each biodiversity value, including HCVs and trigger species, are shown in Table 49 (monitoring method by HCV value/key species) and Table 50 (by method).

Biodiversity monitoring will focus on the Project Zone's HCV areas and key species. Monitoring will be carried out using a variety of field survey techniques, as shown in Table 50. These include camera trapping, orangutan nest surveys, local community interviews to assess hunting levels and threats and SMART patrolling. These methods are designed to both collect data regarding the key habitats and species as listed in Table 49, but also to collect data across a much wider range of species. Rigorous data analysis will then determine whether the Mayas Project has achieved its objectives of net positive biodiversity benefits.

Methods to be employed include:

- Trained and dedicated survey teams for each survey protocol.
- Standardized field survey methods.
- Interview-based survey methods to complement field surveys.
- Baseline data at each monitoring site, including permanent plots and survey transects.
- Standardized data analysis and reporting methods for each survey protocol.

In addition to on-the-ground surveys, data will also be collected through secondary sources (e.g., GIS and remote sensing data, third-party studies). Where specialist surveys are required for a particular species, the Mayas Project will seek to work in collaboration with outside experts of other partners to design and implement such work.

Biodiversity monitoring will also include aspects relating to climate change adaptation, including monitoring the protection and restoration of the peat watershed system, forest cover, fire, and reforestation efforts with native ecologically adapted species.

5.4.2 Biodiversity Monitoring Plan Dissemination (CCB, B4.3)

Biodiversity monitoring plans will be disseminated along with other information regarding the project, as given above in Sections 2.3.1-5.

5.5 Optional Criterion: Exceptional Biodiversity Benefits

5.5.1 High Biodiversity Conservation Priority Status (CCB, GL3.1)

The project seeks to be validated to the Gold Level for exceptional biodiversity benefits as it fulfils criteria for both vulnerability and irreplaceability.

The project area fulfils vulnerability criterion with the presence of at least 3 Critically Endangered species and 5 Endangered species known to occur within the Project Area, and more likely to be discovered (see list within Section 2.1.7 above).

The project area fulfils the irreplaceability criterion as it contains between 1.5 and 2.3% of the Bornean orangutan population. This population is resident. Given the scarcity of intact peat-swamp forest in this region, we suspect the 1% threshold for irreplaceability is met by a number of other endemic species but we do not yet have the data to support this.

5.5.2 Trigger Species Population Trends (CCB, GL3.2, GL3.3)

Trigger species (those listed as Critically Endangered, or Endangered) are shown in Appendix 10, including population trends (where known) and anticipated with- and without-project scenarios. As more trigger species are identified at the site, they will be incorporated to this list.

APPENDIX 1: LIST OF TREE SPECIES IDENTIFIED DURING FOREST BIOMASS SURVEY IN THE PERMANENT SAMPLING PLOT IN 2020

No	Local name	Scientific name	Family
1	Belimo	Madhuca spp	Sapotaceae
2	Bintan	Licania splenden	Rosaceae
3	Belik	unidentified 1	-
4	Gelam	Melaleuca cajuput	Myrtaceae
5	Jelutung	Dyera polyphylla	Apocynaceae
6	Medang kunyit	Cryptocarya impressa	Lauraceae
7	Mentapai/Mentualang	Alangium sp. Lam., nom. Cons.	Cornaceae
8	Jangkang	Hopea beccariana Burck	Dipterocarpaceae
9	Medang	Litsea curtisii	Lauraceae
10	Kumpang/Mendarahan	Gymnacranthera farquhariana	Myristicaceae
11	Gerunggang	Cratoxylum arborescens	Hypericaceae
12	Nyatoh beras/Nyatoh padi	Palaquium gutta Baill.	Sapotaceae
13	Jambu-jambu	Syzygium aqueum (Burm.f.) Alston	Myrtaceae
14	Kayu malam / Kayu Arang	Diospyros oblonga Wall	Ebenaceae
15	Kayu lilin	Aglaia leptantha Miq.	Meliaceae
16	Mentangur jangkar/M. labu	Calophyllum soulattri	Calophyllaceae
17	Punak	Tetramerista glabra Miq.	Theaceae
18	Ramin	Gonystylus bancanus Kurs.	Thymelaeaceae
19	Medang nangka	Pouteria malaccensis	Sapotaceae

No	Local name	Scientific name	Family
20	Perepat darat	Combretocarpus rotundatus (Miq) Danser	Anisophylleceae
21	Asam-asam	Dacryodes sp.	Burseraceae
22	Tiang bendera	Unidentified 2	-
23	Mentangur/Bintangur	Calophyllum inophyllum L.	Clusiaceae
24	Kopi-kopi	Urophyllum macrophyllum (Blume)	Rubiaceae
25	Pandan	Pandanus sp.	Pandanaceae
26	Nyatoh kelincir	Palaquium dasyphyllum Pierre.	Sapotaceae
27	Mempening	Palaquium obovatum	Sapotaceae
28	Kandis hutan	Garcinia parvifolia	Clusiaceae
29	Medang perawas	Litsea elliptica Blume	Lauraceae
30	unidentified 1	unidentified 3	-
31	Jantak	Willughbeia sp.	Apocynaceae
32	Resak	Vatica spp.	Dipterocarpaceae
33	Ubah tembaga / Ki tembaga	Syzygium macrophillum	Myrtaceae
34	Ramin biawak/Ramin batu	Gonystylus macrophyllus A. Shaw	Thymelaeaceae
35	Mentibu	Dactylocladus stenostachys	Crypteroniaceae
36	Gelam tikus/Meranti putih	Parashorea stellata Kurz	Dipterocarpaceae
37	Terentang	Campnosperma coriaceum (Jack.)	Anacardiaceae
38	Mengkajang/Pasang Kayang	Quercus pseudomullucca Blume	Fagaceae
39	Garung	Endospermum sp.	Euphorbiaceae
40	Mang batu	Alstonia spectabilis R.Br.	Apocynaceae
41	Bakung	Crynum sp.	Amaryllidaceae
42	Akar kelait	Spatholobus sp.	Fabaceae
43	Meranti batu	Shorea dasyphylla	Dipterocarpaceae
44	Keminting	unidentified 4	

No	Local name	Scientific name	Family
45	Menjalin	Xanthophyllum sp. Roxb., nom.cons.	Polygalaceae
46	Putat	Barringtonia acutangulata	Lecythidaceae
47	Pandol	Parartocarpus sp.	Moraceae
48	Belian/Tebelian/Ulin	Eusideroxylon zwageri	Lauraceae
49	Ubar merah/Kelat	Eugenia koordersiana King	Myrtaceae
50	Kempas/Menggeres	Koompassia malaccensis Maing.	Fabaceae
51	Jihing/Dahu	Dracontomelon spp.	Anacardiaceae
52	Medang lendir	Litsea sp.	Lauraceae
53	Pasir-pasir	Drypetes sp.	Malpighiales
54	Nyatoh ketio	Ganua motleyana Pierre.	Sapotaceae
55	Nyatoh jangkar	Palaquium xantochymum Pierre va	Sapotaceae
56	Nyatoh duduk	Ganua spp.	Sapotaceae
57	Meranti bunga	Shorea parvifolia Dyer.	Dipterocarpaceae
58	Manggis hutan	Diospyros malabarica (Desr.)	Ebenaceae
59	Pangal	Baccaurea bracteata	Phyllanthaceae
60	Ramin kawan/Ramin engket	Gonystylus velutinus A. Shaw	Thymelaeaceae
61	Kandis gelugur	Garcinia macrophylla	Clusiaceae
62	Meranti merah	Shorea acuminata Dyer	Dipterocarpaceae
63	Make	unidentified 5	-
64	Nyatoh	Palaquium pseudocuneteum HJL.	Sapotaceae
65	Medang keladi	Litsea brachystachya	Lauraceae
66	Rotan jelundung	Calamus sp.	Arecaceae
67	Asam hutan/Membacang	Mangifera foetida Lour	Anacardiaceae
68	Nepephentes	Nephentes sp.	Nepenthaceae
69	Pelawan	Tristania spp.	Myrtaceae

No	Local name	Scientific name	Family
70	Sakubing/Buluan	Harpullia arborea Radlk	Sapindaceae
71	Ketimunan	Timonius borneensis Val.	Rubiaceae
72	Mensira	Ilex cymosa	Aquifoliaceae
73	Erisibeae	unidentified 6	-
74	Kapas-kapas	Camptostemon philippinensis	Malvaceae
75	Belangeran	Shorea balangeran	Dipterocarpaceae
76	Mata nanar/Mata Kucing	Hopea sangal Korth	Dipterocarpaceae
77	Kayu cina	Podocarpus motleyi Dumm	Podocarpaceae
78	Mempisang	Mezzettia herveyana	Annonaceae
79	Garung	Endospermum diadenum (Miq.) Airy	Lauraceae
80	Medang peregam	Cryptocarya palembanica	Lauraceae
81	Mentepung/Setepung	Veronina arborea Ham.	Asteraceae
82	unidentified 2	unidentified 7	-
83	Selingsing	Pandanus sp.	Pandanaceae
84	Rengas manuk/R. burung	Gluta wallichii (Hook. F.) Ding Hou	Anacardiaceae
85	Simpur/Geriga	Dillenia borneensis Hoogl.	Dilleniaceae
86	Medang kuning/M. Batu	Dehaasia lancifolia	Lauraceae
87	Pakis	Cycas sp.	Cycadaceae
88	Kedondong Butong	Litsea cordata	Lauraceae
89	Medang putih /M. Kunyit	Actinodaphne glomerata	Lauraceae
90	Plesari	unidentified 8	
91	Ilas	Parastemon sp. A. DC.	Chrysobalanaceae
92	Keranji	Dialium dinklagei Harms	Fabaceae
93	Mangga hutan	Mangifera indica	Anacardiaceae
94	Bekalal	Ficus vasculasa Wall	Moraceae

No	Local name	Scientific name	Family
95	Pragrea	Unidentified 9	-
96	Laban	Vitex pubescens	Verbenaceae
97	Nuclea sp	Nauclea sp.	Rubiaceae
98	Akar bejaka	Spatholobus littoralis Hassk	Fabaceae
99	Selumar	Jackiopsis ornata (Wallich) Ridsd.	Rubiaceae
100	Topus	unidentified 10	-
101	Ubah Jambu	Cinnamomum porrectum	Lauraceae
102	Pulai	Alstonia spatulata	Apocynaceae
103	Paku-pakuan	unidentified 11	-
104	Jihing	Dillenia exelsa	Dilleniaceae

APPENDIX 2: PROJECT ACTIVITIES & THEORY OF CHANGE TABLE

Outcomes	Objectives	Action plan	Outputs/Sub-outcomes	Key Performance Indicators
MAIN GOAL: To establish a long-term sustainable landscape management model that ensures forest, biodiversity and climate are protected and appropriately managed through carbon finance, while silvicultural systems in already cleared areas of the concession and other livelihoods strategies provide local communities with meaningful opportunities to improve their wellbeing.				
Goal 1: Design and implement a forestry management scheme that protects forest and biodiversity				
Forest and biodiversity are maintained in MPK concession				Forest canopy cover (%) and extent (ha)
	Objective 1: Reduce threats to biodiversity	Conduct education and socialisation at village levels and establish change of behaviour strategies to reduce illegal logging and hunting; Engage community participation through Conservation in Religion, ethnical approaches, Peraturan desa and other approaches;	Higher awareness of ecosystem services and renewed commitment to protect them	# households reporting higher awareness of ecosystem services and renewed commitment to protect them

Outcomes	Objectives	Action plan	Outputs/Sub-outcomes	Key Performance Indicators
		Establish forest protection patrols and collect and report on illegal activities, actors, routes, access;	Illegal logging, encroachment, hunting activities, and all anthropogenic aspects that negatively impact biodiversity are identified, monitored and disinsentivised through field presence. Data are generated to establish strategies for reducing and mitigating the incidence of illegal activities (hunting, logging, encroachment) in the forest; Hunting/logging/encroachment incidents are reduced.	# Periodic updates in the SMART database system; # illegal incidences recorded
		Conduct assessments and investigations into illegal logging and illegal hunting practices with a focus on large traders	Intelligence data on main actors in illegal activities obtained and shared with relevant authorities; reporting mechanism to authorities is established; Law enforcement operations have a deterrent effect on reducing illegal activities	# of recorded cases per year; # of cases followed up on with authorities; Reduction in illegal logging loss recorded during biennial stump surveys and PRA
	Objective 2: Develop and implement an	Prevention: Develop an IFM system and a Fire Prevention Plan;	Integrative management system of fire prevention is established involving local	Planning and monitoring and evaluation documents

Outcomes	Objectives	Action plan	Outputs/Sub-outcomes	Key Performance Indicators
	Integrated Fire Management (IFM) strategy	engagement with local communities; engagement with neighboring companies	communities and neighboring companies; fire threats to the Sentap Kancang forest are reduced.	
		Detection and suppression: Establish forest fire patrols; Conduct training and capacity building for staff in forest fire management; Develop systems for rapid fire detection and weather prediction; Develop SOPs for detection, suppression and recovery	Reduced forest fires in the concession and sorroundings; Increased rapid detection rates for fires and hotspots; fire personnel trained in best suppression techniques	# Forest fire hotspots; # ha of forest loss in fires
		Promote protection of peatlands and good forestry management practices at the government level as one way to combat climate change	Increased awareness amongst governments and local communities for the protection of peatlands and the fire risk; include fire prevention and mitigation strategies as part of the village land use and management plans (RPJMdes);	# Meetings, awareness and education materials; # RPJMDes; # Document PerDes

Outcomes	Objectives	Action plan	Outputs/Sub-outcomes	Key Performance Indicators
			Development of PerDes for fire prevention strategies	
Landscape conservation (forest, peat and biodiversity) and environmental management are improved				# ha of drained peatland with restored hydrology; # ha of non-forest land reforested # ha of intact undrained peat forest protected; all HCV1-3 values maintained or enhanced
	Objective 1: Enhance the protection and restoration of peatlands	Hydrology assessments: Conduct assessment for delineations of water table; Establish buffer zones	Data available to target areas for peat restoration	Maps and images
		Identification and design of strategies. Re-wetting and water management by canal blocking and other water management strategies; Conduct mapping of canals;	The water table rises and carbon emissions are reduced	Design documents and maps; # ha of drained peatland restored; # average water table depth in formerly drained areas restored to average levels in undrained areas

Outcomes	Objectives	Action plan	Outputs/Sub-outcomes	Key Performance Indicators
		Construction and maintenance of hydrology infrastructures		
		Restoration/revegetation: Mapping and identification of suitable areas (burnt areas); Forest rehabilitation: nursery planting; Reforestation	Increased forest cover and reduced carbon emissions; Planning of restoration to increase suitability and success rate of planting process; Biodiversity forest value is increased; orangutan food availability is increased;	# of trees and hectares replanted; Maps of forest cover; # survival rate of plants; carbon data
		Identify all anthropogenic aspects that require drainage and develop strategies for Preventing new canals and infrastructures that damage the peat	The awareness and knowledge about the impact of canals and human activities on the drainage of peat and on fires is increased amongst community members and gov bodies	# Meeting attendance; seminars and workshops
		Buffer zone management: mapping, monitoring, zonation, mitigation	Buffer areas are managed and protected	Maps of buffer areas; designed plan for conservation of buffer areas
		Routine measurement and spatial/temporal	Land management and and water use ; Climatic and	A data sheet and electronic file are

Outcomes	Objectives	Action plan	Outputs/Sub-outcomes	Key Performance Indicators
		mapping of hydrological variables of peatlands in concessions	hydrological data are available for land management and water use	available, the results of routine measurements of climate and hydrological variables
	Objective 2: Establish a Multisilviculture system in degraded and cleared areas	Field and desk-based research to prioritise well adapted timber species; establish nurseries, plant seedlings.	MSS areas increased forest cover and reduce carbon emissions; MSS areas have economic value for local communities	Seedlings planted; Data on Survival rate of seedlings; ha reforested
Goal 2: Improve local wellbeing while reducing the dependence on natural resources of communities around Project Mayas, engaging and supporting communities through participatory methods and radical listening approaches				
The stewardship of MPK forests is ensured by supporting communities to strengthen governance and resolve conflict.				Forest canopy cover (%) and extent (ha)
	Objective 1. Advocate and implement strategies to mitigate tenurial conflict within the MPK area	Conduct conflict management and resolution strategies; establish grievance mechanisms; conduct training and capacity building in conflict resolution processes	Rights of use and management are clear; All conflicts are mitigated	Meeting minutes, attendance lists, # agreements with local communities

Outcomes	Objectives	Action plan	Outputs/Sub-outcomes	Key Performance Indicators
		Establish partnerships with communities and other stakeholders	A landscape-based green growth partnership established;	MoU's with villages with tenurial conflict with MPK
	Objective 2. Conduct village management planning through participatory approaches	Participatory mapping and land suitability analysis; Development of RPJMDes	Comprehensive, gender disaggregated village profiles completed; Actions are developed targeting the most disadvanged people.	PM Documents; RPJMDes documents
		Obtain approval from communities through FPIC methods; Develop Grievance redress mechanisms	All activities and actions taken at the village level are resulted from participatory processes; The communities agree with planned activities; Collaborative partneship agreements are signed by all villages	MoU's and Grievance forms
Monetary and non-monetary aspects of wellbeing improve as a result of project activities				# households reporting higher wellbeing as a result of project activities;
	Objective 1: Engage communities in improved	Conduct socialisation and training/capacity building on agricultural techniques	Increased capacity of local communities; increased productivity; land use efficiency	Data on land productivity; land use maps; # people reporting less of a need to clear

Outcomes	Objectives	Action plan	Outputs/Sub-outcomes	Key Performance Indicators
	agricultural practices, agro-forestry, organic farming and paludiculture programmes	that increase yields while preserving peatland	is increased, pressure on forested land decreases,	additional land, # people reporting benefits from agricultural interventions
		Establish agroforestry / paludiculture systems for the economic benefit of local communities: Establish nurseries; Select suitable sites; conduct training; establish pilot ptojects; planting and monitoring	Increased local benefits and economic incentives for local communities through agriculture; new technologies and better practices for agriculture using non-burning techniques are established, reduced areas of non-productive land;	# of trees planted, # trees surviving year after year; # hectares non-productive land converted to productive
	Objective 2: Develop sustainable income streams through appropriate assessments, design, support, capacity building and ongoing mentoring	Conduct participatory market research; Business strategies analysis; Build business/action plans;	High potential sustainable business strategies have been identified, market barriers and potential solutions to barriers have been discussed and agreed, action plans have been finalised	# high potential business opportunities identified, # action plans discussed and agreed.
		Develop Sustainable livelihoods and business approaches; Establish business entities where appropriate (cooperatives, BUMDes, etc.); establish	Models of sustainable livelihoods developed and piloted in selected villages (communities have received targeted training relevant to overcoming identified barriers,	# sustainable business opportunities piloted. # business entities established where appropriate; # households benefiting

Outcomes	Objectives	Action plan	Outputs/Sub-outcomes	Key Performance Indicators
		pilot projects, Conduct training and capacity building;	communities receive ongoing mentoring).	from sustainable livelihoods initiatives
	Objective 3: Improve access to education, capacity building and skills development	Support disadvantaged children to become computer literate and accessing formal education, support women to improve literacy and financial management skills, support farmers to develop new farming techniques.	Local community members are able to take advantage of different / additional opportunities	# children accessing education as a result of the project; # women improving literacy; # farmers practicing new/additional/improved techniques

APPENDIX 3: PROJECT RISKS TABLE

	Identified risk(s)	Potential impact of risk on stakeholders, ecosystem health, and biodiversity	Mitigation or preventative measure(s) taken
Natural and human induced risks to stakeholders' wellbeing	See Section 2.3.7 "Community Costs, Risks, and Benefits" and Section 4.5.3 "Community Participation Risks" for a detailed consideration of the risks to stakeholders associated with participation in the Maysa Project and their mitigation.	See Section 2.3.7 "Community Costs, Risks, and Benefits" and Section 4.5.3 "Community Participation Risks" for a detailed consideration of the risks to stakeholders associated with participation in the Maysa Project and their mitigation.	See Section 2.3.7 "Community Costs, Risks, and Benefits" and Section 4.5.3 "Community Participation Risks" for a detailed consideration of the risks to stakeholders associated with participation in the Maysa Project and their mitigation.
Risks to stakeholder participation	As above	As above	As above
Working conditions	No risk identified, but the project will remain vigilant to cases occurring in line with established employment and operational procedures.	N/A	See Section 2.5.2 "Relevant Laws and Regulations Related to Worker's Rights" and Section 2.3.19 "Occupational Safety Assessment" for further information.

	Identified risk(s)	Potential impact of risk on stakeholders, ecosystem health, and biodiversity	Mitigation or preventative measure(s) taken
Safety of women and girls	No risk identified, but the project will remain vigilant to cases occurring in line with established employment and operational procedures.	N/A	See above Sections, plus Section 2.3.14 “Anti-Discrimination Assurance” and Section 4.5.5 “Net Impacts on Women”
Safety of minority and marginalized groups, including children	No risk identified, but the project will remain vigilant to cases occurring in line with established employment and operational procedures.	N/A	See above Sections, plus Section 4.5.4 “Marginalized and/or Vulnerable Community Groups”
Pollutants (air, noise, discharges to water, generation of hazardous materials and chemical pesticides and fertilizers)	No risk identified.	N/A	The project has in place rigorous Health, Safety, Security and Environment (HSSE) assessment and monitoring procedures. See Sections 2.3.19, 5.2.8 & 5.2.9.
Discrimination	No risk identified, but the project will remain vigilant to cases occurring in line with established employment and operational procedures.	N/A	See Section 2.3.14 “Anti-Discrimination Assurance”, Section 2.5.2 “Relevant Laws and Regulations Related to Worker’s Rights” for further information.

	Identified risk(s)	Potential impact of risk on stakeholders, ecosystem health, and biodiversity	Mitigation or preventative measure(s) taken
Sexual harassment	No risk identified, but the project will remain vigilant to cases occurring in line with established employment and operational procedures.	N/A	See Section 2.3.14 “Anti-Discrimination Assurance”, Section 2.5.2 “Relevant Laws and Regulations Related to Worker’s Rights” for further information.
Equal pay for equal work	No risk identified, but the project will remain vigilant to cases occurring in line with established employment and operational procedures.	N/A	See Section 2.3.14 “Anti-Discrimination Assurance”, Section 2.5.2 “Relevant Laws and Regulations Related to Worker’s Rights” for further information.
Gender equity in labour and work	No risk identified, but the project will remain vigilant to cases occurring in line with established employment and operational procedures.	N/A	See Section 2.3.14 “Anti-Discrimination Assurance”, Section 2.5.2 “Relevant Laws and Regulations Related to Worker’s Rights” for further information.
Forced labour	No risk identified, but the project will remain vigilant to cases	N/A	The Mayas Project operates entirely in

	Identified risk(s)	Potential impact of risk on stakeholders, ecosystem health, and biodiversity	Mitigation or preventative measure(s) taken
	occurring in line with established employment and operational procedures.		compliance with Indonesian Employment Law and laws regarding Forced Labour, Child Labour and Human Trafficking.
Child labour	No risk identified, but the project will remain vigilant to cases occurring in line with established employment and operational procedures.	N/A	The Mayas Project operates entirely in compliance with Indonesian Employment Law and laws regarding Forced Labour, Child Labour and Human Trafficking.
Human trafficking	No risk identified, but the project will remain vigilant to cases occurring in line with established employment and operational procedures.	N/A	The Mayas Project operates entirely in compliance with Indonesian Employment Law and laws regarding Forced Labour, Child Labour and Human Trafficking.
Recognition of, respect of, and promotion of the rights to IPs, LCs and customary rights holders	No risk identified.	N/A	The Mayas project will actively recognize and respect rights to IPs, LCs and customary rights holders if and when such

	Identified risk(s)	Potential impact of risk on stakeholders, ecosystem health, and biodiversity	Mitigation or preventative measure(s) taken
			cases arise. Currently none are anticipated.
Preserving and protecting cultural heritage	No risk identified.	N/A	The Mayas project actively seeks to preserve and protect cultural heritage. See Section 2.5.4 “Indigenous Peoples and Cultural Heritage” for more information
Protecting and preserving property rights, customary rights, or protecting legal or customary tenure/access rights to territories, property, and resources, including collective and/or conflicting rights	See Section 2.5.5 “Statutory and Customary Property Rights” for a full assessment of the associated risks and mitigations associated with access and property rights.	See Section 2.5.5 “Statutory and Customary Property Rights”	See Section 2.5.5 “Statutory and Customary Property Rights”
Impacts on biodiversity and ecosystems	No risk identified. This is one of the principal risks identified under the baseline scenario (see Section 5.1.3 “Without-project Scenario: Biodiversity”) but it is not considered a risk under the project scenario.	See Section 5.1.3 “Without-project Scenario: Biodiversity” and Section 5.2.2 and 5.3.1 concerning negative Offsite biodiversity impacts and mitigation measures	This risk, under the baseline scenario, is one of key risks mitigated by the Mayas project. For more information see Section 2.1.17 “Project Activities

	Identified risk(s)	Potential impact of risk on stakeholders, ecosystem health, and biodiversity	Mitigation or preventative measure(s) taken
			and Theory of Change" and Section 5.
Soil degradation and soil erosion	No risk identified. Preventing peat drainage and erosion, with corresponding changes in the water table, are a principal risk identified under the baseline scenario (See Sections 3.1.4 & 3.1.5 Baseline and Additionality) but are not considered a risk under the project scenario	See Section 2.2 "Without-project Land Use Scenario and Additionality"	It is one of the principal objectives of the Mayas project to protect the integrity of the peatland ecosystem and associated hydrology (see Section 2.1.17 "Project Activities and Theory of Change")
Water consumption and stress	No risk identified. Preventing peat drainage and erosion, with corresponding changes in the water table, are a principal risk identified under the baseline scenario (See Sections 3.1.4 & 3.1.5 Baseline and Additionality) but are not considered a risk under the project scenario	See Section 2.2 "Without-project Land Use Scenario and Additionality"	It is one of the principal objectives of the Mayas project to protect the integrity of the peatland ecosystem and associated hydrology (see Section 2.1.17 "Project Activities and Theory of Change")
Habitats (and areas needed for habitat connectivity) for rare, threatened, and endangered species	No risk identified. This is one of the principal risks identified under the baseline scenario (see Section 5.1.3 "Without-project Scenario: Biodiversity") but it is	See Section 5.1.3 "Without-project Scenario: Biodiversity" and Section 5.2.2 and 5.3.1 concerning negative Offsite biodiversity impacts and mitigation measures	This risk, under the baseline scenario, is one of key risks mitigated by the Mayas project. For more information see Section

	Identified risk(s)	Potential impact of risk on stakeholders, ecosystem health, and biodiversity	Mitigation or preventative measure(s) taken
	not considered a risk under the project scenario.		2.1.17 “Project Activities and Theory of Change” and Section 5.
Areas needed for habitat connectivity	No risk identified. This is one of the principal risks identified under the baseline scenario (see Section 5.1.3 “Without-project Scenario: Biodiversity”) but it is not considered a risk under the project scenario.	See Section 5.1.3 “Without-project Scenario: Biodiversity” and Section 5.2.2 and 5.3.1 concerning negative Offsite biodiversity impacts and mitigation measures	This risk, under the baseline scenario, is one of key risks mitigated by the Mayas project. For more information see Section 2.1.17 “Project Activities and Theory of Change” and Section 5.
Invasive species	Minor risk identified from community use of *Calliandra calothyrsus* as animal fodder in the Project Zone (see Section 5.2.6 “Invasive Species”).	Known invasive species that is already widely established in Indonesia.	The project will not plant any individuals of this species as part of its agroforestry and conservation agriculture programmes (see Section 5.2.6 for more information).
Ecosystem conversion	No risk identified. This is one of the principal risks identified under the baseline scenario (see Section 5.1.3 “Without-project Scenario: Biodiversity”) but it is not considered a risk under the project scenario.	See Section 5.1.3 “Without-project Scenario: Biodiversity” and Section 5.2.2 and 5.3.1 concerning negative Offsite biodiversity impacts and mitigation measures	This risk, under the baseline scenario, is one of key risks mitigated by the Mayas project. For more information see Section 2.1.17 “Project Activities

	Identified risk(s)	Potential impact of risk on stakeholders, ecosystem health, and biodiversity	Mitigation or preventative measure(s) taken
			and Theory of Change" and Section 5.

APPENDIX 4: LIST OF CONSULTATION MEETINGS

#	Month	Day	Location	Meeting topic	#P	Details on activity
1	Oct-16		Jakarta	Meeting between YIARI and BRG (Peat Restoration Agency).		Discussion on peat degradation and risks to biodiversity in the project area
2	Dec-16	9	Pontianak	Meeting between YIARI, MPK, Provincial Forestry Department (Dinas Kehutanan) and BRG (Peat Restoration Agency).	12	Discussion on peat degradation and risks to biodiversity in the project area

#	Month	Day	Location	Meeting topic	#P	Details on activity
3	Dec-16-Mar-17		Online meetings	Various meetings with local and international NGO's to consolidate strategy and join efforts to protect Sentap Kancang Forest		
4	Mar-17		Project Zone	GAKKUM (Law Enforcement Agency of MoEF) conducts a field investigation in MPK area. YIARI provides supporting documentation and evidence.		

#	Month	Day	Location	Meeting topic	#P	Details on activity
5	Aug-17		Project Zone	YIARI conducts a Rapid Social Assessment in 12 villages surrounding MPK concession to understand perception of local communities		
6	Nov-Dec 2017		Project Area	YIARI undertakes biodiversity and peat depth assessment within MPK concession with agreement of MPK		
7	Nov-17	13	Sungai Putri	Participatory mapping workshop by YIARI	23	YIARI held a workshop to explain the main principles of participatory mapping to community representatives
8		14	Sungai Putri	Training on mapping and GPS point collection by YIARI to communities	15	YIARI trained communities how to use GPS as a tool to collect data for Participatory Mapping

#	Month	Day	Location	Meeting topic	#P	Details on activity
9	Dec-17	15,16,17,18	Sungai Putri	Taking coordinates of participatory mapping	57	Collecting landuse, infrastructures and landmarks point inside administrative area of Sungai Putri
10	Jan-18	5	Sungai Putri	Participatory Land Use Planning meetings by YIARI	23	Identification and solutions to landuse problems
11					22	Drafting Village Spatial Plan to define cultivation areas and protected areas in the village
12		10	BAPPEDA office in Ketapang	Public consultation and land-use planning	73	Involving stakeholders in the preparation of village spatial plans in Sungai Putri Village
13		30.31	Ulak Medang	Participatory Land Use Planning meetings	66	Finalization of the Participatory Map in Sungai Putri Village
14			Ulak Medang	Assessment of Ulak Medang lake for ecotourism program with PT BGA and the Ulak Medang Village Administration	12	Survey of ecotourism locations at the lake in Ulak Medang

#	Month	Day	Location	Meeting topic	#P	Details on activity
15			Ulak Medang	Assessment of the Ulak Medang lake	3	Survey of tourist attractions that can be developed
16		19	Ulak Medang	Participatory mapping workshop by YIARI	55	YIARI held a workshop to explain the main principles of participatory mapping to community representatives
17		20	Ulak Medang	Training on the use of GPS for the Mapping Team	18	YIARI trained community representatives to use GPSs to support the participatory mapping process
18		21 - 23	Ulak Medang	Mapping data retrieval	15	GPS coordinates are mapped
19		31	Ulak Medang	Synchronization of village boundaries and data collection results	38	Administrative village boundaries and GPS coordinated mapped by village representatives are harmonised
20	Feb-18		Ulak Medang	Meetings and consultation for the elaboration of an Annual Work Plan with the Ulak Medang Village Government and communities	21	Annual workplans describe the development goals and objectives of the village as a whole.

#	Month	Day	Location	Meeting topic	#P	Details on activity
21	Apr-18	29	YIARI – Sir Michael Uren Learning Centre (Sungai Awan Kiri)	Dissemination of Prevention and Impact of Forest and Land Fires	34	Multi-stakeholder training and training of trainers on the impact of fires and how to prevent them
22	Aug-18	24-30	Sungai Awan Kanan	Agro-fisheries Training	20	Sustainable agriculture and fisheries training
23		19-21	Kuala Satong	Field training for local communities on mangrove management and crab fisheries in the Batau Ampar Village Forest and Mempawah Mangrove Center	7	Local community representatives are trained in mangrove management for sustainable fisheries and ecotourism
24	Sep-18	12-13	YIARI – Sir Michael Uren Learning Centre (Sungai Awan Kiri)	Accounting and Communication Training for local communities around the Sentap Kancang landscape	13	Participants are trained to manage and report on activity group finances and improve public speaking skills

#	Month	Day	Location	Meeting topic	#P	Details on activity
25	Dec-18		Pontianak	Multistakeholder discussion between PT.MPK, BKSDA, Dinas Kehutanan and YIARI		
26	Jan-19	16	Ulak Medang	FGD and consultations for eco-tourism project in Ulak Medang lake	8	Discussion on implementing a lake cleanup and on how to open access to the lake
27		19	Ulak Medang	FGD and consultations for eco-tourism project in Ulak Medang lake	7	Discussion on making proposals to BGA for lake cleaning and opening access to the lake
28	Feb-19	18 - 19	YIARI – Sir Michael Uren Learning Centre (Sungai Awan Kiri)	Food preparation for fisheries Training	10	Train participants to make fish feed with natural ingredients such as water hyacinth, palm fruit, etc.
29	Mar-19	13 - 15	Ulak Medang	Cleaning and creating access to Ulak Medang Lake	12	Open access to the lake
30					10	Open access to the lake
31					13	Lake cleanup

#	Month	Day	Location	Meeting topic	#P	Details on activity
32		28	Ulak Medang	Fisheries training	2	Technical guidance on using cages
33	Apr-19	1	Ulak Medang	Planting Program around Ulak Medang Lake with school children	24	Planting in two schools: SD Negeri 3 Muara Pawan and SMP Negeri 2 Muara Pawan
34		22	Muara Pawan	Discussions with Muara Pawan BKKBN regarding commodity development at Ulak Medang	5	Workplanning to encourage added value products in Ulak Medang
35	May-19	5	Muara Pawan	Signing of the Agreement on the Sharing of Community Group Facilitation Roles in Ulak Medang YIARI and BKKKBN Muara Pwan	5	Formalising the commitment to cooperate in supporting added value products in Ulak Medang
36		24	Ulak Medang	Socialization of Fisheries Group Formation	48	Socializing the formation of fishery groups in support of tourism programs at Lake Ulak Medang

#	Month	Day	Location	Meeting topic	#P	Details on activity
37		25	Ulak Medang	Explanation of Ulak Medang Lake Ecotourism Development Plan	8	Dissemination of the Ulak Medang Lake Tourism Development Plan to Ulak Medang Village Officials
38	Jul-19	15	Kuala Satong	Pokdarwis (community based eco-tourism group) management training coordination	3	Coordination of timeframes and other apsects of the mangrove tourism management training to Pokdarwis
39		29 - 31	Kuala Satong	Mangrove Tourism Management Training for Pokdarwis (community based tourism group)	16	Strengthening tour groups, identifying tourist attractions, explaining what makes a good tour guide, and putting together tour packages in mangrove tourism
40	Aug-19	22	Kuala Satong	Trial of the Kuala Satong tour package	14	Trial of tour packages that have been prepared

#	Month	Day	Location	Meeting topic	#P	Details on activity
41	Sep-19	21-22	Kuala Satong	Fishing Festival and Decorative Boat Race	120	This competition was held in collaboration with Pokdarwis, YIARI and the Regional Government in supporting the promotion of mangrove tourism in Kuala Satong
42	Oct-19	14	Ulak Medang	Delivery of new packaging for fisheries products to the fisheries Group	8	Delivery of packaging is done together with BKKBN
43		14	Muara Pawan, Sungai Awan Kiri	Organic Farming Training	40	The training took place at SMK N 1 Muara Pawan. The training materials are in the form of theory and practice of making compost, vegetable pesticides and liquid fertilizer
44		24	Sungai Awan Kiri	Participatory mapping Seminar	38	The seminar was conducted to provide community representatives with an understanding of the objectives of Participatory Mapping in Sungai Awan Kiri
45		26	Sungai Awan Kiri	Participatory Mapping Socialisation	28	

#	Month	Day	Location	Meeting topic	#P	Details on activity
46	Nov-19	19	YIARI – Sir Michael Uren Learning Centre (Sungai Awan Kiri)	Peat Management Seminar and Socialization	38	The socialization was carried out to provide understanding to the Regional Government, Villages and the Private sector regarding Peat Ecosystem Management. In addition, so that the issue of forest and land fires can become a major concern in Regional Planning
47		20	YIARI – Sir Michael Uren Learning Centre (Sungai Awan Kiri)	Peat Protection Education Training for Elementary School Teachers and Synchronization of Field School Modules	18	The training is carried out in the context of synchronization and mainstream methods of peat education into the curriculum in elementary schools

#	Month	Day	Location	Meeting topic	#P	Details on activity
48		20-21	YIARI – Sir Michael Uren Learning Centre (Sungai Awan Kiri)	Peat Discussion Infrastructure Development Training	35	The training focused on supporting Village Governments in understanding how to establish Peat rewetting Infrastructure (canal blocking and wells)
49	Dec-19	19	Sungai Awan Kiri	FGD Participatory land use planning	25	Involving community leaders in Sungai Awan Kiri Village, village officials and youth leaders. PLP was conducted to discuss the management of resources in Sungai Awan Kiri
50		20	Sungai Awan Kiri	FGD Participatory land use planning	22	
51	Jan-20	22	Sungai Awan Kiri	Coordinating the implementation of the F1 Embio, a natural, house-made, organic fertiliser and Organic (chemical free) Pesticides Training	3	Discussion of the timing and number of participants in the implementation of the F1 Embio-making training
52		30	Sungai Awan Kiri	Village Land use planning meeting	25	Discussing the Village Spatial Plan agreed at the village level

#	Month	Day	Location	Meeting topic	#P	Details on activity
53	Feb-20	3	Sungai Awan Kiri	Training on Making f1 Embio and Organic Pesticides	18	Train and practice making F1 Embio and plant-based pesticides
54		6	Sungai Awan Kiri	Review of PM Sungai Awan Kiri	15	Discussions to re-socialize the Village Spatial Plan that had been agreed previously, and synergized with the hamlet boundaries
55		13	Local Government – Bupati building	Providing PLTB material on the Socialization of the Self-sustainable Village Program Towards a Blue Sky	34	Collaboration with the TNI, Manggala Agni and BPBD in realizing a village free from forest and land fires through improved agricultural activities
56	Mar-20	2	Ketapang	Discussion on proposal development with BNI, FFI and Asana Nevada	3	In order to submit proposals for activities and physical procurement from the CSR programs of BNI and Asana Nevada, as well as activities from FFI

#	Month	Day	Location	Meeting topic	#P	Details on activity
57		7	Hotel Aston Ketapang	Pre-mediation meeting between MPK and Sungai Awan Kiri Village Dusun Pematang Merbau and Dusun Kalibaru		Mediation training aims to provide an understanding of the stages of the conflict mediation process between MPK and the Sukamaju Community. These were given to Kalibaru Hamlet and Pematang Merbau Hamlet
58		10	Muara Pawan district office	Muara Pawan District Participatory Mapping Seminar	18	The seminar was held at the sub-district level, to arrange a timeline for PM activities in 4 villages in Muara Pawan
59		10	Hotel Aston Ketapang	Pre-mediation meeting between MPK and Sungai Awan Kiri Village	28	Mediation training aims to provide an understanding of the stages of the conflict mediation process between MPK and the Sukamaju Community, given to all stakeholder groups of the Sungai Awan Kiri Village community
60		11	Kantor Desa Sungai Maju	Sukamaju Village Mediation Training	20	This training resulted in a mediation team representing the Sukamaju community

#	Month	Day	Location	Meeting topic	#P	Details on activity
61	Apr-20	10	Sungai Putri	Discussion on the Marketing Plan for the Sungai Putri BUMDes (Village owned Business organization) - Putri Mandiri Group	10	The discussion discussed the problems faced by groups receiving capital assistance for the Economic Revitalization program from the Peat Restoration Agency and how to solve them.
62		21	Kuala Satong	Installation of mangrove tourism publication signbox	4	Publication signs are posted and aimed at disseminating information about natural tourist attractions in Kuala Satong
63	Jan-Dec 2020		Pematang Merbau and Kalibaru sub-villages, Sungai Awan Kiri	Sungai Awan Kiri Farmer support and field training in organic farming	12	Assist local farmers in managing land without burning through the manufacturing of fertilizers, plant maintenance and provision of seeds for farmers

#	Month	Day	Location	Meeting topic	#P	Details on activity
64	Jun-20	12	YIARI – Sir Michael Uren Learning Centre (Sungai Awan Kiri)	Village Facilitator administrative briefing and program launching Involving local communities in efforts to prevent forest and land fires	10	Village Facilitator Program Kick Off in preventing forest and land fires. Description of the Jobdesk, training on activity administration and monitoring and evaluation of activities carried out by Village Facilitators
65		15	YIARI – Sir Michael Uren Learning Centre (Sungai Awan Kiri)	Training on the use of avenza maps in fire patrols	6	Training is given to Village Facilitators, to make it easier to identify locations prone to forest and land fires, as well as to evaluate staff performance.
66		25	Sukamaju village hall	Training on the use of GPS and mapping village boudares for the participatory Mapping Team	20	The mapping team was trained to use GPS to collect data in the field, and using them in combination with village sketches

#	Month	Day	Location	Meeting topic	#P	Details on activity
67		29	Sukamaju	Mapping and GPS Field training	21	Data collection in the field, using GPS and tallysheets containing important information such as land use, important places, infrastructure, etc.
68	June -Oct 2020		Sungai Awan Kiri, Tempurukan, Sungai Putri dan Tanjung Baik Budi	Establishment of Fire patrols and Land Fire Prevention Signboards	12	The installation of the socialization sign for the prevention of forest and land fires was carried out together with Manggala Agni and the TNI.
69	Jun-20	23	Kantor Desa Laman Satong	Socialization and introduction of the new management of MPK	32	New management socialization activities of MPK and work programs that can be cooperated together with the community around the concession of MPK. In this activity signing the Minutes of Socialization of MPK
70		24	Kantor Desa Sukamaju	Socialization and introduction of the new management of MPK	30	

#	Month	Day	Location	Meeting topic	#P	Details on activity
71		25	Hotel Aston Ketapang	Pre-mediation meeting between MPK and Sungai Awan Kiri Village	25	The meeting aims to collect information and data related to the problem of the beginning of the conflict
72	Jul-20	18	Gedung Adat Desa Laman Satong	Socialization and introduction of the new management of MPK	38	socialization activities of the new management of MPK and work programs that can be implemented together with the community around the concession.
73		1	Tanjung Baik Budi	Check the location and condition of the peat rewetting infrastructure in Tanjung Baik Budi	4	Checks are carried out to determine the condition of the peat rewetting infrastructure and access to facilities
74		1-2	Sungai Putri	Check the location and condition of the peat rewetting infrastructure in Tanjung Baik Budi	3	Checks are carried out to determine the condition of the peat wetting infrastructure and access to facilities

#	Month	Day	Location	Meeting topic	#P	Details on activity
75		6	Sukamaju village hall	Crosscheck data on the results of taking points in the field and digitizing satellite imagery	11	Attended by community leaders and the mapping team.
76		15	Sungai Putri Village Office	Socialization of the program to the Sungai Putri village with council members	8	Discussion about forest and land fire prevention programs through local empowerment with the Village Head
77		23	Sungai Putri	Collecting Logger and access information towards MPK Forest	9	Data collection for carbon calculation processes
78		22-30	Sungai Putri, Tempurukan, Tanjung Baik Budi dan Sukamaju	Fire Patrols using Drones	4	Check the location of the fire and several location of the fire to see the area of prone area and access in
79	Aug-20	14	Pematang Merbau, Sungai Awan Kiri	Socialization of People's Business Credit to Farmers with Agriculture instructor	12	Explain the capital loan program for farmers in starting a business in agriculture

#	Month	Day	Location	Meeting topic	#P	Details on activity
80		13 - 15	Kantor Balai Penyuluh Pertanian Muara Pawan district office	Discussions with Agricultural Instructors to Identify Farmers who Implement PLTB (non-burning agricultural techniques) in Muara Pawan	4	Discussion, identification and groundcheck the location of farmers who implemented PLTB in the context of the awarding of farmers' environmentally friendly on IOD 2020
81		28	Pematang Merbau, Sungai Awan Kiri	Clearing of non-productive land that will be used with farmers in Pematang Merbau	6	Assistance in cleaning the land which will later be used as a demonstration plot. Farmers as land managers and suppliers of vegetables, YIARI as buyers
82		6	Sungai Awan Kiri	Checking fire-fighting equipment	9	
83		7	Sungai Putri	Check the location and condition of the peat rewetting infrastructure in Sungai Putri	6	Checks are carried out to determine the condition of the peat wetting infrastructure and access to facilities

#	Month	Day	Location	Meeting topic	#P	Details on activity
84		8	YIARI – Sir Michael Uren Learning Centre (Sungai Awan Kiri)	Peat management briefing for Village Facilitators from the Peat Restoration Agency	6	Providing direction from the peat restoration body about the scope of work, peat education and peat management with stakeholders
85		26	Kuala Satong	Coordinating the location of Land and Forest Rehabilitation in the mangrove locations of the Kuala Satong Mangrove Center	3	Discussing Determining Location and Technical Implementation of the Mangrove Rehabilitation Program as a National Economic Recovery Effort
86		27-29	Pontianak	Coordination Meeting on Strengthening the Implementation of Peatland Restoration at the Site Level, West Kalimantan Province	54	Coordination between provincial level village facilitators to evaluate programs that have been running and their follow-up plans

#	Month	Day	Location	Meeting topic	#P	Details on activity
87		3	YIARI – Sir Michael Uren Learning Centre (Sungai Awan Kiri)	Technical Guidance on the Operation of Land and Forest Fire Fighting Equipment	34	The training was conducted to train fire blackouts to community groups at the village level. YIARI Cooperation, Regional Disaster Management Agency, and Manggala Agni
88		4	Sungai Putri	Collecting Logger and access information towards MPK Forest	3	Data collection for carbon calculations
89			Sukamaju	Integrated Fire Patrol with communities and military	5	Patrols were carried out in locations prone to fire and recently burned areas
90			Pematang Merbau Sub-Village, Sungai Awan Kiri Village	Forest and Land Fire Fighting	5	Village teams were supported to fire fight in the river village of the Kiran River, with TNI and the YIARI fire fighting team

#	Month	Day	Location	Meeting topic	#P	Details on activity
91		19	Pontianak	Coordination Meeting to identify location candidates for Mangrove reforestation programme in West Kalimantan	56	YIARI attended a meeting to provide information related to the locations of Ketapang's coastal villages which can be involved in mangrove rehabilitation and mangrove conservation in Ketapang Regency
92			YIARI – Sir Michael Uren Learning Centre (Sungai Awan Kiri)	Fire prevention coordination meeting with military agency of Sungai Awan Kiri, Tempurukan, Tanjung Baik Budi and Sungai Putri		TNI participation to encourage local villages in efforts to prevent forest and land fires
93		6	Sungai Awan Kiri	Check the location and condition of the peat rewetting infrastructure on Sungai Awan Kiri	6	Checks are carried out to determine the condition of peat rewetting infrastructure and access to facilities

#	Month	Day	Location	Meeting topic	#P	Details on activity
94			Tanjung Baik Budi	Check the location and condition of the peat rewetting infrastructure in Tanjung Baik Budi		Checks are carried out to determine the condition of peat rewetting infrastructure and access to facilities
95			Tempurukan	Check the location and condition of the peat rewetting infrastructure in Tempurukan		Checks are carried out to determine the condition of the peat rewetting infrastructure and access to facilities
96		1-15	Tanjung Baik Budi	Identification of fire fighting equipment in Tanjung Baik Budi Village	4	Assessing the village's readiness to prevent and control forest and land fires
97		1-15	Tempurukan	Identification of fire fighting equipment in Tempurukan Village	2	

#	Month	Day	Location	Meeting topic	#P	Details on activity
98		1-15	Sungai Awan Kiri	Identification of fire fighting equipment in Sungai Awan Kiri Village	3	
99		11	Hotel Aston Ketapang	The mediation process between MPK and Sukamaju Village	18	Mediation training aims to provide an understanding of the stages of the conflict mediation process between MPK and communities
100		29	Aula Desa Sungai Awan Kiri	Formation of the Sungai Awan Kiri Village negotiation team	50	Formation of a negotiation and mediation team for Sungai Awan Kiri
101		31	Aston Hotel Ketapang	The mediation process between MPK and Sungai Awan Kiri Village	23	Mediation process to get mutual agreement between 2 parties
102	Sep-20	1	Sungai Putri	Socialization and establishment of Women empowerment called Jenjamut	10	Present the Women's Empowerment Program in Efforts to prevent forest and land fires and "no plastic" campaigns

#	Month	Day	Location	Meeting topic	#P	Details on activity
103		2, 3	Sungai Awan Kiri, Tempurukan, Tanjung Baik Budi dan Sungai Putri	Survey of prospective Mangrove Restoration programme location list	10	Survey conducted by going down directly to the field seeing the suitability of the land of the mangrove land planting location
104		9	Tanjung Baik Budi	Launching of the MPA (masyarakat peduli api = community fire fighting) group	18	Exposure regarding the function of the Fire Care Community Group and its benefits for farmers in Tanjung Big Budi
105		15	Sungai Awan Kiri	Socialization of the National Economic Recovery program through Forest and Land Rehabilitation	32	Socialization was carried out by a river management center and facilitated by YIARI
106		26	Sungai Putri	Discussion on the mechanism for making pandan ecopolibags from pandanus	10	Technical guidance for making ecopolibags from pandanus plants with considerations on marketing and use

#	Month	Day	Location	Meeting topic	#P	Details on activity
107		28	Kuala Satong	Socialization of the National Economic Recovery program through Forest and Land Rehabilitation	69	Socialization was carried out by a river management center and facilitated by YIARI
108	Oct-20	3	Sungai Putri	Making compos fertilization	9	The practice of making compost fertilizer. Fertilizers will be used on powder and eggplant planting land
109		9	Sungai Putri	Chilli and Eggplant Nurseries	9	
110		10	Sungai Awan Kiri	Searching Mangrove seedling	16	Search for mangrove seeds is carried out around the planting site and transplanting them
111		12	Ketapang	Development of social media for Kuala Satong Mangrove Center	3	Facebook and Instagram Social Media Accounts for Kuala Satong Mangrove Center as a means of engaging with prospective visitors

#	Month	Day	Location	Meeting topic	#P	Details on activity
112		15	Kuala Satong	Survey of access to planting location for transport of seedlings	10	The survey was conducted to see the access point from and to the planting location to the nursery location
113	Nov-20	4	Sungai Awan Kiri	Planting Mangrove	32	Mangrove planting was carried out by the community working with YIARI
114		17	Tanjung Baik Budi	Checking planting ubi gajah location	5	Planting of Ubi Gajah was carried out at the location prone to fire. This planting program is written to utilize non-productive land prone to forest and land fires into productive land
115		26	Sungai Awan Kiri	Making ajir and larikan path	14	Mangrove planting was carried out by the community in YIARI supervision and assistance as a technical companion program
116		28	Sungai Putri	making F1 Embio	9	Practicals to make F1 embio with Jenjamut group
117		28	Ulak Medang	FPIC meeting	97	New management socialization activities of MPK and work programs that can be
118		29	Tanjung Pura	FPIC meeting	34	

#	Month	Day	Location	Meeting topic	#P	Details on activity
119		29	Mayak	FPIC meeting	26	implemented together with the community around the concession of MPK. In this activity signing the Minutes of Socialization of MPK
120		30	Tempurukan	FPIC meeting	47	
121		21	Balai Desa Sukamaju	Deliberation on the formation of the Sukamaju Village Working Group (POKJA)	30	Establishment of a Working Group Mapping the location of overlapping community agricultural locations within the MPK
122	Dec-20	4	LC	Meeting the equation of perceptions with Ketapang State Politap	15	The meeting contains the presentation of each party for inter-institutional cooperation. YIARI in community empowerment programs, human-orangutan-conflict mitigation, education (scholarships)
123		5	Sungai Putri	Gotong Royong menanam cabe dan terong	9 org	Joint planting with the Jenjamut group
124		21-22	Sungai Putri	Pembuatan pupuk kompos	9 org	Practice making compost with the Jenjamut group. Compost will be used on land that has been planted with chilies and eggplant

#	Month	Day	Location	Meeting topic	#P	Details on activity
125		4	YIARI – Sir Michael Uren Learning Centre (Sungai Awan Kiri)	Collaboration assessment discussion with POLITAP (Ketapang Politecnic School)	12	This meeting contains an explanation of the YIARI program that can be supported by Politap
126		18	YIARI – Sir Michael Uren Learning Centre (Sungai Awan Kiri)	Meeting with the Tanjung Baik Budi Village Care Community Alliance. Preserving agricultural land.	5	The meeting discussed local people's thoughts and aspirations regarding mining companies operating on community agricultural land
127		21	Kalibaru	Discussion with ARCAPADA CENTER organisation about the Sungai Awan Kiri conflict	2	The meeting discussed the conflict between the people of Kalibaru and MPK. Arcapada was called upon as a stakeholder that had historical knowledge of the conlict bwtween Sungai Awan Kiri and the old management of MPK
128		23	Kalibaru	Discussion with ARCAPADA CENTER the development of the SAKI conflict	7	The meeting listened to the aspirations of the Kalibaru community regarding the conflict with MPK old management. Arcapada becomes a facilitator

#	Month	Day	Location	Meeting topic	#P	Details on activity
129		23	Sungai Awan Kiri Village hall	Discussion with Sungai Awan Kiri Village Secretary about the plan to update village map	1	The meeting discussed the results of participatory mapping exercise, which will be used for reporting to the Provincial Government as social mapping (livelihoods of the Sungai Awan kiri community)
130		28	Sungai Awan Kiri Village hall	Sungai Awan Kiri village data updating	10	The mapping was carried out to re-socialize the results of the participatory mapping to the people of the Sungai Awan kiri village
131	Jan-21	3	Tempurukan	socialization with farmers on agricultural practices	4	socialization aims to provide an understanding to clear land without burning to prevent forest and land fires

#	Month	Day	Location	Meeting topic	#P	Details on activity
132		4	Kalibaru	Discussion with ARCAPADA CENTER about conflict, Tanjung Belandang beach waste, hydroponics farming program	6	The discussion was carried out in order to plan for beach clean-up actions (determining the time, place and parties involved), capacity building related to hydroponics, and technical strategies in resolving conflicts between MPK with Sungai Awan Kiri Village Community
133		7	Tanjung Baik Budi	Discussions with several community members about forest and land fires issues and what can help prevent them.	6	The discussion aims to gather information related to forest and land fires in Tanjung Baik Budi and its surroundings. Identify the perpetrators of the fire, where the location is prone to fire, why it burns, the method of burning and how to deal with it.

#	Month	Day	Location	Meeting topic	#P	Details on activity
134		16	Tanjung Belandang beach	Plastic waste cleaning action with ASP students, Arcapada, WeBe	40	Within 30 minutes, 1 pick-up non-organic waste can be collected. Collected 80 signatures from visitors to Tanjung Netherlands Beach not to litter. There was 1 visitor who took a photo at the photo booth posting a photo on personal social media
135		17	YIARI – Sir Michael Uren Learning Centre (Sungai Awan Kiri)	GIS training; participatory mapping training for Village facilitators and Korlap	10	Equalize perceptions and provide an understanding of the objectives of Participatory Mapping for Village Facilitators and Coordinators as a strategy in approaching villages
136		21	YIARI – Sir Michael Uren Learning Centre (Sungai Awan Kiri)	Meeting with the Kuala Satong community eco-tourism group	4	The meeting aims to socialize the 2021 work program to the group and how to prepare for the implementation of the work program

#	Month	Day	Location	Meeting topic	#P	Details on activity
137		22	Tempurukan	Site visit to local entrepreneur who produces roasted husk charcoal	4	The survey aims to see the condition of local businesses that have been built by local champions and how cooperative relationships can be built with YIARI
138		25	Sungai Awan Kiri	Verifkasi dan validasi peta penggunaan lahan/ Land use	8	The resulting map is no longer relevant to current conditions, so it needs some improvements. Data validation was carried out by community leaders and village officials.

#	Month	Day	Location	Meeting topic	#P	Details on activity
139		26	Sungai Putri village hall	Meeting with the Sungai Putri village government. The village head, village secretary, BPD and LPM agreed to hold a follow-up meeting with MPK and YIARI	10	The initial meeting discussed the plan to use 1,000 hectares of land in Sungai Putri Village. This meeting also aims to see how the Sungai Putri Village Government's resistance to YIARI and MPK. Through a meeting, the Village Government agreed to follow up on the results of the meeting with a follow-up meeting to discuss the division of roles in the use of the land.
140		27	Tanjung Baik Budi – Yandri's home	Discussion with the secretary of Tanjung Baik Budi village about group activities	7	The meeting went smoothly and the village secretary supported the activities of YIARI and MPK in Tanjung Baik Budi Village

#	Month	Day	Location	Meeting topic	#P	Details on activity
141		27	Tempurukan	meeting with vegetable farmers: Pak Mahari, pak Newar dan pak Yadi	4	The meeting aims to socialize the prevention of forest and land fires through land management without burning
142		27	Ulak Medang	Informal meeting to make contact with Village Facilitator in Ulak Medang village	5	The meeting was the initial interview in the local community recruitment process to become village facilitators who served as representatives of MPK in forest and land fire prevention programs
143		27	Ketapang	Meeting with MPK and Village Secretary of Sungai Putri to prepare for FPIC meeting	4	Initial technical coordination in the FPIC process to determine the timing of the FPIC meeting. The FPIC meeting is planned for February 1, 2021.

#	Month	Day	Location	Meeting topic	#P	Details on activity
144		29	Tempurukan	meeting with communities on agricultural and fisheries initiatives that will be developed	5	The meeting discussed agricultural and fishery problems faced by farmers and fishermen. The information obtained will be the basis for making agricultural and fishery work programs in Tempurukan Village.

#	Month	Day	Location	Meeting topic	#P	Details on activity
145	Feb-21	1	Sungai Putri	FPIC meeting Sungai Putri Village	43	The meeting was attended by Community Leaders, Village Government, and representatives of the Sungai Putri Village community. The meeting aims to provide information related to the new management of MPK and how is the relationship between MPK with YIARI. The meeting did not go smoothly because the village community was still resistant to YIARI's programs which "he said" had no impact on the local community.

#	Month	Day	Location	Meeting topic	#P	Details on activity
146		2	Sukamaju	FPIC meeting in Suka Maju Village	48	The meeting was attended by Community Leaders, Village Government, Representatives of the Sukamaju Village Community. This meeting discussed the Program Agreement to be implemented in Sukamaju. Starting from the initial mapping of conflict areas (overlapping) MPK with community land to fostering agricultural groups. The community is very enthusiastic about this program plan.
147		2	Kuala Satong	Discussion with Pokdarwis and Local Government about PROKLIM	8	The meeting discussed the plan for submitting the village of Kuala Satong as one of the pro-climate candidates.

#	Month	Day	Location	Meeting topic	#P	Details on activity
148		2	Camat MHU Office	Informal meeting in MHU sub-district	5	Due to the change of position, as a partner, YIARI as a representative of MPK re-acquainted with the new Head of Matan Hilir Utara.
149		3	Kantor Camat Muara Pawan	Informal meeting in Muara Pawan sub-district	5	Due to the change of position, as a partner, YIARI as a representative of MPK re-acquainted with the new Muara Pawan sub-district head.
150		4	Sukamaju	Socialization of BPN Kancah Ketapang activity plans related to data collection of community cultivated lands in other use areas (APL) for the implementation of the land deeds system (PTSL)		The socialization was carried out by BPN Ketapang. The results of the socialization are in line with the duties and roles of the Pokja Mapping conflict areas in Sukamaju Village.

#	Month	Day	Location	Meeting topic	#P	Details on activity
151		4	Sungai Putri	Coordination meeting for farmer activities with the JENJAMUT group	7	Coordination with regard to planned visits and discussions when donors arrive
152		5	Tanjung Baik Budi	Meeting with the former head of the BPD of Tanjung Baik Budi village regarding the relationship between MPK and YIARI.	2	It is an informal meeting. Inquire about the background of PT. PIE. And coordinate related to FPIC activities, soliciting his opinion about YIARI programs.
153		6	Tanjung Baik Budi	Mangrove survey and selection of areas for mangrove restoration	5	The survey was conducted on 4 potential restoration sites. As a result, 1 location was selected as a planting location, 1 location as a nursery, and a location to look for uprooted seeds.

#	Month	Day	Location	Meeting topic	#P	Details on activity
154		7	Ulak Medang	Discussion with the head of group 01 on the issue of forest fires (kahutla)	2	Discussion of the division of roles between YIARI and the village in preventing forest and land fires in Ulak Medang Village, especially around the concession area of MPK
155		8	Ulak Medang	Meeting with the head of group 02 at Pak Saiful's home to talk about forest fires (kahutla) and MPA	3	Discussion of the division of roles between YIARI and the village in preventing forest and land fires in Ulak Medang Village, especially around the concession area of MPK
156		9	Kalibaru	Discussions with ARCAPADA CENTER about donor visits, hydroponics, public speaking, etc. Preparation for the placement of proboscis monkey habitat sign-posts	5	Discussions were held to plan donor travel schedules, comparative studies on horticultural vegetable cultivation with the hydroponic concept, and survey the location of the signposts.

#	Month	Day	Location	Meeting topic	#P	Details on activity
157		10	Tanjung Baik Budi	Discussions with the head of subvillage regarding the relationship between MPK and YIARI and forest fires.	2	The meeting aims to socialize the activities initiated by YIARI with MPK
158		10	Tanjung Baik Budi	Discussion with MPA members from Tanjung baik Budi village about forest fire issues and converting sweat potato plantations to sugar cane	8	The discussion was held at the house of the Tanjung Baik Budi Village Facilitator. MPA members suggested that areas prone to fire be used as productive areas so that the community is responsible for protecting them. And evaluate the development of yam plants that have been planted previously. Not good development
159		11	Sungai putri	Gathering with residents who run vegetable / fruit gardens.	4	Discussion to monitor community activities in agricultural demonstration plots in Sungai Putri Village

#	Month	Day	Location	Meeting topic	#P	Details on activity
160		11	Ulak Medang	Discussions with floating cage owners about fisheries	4	Discussions to collect information and initial data on the initiation of aquaculture programs in Ulak Medang and Tanjungpura
161		11	Sungai putri	Donor visit preparation	14	A Visit from a Donor
162		12	Ulak Medang	Meeting with PT. BGA to discuss fire-prone concessions	3	The meeting was held at the house of one of the residents of Ulak Medang Village while conducting a fire patrol with the community
163		12	Sungai putri	Training for the Farmer's group (JENJAMUT group) in developing chilli / ginger seedlings and in the production of organic pesticide	13	The training was held at the Sungai Putri Village Facilitator's House to make it easier to control the growth of plant seeds and pesticides

#	Month	Day	Location	Meeting topic	#P	Details on activity
164		13	Tanjung Baik Budi	A meeting with MPA members to discuss converting sweet potatoes into sugar cane plantations	8	The meeting discussed technical land use, how to process land into sugarcane plantations, types of sugarcane used, how MPK can help the community, etc
165		14	Ulak Medang	Training with fisher group members to discuss how to establish fisheries	9	
166		15	Tempurukan	Fire fighting	7	Fire fighting in Karamunting 2 (-1˚40'55", 110˚2'18")
167		15	Tanjung Baik Budi	Discussion with village representatives for the FPIC meeting	2	Coordination with technical team for timing of FPIC
168		16	Ulak Medang	Discussion with village representatives in ulak medang on the problem of forest fires	3	Discussion of the division of roles between YIARI and the village in preventing forest and land fires in Ulak Medang Village, especially around the concession area of MPK

#	Month	Day	Location	Meeting topic	#P	Details on activity
169		17	Muara Pawan district office	Socialisation to resolve village boundaries in Muara Pawan district, Ketapang regency.	41	The socialization was carried out at the Muara Pawan sub-district office by presenting community leaders and village heads from villages in Muara Pawan sub-district.
170		21	Kalibaru	Discussion with ARCAPADA CENTER for the beach cleanup day on 21 02 21	6	The discussion discussed technical preparations for beach clean-up actions to commemorate Earth Day in 2021
171		17	Ulak Medang	Gathering at the home of Mrs. Haminah, a shredded haruan fish producer	3	
172		17	Tanjung Baik Budi	Noting coordinates of degraded mangove areas for replanting	6	Survey of potential planting sites together with the group

#	Month	Day	Location	Meeting topic	#P	Details on activity
173		17	Tanjung Pura	Socialising Tanjung Pura village maps	30	The PM team presented a map of the situation of Tanjungpura village from satellite imagery and the status of the area
174		18	Kalibaru	Fire fighting	8	Fire fighting in Titik (-1.70335, 110.03684)
175		18	Sungai Awan Kiri	Rewetting TPA	7	Wetting dry areas prone to forest and land fires using a robin machine owned by MPA Sungai Awan Kiri Village
176		18	Sungai Putri	Assisting the JENJAMUT farmer group. Fertilization Compost chillies and eggplant	13	Together with the agricultural team, fertilizing plants in the field school demonstration plot in Sungai Putri Village
177		19	Tanjung Baik Budi	Identifying fire extinguishers in Tanjung Baik Budi village.	3	The MPA team began to identify community fire extinguishers for preventive measures to prevent land and garden fires

#	Month	Day	Location	Meeting topic	#P	Details on activity
178		19	Tanjung Pura	Participatory mapping	12	GPS training for village mapping and sketching teams
179		19	Tanjung Pura	Participatory mapping	12	Taking coordinates by the village mapping team

#	Month	Day	Location	Meeting topic	#P	Details on activity
180		20	Tanjung Belandang beach	Tanjung Belandang beach cleanup	70	Activities are supported by agencies and communities in Ketapang, including the Public Housing Service for Settlement Areas and the Environment in Ketapang, Ketapang Police, Dandim 1203 Ketapang, Muara Pawan Police, Arcapada Center Community, Webe Advanture Community, and Masata Sungai Awan Kiri Village. Apart from collecting garbage, there were also exercises with children and beach visitors, making eco-friendly bags from cloth (eco bags), and collecting signatures as a form of support for reducing the use of plastic waste on Tanjung Belandang Beach. The total weight of the garbage collected in this action was 42.8 kg and received support in the form of 84 signatures from beach visitors.

#	Month	Day	Location	Meeting topic	#P	Details on activity
181		21	Tanjung Pura	Participatory mapping	12	Taking coordinates by the village mapping team
182		21	Sungai Putri	Discussions with Sungai Putri community members for potential collaboration with YIARI - MPK	7	The meeting took place at LC Sir Michael Uren. Attended by community leaders and the village government of Sungai Putri. This meeting discussed the land use plan to become a sustainable agricultural area of 1,000 hectares as a result of participatory mapping in the Sungai Putri area.
183		22	Sungai Awan Kiri	Fire fighting	8	Fire fighting at Jln Tanjungpura (-1˚ 44' 2", 110˚ 2' 30"). Fire suppression carried out together with Sungai Awan Kiri Village MPA
184		22	Tanjung Pura	Participatory mapping	12	Verification and validation of point-taking results in the field

#	Month	Day	Location	Meeting topic	#P	Details on activity
185		22	Kalibaru	Meet with Kalibaru farmers to agree a mangrove conservation area in Kalibaru hamlet	30	The meeting was held at LC Sir Michael Uren which was attended by community leaders and mangrove conservation actors in Kalibaru. The meeting aims to listen to the aspirations and opinions of the community as well as to prepare an action plan for the protection of mangrove areas in Kalibaru
186		23	Tanjung Baik Budi	Socialization with several community members about the forest and land fires problem	8	The socialization was carried out in conjunction with the fire patrol conducted by the MPA team in Tanjung Baik Budi Village
187		23	Kuala Tolak	Coordination and preparation for FPIC meetings	5	Coordination with Village Government regarding to decide the timing of FPIC implementation (socialization and gathering of MPK)

#	Month	Day	Location	Meeting topic	#P	Details on activity
188		23	Laman Satong	Coordination and preparation for FPIC meetings	4	Coordination with Village Government regarding to decide the timing of FPIC implementation (socialization and gathering of MPK)
189		23	Tanjung Baik Budi	Coordination and preparation for FPIC meetings	3	Coordination with Village Government regarding to decide the timing of FPIC implementation (socialization and gathering of MPK)
190		23	YIARI – Sir Michael Uren Learning Centre (Sungai Awan Kiri)	Forest fire coordination with the OPU, education and Babinsa team	7	Coordination is carried out in preparation for the dry season. Each team explained the efforts to prevent forest and land fires that would be carried out, joint action plans and mapping of actors in efforts to prevent forest and land fires.

#	Month	Day	Location	Meeting topic	#P	Details on activity
191		24	Dusun Sepahan, Sungai Kelik	Coordination and preparation for FPIC meetings	5	Coordination with Village Government regarding to decide the timing of FPIC implementation (socialization and gathering of MPK)
192		25	Tanjung Pura	Preparing for Participatory Land Use Planning and PLP	7	Finalization of maps and data from the field
193		26	Sungai Putri	Together with members of the JENJAMUT farmer group do clearing the land	12	Together with members of the JENJAMUT farmer group, clearing the land for planting chilies and eggplants with non-burning techniques (PLTB)
194		26	Tanjung Pura	Participatory Land Use Planning Tanjung Pura village	20	The community participatively identifies threats and how to deal with environmental threats around them, then plans sustainable land use at the village level.

#	Month	Day	Location	Meeting topic	#P	Details on activity
195		27	Tanjung Pura	Participatory Land Use Planning and PLP data processing	5	The community participatively identifies threats and how to deal with environmental threats around them, then plans sustainable land use at the village level. The data that has been obtained from the results of the discussion are directly inputted into tables and reports.
196	Mar-21	1	Laman Satong	FPIC meeting in Laman Satong village	36	The socialization of the new management of MPK and programs to be run
197		2	Kuala Tolak	FPIC meeting in Kuala Tolak village	41	The socialization of the new management of MPK and programs to be run
198		3	Tanjung Baik Budi	FPIC meetings with Tanjung Baik Budi villagers	37	The socialization of the new management of MPK and programs to be run

#	Month	Day	Location	Meeting topic	#P	Details on activity
199		4	Kalibaru	Setting a mangrove conservation area information board with Kalibaru fisherman	10	A total of 3 information signs were installed at 3 vulnerable points in the mangrove area in Kalibaru. Installation is carried out together with community leaders and conservation actors in the mangrove area in Kalibaru
200		6	Sungai Kelik	FPIC meeting at Sepahan sub-village, Sungai Kelik village	34	The meeting was held at the hamlet level, namely Sungai Kelik Hamlet. The meeting was attended by village officials, religious leaders and community leaders. Through this FPIC, the local community has received information regarding the latest management of MPK and YIARI status of MPK. In addition, the local community also supports the existence of YIARI and MPK.

#	Month	Day	Location	Meeting topic	#P	Details on activity
201		6	Tanjung Baik Budi	Coordination with farmer groups for activities to manufacture organic (non-chemical) pesticide	14	Coordination is carried out using the FGD method to agree on an action plan, timeline and administrative preparations that must be prepared
202		7	Sungai Putri	Coordination with farmer groups for activities to manufacture organic (non-chemical) pesticide	5	Coordination is carried out using the FGD method to agree on an action plan, timeline and administrative preparations that must be prepared
203		8	Kalibaru – Sungai Awak Kiri	Proboscis monkey habitat survey	8	The survey was conducted with the biodiversity team to identify animals and their diversity in the mangrove area in order to develop a protected area management plan.
204		10	Tempurukan	Coordination for participatory mapping	4	Communication of the timing of the participatory mapping and preparation of the mapping team from the village

#	Month	Day	Location	Meeting topic	#P	Details on activity
205		10	Sukamaju	Meeting with mapping team and working groups and representatives PT.MPK	17	The meeting discussed the work plan of the conflict resolution working group in Sukamaju
206		11	Tempurukan	Coordination with farmer groups for activities to make compost organic (non-chemical) pesticide	23	The meeting discussed the timeline and preparation of materials for composting for farmer groups in Tempurukan
207		24	Sungai Awan Kiri	FPIC meeting	40	The socialization of the new management of MPK and programs to be run
208		24	Kuala Satong	FPIC meeting	40	The socialization of the new management of MPK and programs to be run
209		31	Sukamaju	Mapping scheduling meeting	12	The meeting discussed the mapping schedule and action plans to be carried out by the working group during 2021

#	Month	Day	Location	Meeting topic	#P	Details on activity
210	Apr-21	3	Sukamaju	Mapping working group discussion, activity planing, task sharing and training,	26	The follow-up meeting discussed the division of roles in mapping and capacity building that could be supported by MPK
211		4	Sukamaju	Training on mapping and tally-sheet format for data collection	26	Training on the use of GPS and simulation of taking points in the field and filling out tallysheets
212		8	Sungai Putri	Discussions with Sungai Putri village officials regarding the plan for a feasibility study for agricultural land	6	This meeting is a follow-up meeting regarding the use of 1000 hectares of land in Sungai Putri to become a sustainable agricultural area. In this meeting no agreement was reached, so the program was temporarily postponed.
213		16	Sukamaju	Briefing to mapping working group	21	Preparation of the working group team in mapping the land area and land owners in the MPK in Sukamaju, as well as point-taking by the working group team

#	Month	Day	Location	Meeting topic	#P	Details on activity
214		17	YIARI – Sir Michael Uren Learning Centre (Sungai Awan Kiri)	SAKI village women's group meeting: Discussion about capacity building options for this women's group	30	YIARI and the Women's Group from Sungai Awan Kiri agreed to conduct training related to food processing for mothers (the people of Sungai Awan Kiri Village) in 2021
215		19	YIARI – Sir Michael Uren Learning Centre (Sungai Awan Kiri)	The visit of the fishermen group from Kalibaru subvillage, SAKI Village. Discussion on mangrove conservation plans. A meeting will be held on the socialization of survey results, mangrove conservation and animal-friendly village programs	25	The meeting was attended by community leaders from Kalibaru Hamlet and people who are aware of the issue of proboscis monkey hunting in the Kalibaru mangrove area. The meeting went smoothly and the community was very enthusiastic to continue the follow-up plan for installing the socialization sign
216		21	Sukamaju	Mapping data input and verification	15	Verification of data from point-taking in the field with community leaders

#	Month	Day	Location	Meeting topic	#P	Details on activity
217		4	Sungai Putri	First compost mixing activity	19	Mixing compost with the Jenjamut group
218		11	Sungai Awan Kiri (Kali Baru)	Assistance in assessing nursery growth	1	Observing rice seedlings related to seedling height, seedling health, irrigation in seedling fields, intensity of fertilization, and pest control
219		14	Sungai Putri	Second Compost mixing activity	12	Mixing compost with the Jenjamut group
220	######	18	Sungai Awan Kiri	Agricultural Land processing	22	Mechanical processing using tractors
221		19	Tempurukan	Agricultural Land Processing	26	Conventional manual land processing using a hoe
222		20	Tanjung Baik Budi	Agricultural Land Processing	16	Mechanical processing using tractors
223		21	YIARI – Sir Michael Uren Learning Centre (Sungai Awan Kiri)	Training and coordinating responses to solve crop-specific issues	6	The discussion involved farmers from 5 villages, namely Sungai Awan Kiri, Tempurukan, Sungai Putri, Tanjung Baik Budi and Sukamaju.
224		22	Suka Maju	Agricultural Land Processing	25	Processing is carried out by the Farmer's Group

#	Month	Day	Location	Meeting topic	#P	Details on activity
225		24	Sungai Putri	Compost Packaging and Land Clearing	14	Compost packaging using sacks, and compost storage at room temperature
226		27	Tempurukan	Rice planting	16	Land clearing using a manual tractor, 1 ton of compost and 6kg of Triple Superphosphate 36
227		2	Tempurukan	Paddy field management and snail control	2	Control of snail pests in rice paddies was overcome using processed papaya leaves and manual collection.
228	Jun-21	3-18	Sungai Awan Kiri (Kali Baru)	Training on Making Mangrove Nursery Houses in Sungai Awan Kiri, Kalibaru Hamlet	10	The training activity began with presentations and discussions related to the construction of a mangrove nursery house and the selection of mangrove seeds for breeding. community commitment in participating in this activity/program was demonstrated through the formation of activity groups
229		4	Sungai Awan Kiri (Kali Baru)	Delivery of rice seeds	2	Delivery of 2 sacks of seeds, namely the Grand Punjabi 01 variety of rice.

#	Month	Day	Location	Meeting topic	#P	Details on activity
230		4	Suka Maju	Plant watering	16	Watering long bean spinach plants, and giving natural insecticides.
231		5	Tanjung Baik Budi	Re-spraying the land with herbicides	7	Spraying using herbicides according to the dosage and rules, spraying this herbicide using a tool, namely a back pump spray
232		6	Suka Maju	Vegetable seeding and watering with tobacco water	17	Filling the seed planting media (soil mixed with compost) into polybags then planting 1 seed in each polybag. The polybags are then arranged in a place protected from rainwater. Next, seeds are sprayed with tobacco water.
233		7	Suka Maju	Growth Observation, Watering Plants with plant-based anti-rat fertilizer	2	Observation of plants sown in polybags and watering with anti-rat POC plant-based anti-rat fertilizer using a ratio of 15 ml/1 Liter. In addition to the distribution of fertilizers to farmer groups.

#	Month	Day	Location	Meeting topic	#P	Details on activity
234		7	Tempurukan	Assistance in assessing Rice Growth and Development	2	Observations on plants that were 11 days old were re-examined the growth and development of these plants. In some rice stalks there are already 2-3 tillers. Plant growth is disturbed due to the soil starting to crack/lack of water.
235		7.13	Sungai Putri	Delivery of Fertilizer and Measurement of land area	1	On June 7, 2021, the activities carried out were the delivery of 30 kg of NPK fertilizer and 7 sachets of vegetable seeds. On the 13th, the activity carried out was measuring the area of the field school demonstration plot using GPS (875 m2).

#	Month	Day	Location	Meeting topic	#P	Details on activity
236		9	Sungai Awan Kiri (Kali Baru)	Training on building tree Nurseries and on Mangrove Breeding Methods	11	Training on seed selection, determining the type of mangrove to be sown, determining the area of the nursery building, determining the type of mangrove to be sown, determining the area of the nursery building, and determining the schedule of activities for the community.
237		10	Tempurukan	Weed spraying	2	Observations on plants that were 11 days old were re-examined the growth and development of these plants. In some rice stalks there are already 2-3 tillers. Plant growth is disturbed due to the soil starting to crack/lack of water.

#	Month	Day	Location	Meeting topic	#P	Details on activity
238		10,14	Suka Maju	plant growth assessment and spraying seeds with tobacco water	3	Assessment of vegetable seeds that had been sown. In some polybags, some of the plants that have been planted and the seedlings in the tubs had started to grow. Vegetable seedlings were sprayed again with tobacco water with a 20 ml/1 Liter of water ratio.
239		11	Sungai Putri	Training on building tree Nurseries and on Mangrove Breeding Methods	14	Training covered plans for nursery building and how to breed mangroves through presentations on the technical aspects starting from building construction, selecting the type of seeds to sow, building locations and forming a mangrove nursery group.

#	Month	Day	Location	Meeting topic	#P	Details on activity
240		11	Sungai Putri	Training on building mangrove Nurseries	15	Training on seed selection, determining the type of mangrove to be sown, determining the area of the nursery building, determining the type of mangrove to be sown, determining the area of the nursery building, and determining the schedule of activities for the community.
241		13	Tempurukan	Plant watering	8	Watering rice with a water suction machine (robin).

#	Month	Day	Location	Meeting topic	#P	Details on activity
242		13	Tanjung Baik Budi	Making a shipyard trench, re-spraying the land with herbicides and measuring the area of the field school demonstration plot	9	The activities carried out were stretching the sides of the trench with raffia rope then making a side trench with a width of 55 cm and a height of 65 cm and also spraying the land using herbicides according to the rules and doses of herbicides. The tool used is a back pump sprayer. Then land measurement activities are carried out with GPS. The area of land that will be used as a field school demonstration plot for sugar cane is 5,000 m2.
243		14	Tempurukan	Training on Making Mangrove Nurseries in Tempurukan	16	Presentation and discussion related to the construction of a mangrove nursery and the selection of mangrove seeds for breeding.

#	Month	Day	Location	Meeting topic	#P	Details on activity
244		15 - 16	Suka Maju	Measurement of land area and plant-based anti-rat fertilizzer spraying on plants.	3	The activity carried out on the 15th was measuring the area of land that will become a field school demonstration plot using GPS, a land area of about 675 m2 on the 16th, spraying spinach and long beans with anti-rat liquid fertilizer at a dose of 15 ml/1 Liter
245		15	Sungai Awan Kiri (Kali Baru)	Assistance in Sowing Compost and assessing Nurseries	10	Applying 1,500 kg of compost in 2,475 m2 of rice fields. Initially, the land used for the field school demonstration plot was 1,800 m2. Over time, the Kali Baru farmer group increased the area of the field school demonstration plot to 2,475 m2. In addition to sowing compost, the growth of rice seedlings was also assessed. Rice height has reached 15-17 cm2.

#	Month	Day	Location	Meeting topic	#P	Details on activity
246		17	Tempurukan	Fertilizing paddy fields	7	The activities carried out were fertilizing the land using 2 tanks of anti-rat POC, 7 kg of urea fertilizer and 6 kg of potassium chloride fertilizer on the land, as well as monitoring plant growth.
247		19	Sungai Putri	Re-Spraying Land with Herbicides	2	The activity carried out was re-spraying the field school demonstration plot in Sungai Putri using herbicides according to the dosage and instructions for use.

#	Month	Day	Location	Meeting topic	#P	Details on activity
248		20	Tanjung Baik Budi	re-spraying the land with herbicides	10	The activities carried out were continuing the trench construction which was carried out on June 13 and then rebuilding the trench around the side of the land with a width of 55 cm and a height of 65 cm and also spraying the land using herbicides according to the rules and doses provided and using a back pump sprayer.
249		20	Sungai Awan Kiri (Kali Baru)	Potassium phosphate fertilizer Application	8	The activity carried out was applying 14 kg of potassium sulphate fertilizer (SP36) on the field school demonstration plot in Kali Baru

#	Month	Day	Location	Meeting topic	#P	Details on activity
250		21-22	Sungai Awan Kiri (Kali Baru)	Rice planting	16	Removing the rice seeds that had been made to germinate and planting them in the ground. Rice planting is carried out when the soil is saturated with water. Rice planting is done by 2-3 planting holes. The distance for rice plants is 20 X 20 cm.
251		21, 23 - 28	Kuala Satong	Discussing Biodiversity surveys in mangrove forests	22	The activity begins with a presentation on program planning in improving natural resources, discussions on the formation of working groups, and drafting workplans.
252		23	Kantor Desa Ulak Medang	Group formation and program planning, fertilizing land and other types of agricultural interventions.	15	The maintenance activities carried out were spraying anti-rat POC, making compost independently, applying 18 kg urea and 14 kg KCL, irrigating land, and spraying weeds.

#	Month	Day	Location	Meeting topic	#P	Details on activity
253	Jul-21	2,3,7,11,13	Sungai Awan Kiri	Digging a trench and re-spraying	20	A trench was dug. The width of the trench is 80 cm, the depth is 40 cm, and the width between the beds is 180 cm. Next is spraying weeds, land management which consists in making a trench at the edge of the land. 5000 m2 of land have been worked this way.
254		4,6,11,13,14,18, 19,22,23,25,28, 29	Tanjung Baik budi	Plant care		Treatment activities such as spraying anti -rat POC, monitoring of rats & locusts, installation of rat traps, manual weed control and manual and chemical locust eradication.

#	Month	Day	Location	Meeting topic	#P	Details on activity
255		6,11,13,21	Tempurukan	Photography Event Location Survey		1. Enthusiasm from the director and POLITAP staff who came to the location for the Photography event. 2. The Director of POLITAP wants to provide assistance with a trash cans for the Kuala Satong Mangrove Center on condition that they include the POLITAP logo. 3. POLITAP has a laboratory to analyze the content in the soil, so that it can collaborate with the ComDev team for agricultural activities. 4. They want to collaborate with related parties who want to package food in aluminum foil packaging. 5. POLITAP also has a broadcast channel that they will use as a place to broadcast positive things and they can invite the general public who have positive values and can motivate the community. 6. POLITAP has several diverse study programs, with this the POLITAP is willing to help the YIARI program in community assistance activities to collaborate with several related study programs.

#	Month	Day	Location	Meeting topic	#P	Details on activity
252		10	Kuala Satong	Vegetable planting	17	Plant bed construction (for eggplant seedlings) with width of 120 cm and a length adjusted to the shape of the plot. 1 bed was planted with vegetables with a spacing of 50 X 70 cm. In each planting hole, compost is given and then planted with vegetable seeds. The number of seeds planted were 100 tomatoes, 155 eggplants and 200 chilies.
253		10, 12	Suka Maju	Plant care	23	The activities carried out were watering, fertilizing, manual weed control and harvesting of long beans and spinach.
254		13 - 31	Suka Maju	Agricultural equipment delivery		Delivery of tools and materials to manage the field school demonstration plots. Uncertain seasons result in delayed land cultivation. When it rains, there are frequent floods.

#	Month	Day	Location	Meeting topic	#P	Details on activity
255		15	Sungai Putri	Visits and gatherings of local scout groups	21	1. The Peduli (caring) Scout Community came with a group of 21 participants to LC YIARI 2. The Peduli Scout Community also has several activities that have been carried out for the community, namely, distributing masks, cleaning garbage in ecotourism places, cleaning cemeteries, and raising funds for people in need such as accident victims, victims of natural factors, the elderly and disabled. 3. The purpose of the caring scout visit is to provide experience, education and knowledge about conservation and social activities which are rarely acquired in schools

#	Month	Day	Location	Meeting topic	#P	Details on activity
256		17	YIARI – Sir Michael Uren Learning Centre (Sungai Awan Kiri)	Technical meeting Lomba Photography	21	During the visit, the education team distributed several materials related to the history of LC Sir Michael Uren, the Peat Ecosystem and environmental education on plastic waste management
257		23	Politeknik Negeri Ketapang	Photography	35	The photography competition is a celebration to commemorate World Mangrove Day which falls on July 26. The competition was attended by 23 teams consisting of students and the general public. During the technical meeting, the committee conveyed the rules of the competition, introduced the competition judges, and also conveyed the results of the biodiversity survey that had been carried out by the biodiv team.

#	Month	Day	Location	Meeting topic	#P	Details on activity
258		24 - 27	Kuala Satong	Photography contest submissions	69	A total of 23 teams took part in the competition. Each team took turns taking pictures at the Kuala Satong Mangrove Tourism location according to the location's capacity and health protocols.
259		28 - 31	Politeknik Negeri Ketapang	Exhibition preparation meeting	40	Each team must enter at least 1 work in the exhibition. The works that will be exhibited are photographs taken from photography at the Kuala Satong mangrove location and framed using a minimum frame size of 10 R. The collected works are 42 works from 3 categories, namely landscapes, modeling and flora and fauna.

#	Month	Day	Location	Meeting topic	#P	Details on activity
260	Aug-21	1	Politeknik Negeri Ketapang	Participatory mapping and land use planning	6	The meeting discussed the technicalities of the exhibition of competition results, determining the timeline for the exhibition, the resources needed, etc. After that, survey the room that will be used as the location of the exhibition
261		15-13	Sungai Kelik Dusun Sepahan	Participatory mapping and land use planning	65	1. Participatory mapping seminar 2. Taking coordinates 3. Participatory land use planning
262		21 - 22	Politeknik Negeri Ketapang	Photography exhibition	23	The organizing committee prepares the location, the necessary exhibition and administrative equipment, as well as the installation of equipment to fill out a digital guest book for visitors

#	Month	Day	Location	Meeting topic	#P	Details on activity
263		23 - 25	Politeknik Negeri Ketapang	Exhibition visit	575	Attended by the people of Ketapang to North Kayong. Most of the visitors came from the village of Payak Kumang.
264	Sep-21	1	Tanjung Baik Budi	POLITAP lecture and community service	28	The activity began with an opening by the POLITAP lecturer and the village head at the Tanjung Baik Budi Village Office. After the activity was finished, the students carried out community service, one of which was the sowing of lime on the demonstration plot of the Field School for sugar cane.

#	Month	Day	Location	Meeting topic	#P	Details on activity
265		1	Suka Maju	POLITAP lecture and community service	13	The activity began with an opening by the POLITAP lecturer and the Village Head at the Suka Maju Village Office, after the activity was finished, the students carried out community service which was divided into two, some cleaned the mosque and partly cleared the field school demonstration plot area, installed demonstration plot signs and made fly traps
266		1-30	1. Ulak medang 2. Suka maju 3. Sungai awan kiri 4. Tempurukan 5. Sungai putri 6. Tanjung baik budi 7. Kuala tolak 8. Kuala satong	Patrol and Identification of Forest and Land Fires	36	Fire patrols are carried out by the village facilitators together with MPA/fire volunteers, and are routinely carried out for 21 days. There have been several land discussions due to dry land conditions

#	Month	Day	Location	Meeting topic	#P	Details on activity
267		02, 04, 12, 20, 29	Suka Maju	Cleaning weeds, spraying pests and applying organic fertilizers	25	During the rainy and flood seasons, pest and POC spraying activities are not carried out. The field school demonstration plot in Suka Maju was planted with mustard greens on September 2, treated with fungicides on September 4. On September 12th Tomatoes and Mustard were harvested. On the 20th eggplants were harvested
268		7	Tempurukan	Drying and milling of rice	3	The activity was carried out by drying rice during the day and milling in the afternoon, the rice produced was 80 kg from a land area of 675 m2.
269		9, 21 - 28	Laman Satong	Participatory mapping and land use planning	46	1. Participatory mapping seminar 2. Taking coordinates 3. Participatory land use planning

#	Month	Day	Location	Meeting topic	#P	Details on activity
270		10	Sungai Putri	Observation of the Development of Vegetable Seeds and Land	1	The activities carried out were checking the field school demonstration plot and seeing the growth of vegetable seeds in the Putri River with Pak Hamiji.
271		14	Tanjung Baik Budi	Discussion Group Forum Non-productive land analysis	26	The activity began with remarks from the representative of the Village Head followed by the submission of the activity plan for the feasibility analysis of non-productive land. A discussion with community members and NGO facilitators followed.
272		16 & 27	Sungai Awan Kiri	Spraying Pests and POCs, Harvesting Rice	11	The pest spraying activity, the POC spraying activity and the rice harvesting activity for the Inpari 32 variety in the field school demonstration plot

#	Month	Day	Location	Meeting topic	#P	Details on activity
273		18	Tanjung Baik Budi	Sugarcane Planting, Compost application and Weed Control	11	Planting activities were carried out in 7 beds with one planting line each, the number of seeds planted was 3,500 pcs with an area of 0.5 ha. In the process of planting the MPA farmer group, one more person from the community joined in the activities of the farmer group.

#	Month	Day	Location	Meeting topic	#P	Details on activity
274		25	Sungai Awan kiri	Harvest Festival Field School Demonstration	52	The activity was attended by the Regent of Ketapang represented by Assistant 2 of Ketapang, Mr. DRS. H. Marwannor, MM. Director of the YIARI, Dr. Karmele Llano Sanchez, Head of the Ketapang Regency Agriculture Service, Ir. Sikad Gudag, M.Sc., Chairman of Commission III DPRD Ketapang Regency Abdul Aen., Camat Muara Pawan Erdinan, S.Pd. MM.Pd., Muara Pawan Police Head IPDA DewaJaya Feroguta, S.H. M.H., Danramil Muara Pawan, Head of Sei Village. Awan Kiri Sapwan Noor, S.Pd and YIARI Partners MPK (Mohairson Pawan Khatulistiwa) was represented by Andrian Kurnianto, Director of Politap (Ketapang State Polytechnic) represented by Adha Panca Wardana, Head of LPPNU (Nahdlatul Ulama Agricultural Development Institute) Asih Farahmi, ST and assisted farmers. The harvest activity was carried out in the demonstration plot of the Kali Baru Hamlet, Sungai Awan Kiri Village, on a 3 meter (675 m2) land area for the 32 impai rice variety. The activities were opened after the invited guests cut rice simultaneously at the field school demonstration plot location. After that, the activity was continued to Lc for hospitality and talks between farmers and related parties.

#	Month	Day	Location	Meeting topic	#P	Details on activity
275	Oct-21	1-31	1. Ulak medang 2. Suka maju 3. Sungai awan kiri 4. Tempurukan 5. Sungai putri 6. Tanjung baik budi 7. Kuala tolak 8. Kuala satong	Patrol and Identification of Forest and Land Fires	41	Fire patrols are carried out by the village facilitators together with MPA/fire volunteers, and are routinely carried out for 21 days. There have been several land discussions due to dry land conditions
276		6	Sungai Putri	Training on mangrove planting techniques in Sungai Puteri	12	The training materials contain appropriate techniques in selecting suitable seeds for planting, the best location to start planting, techniques for transporting seeds and maintaining plants after planting.

#	Month	Day	Location	Meeting topic	#P	Details on activity
277		6	Tanjung Baik Budi, Sungai Putri	Activity visit to the location of the field school demonstration plot (fire prone land (PLTB))	4	1. Land was prepared to plant sugarcane and vegetable commodities. 70% of sugarcane and vegetable planting has been carried out and vegetable planting. In Sungai Putri a major challlenge are frequent floods 2. A potential solution is the construction of a water outlet

#	Month	Day	Location	Meeting topic	#P	Details on activity
278		6	Sungai Putri	Technical Training/Mangrove Planting Procedures	11	1. Land was prepared to plant sugarcane and vegetable commodities. 70% of sugarcane and vegetable planting has been carried out and vegetable planting. In Sungai Putri a major challlenge are frequent floods 2. A potential solution is the construction of a water outlet
279		6, 9, 23, 24	Suka Maju	Management, Nurseries, Care and Field Assistance	18	Various activities including removal and cleaning of plants, loosening of soil and compost application before planting corn. Other crop used are mustard greens, celery and broccoli, eggplant and bitter melon.

#	Month	Day	Location	Meeting topic	#P	Details on activity
280		8	Tempurukan	Technical training on planting mangroves	14	Mangrove techniques for planting. Agreement on planting locations and planting techniques in village coastal areas.
281		09, 10, 20, 23	Tanjung Baik Budi	Cleaning demonstration plot entrances, planting vegetables, mentoring, plant care.	9	The demonstration plot is about 800m from the highway, so it is necessary to clear a path. In the demonstration plot, cucumber, corn and chili have been planted. Assistance, plant maintenance for sugarcane, chili, corn and cucumber is carried out routinely with a plant care picket system.
282		11	Sungai Awan Kiri	Technical training on planting mangroves	15	Mangrove techniques for planting. Agreement on planting locations and planting techniques in village coastal areas.

#	Month	Day	Location	Meeting topic	#P	Details on activity
283		12	Tempurukan	Survey of Mangrove Planting Area	4	The survey was conducted using a water motor. To see the condition of the sea coast that is suitable to be used as a mangrove planting location.
284		12-18	Kuala Satong	Participatory mapping and land use planning	48	1. Participatory mapping seminar 2. Taking coordinates 3. Participatory land use planning
285		12 & 26	Tempurukan	Production of POC Fertilizer (Liquid Organic Fertilizer)	19	The materials used for POC production are materials collected by the community independently. The filtered results are POC that is ready to be used while the POC dregs are used by sprinkling them on top of the plant.

#	Month	Day	Location	Meeting topic	#P	Details on activity
286		14	Tanjung Baik Budi, Sungai Putri, Sungai Awan Kiri, Suka Maju	Activity visit from the MPK directors to the demonstration plot of the agricultural field school in the sentap kancang area	7	1. The visit was carried out in the village of Tanjung Baik Budi on a field school demonstration plot with 5,000 m2 of land processing using manual tools and 70% of the land has been planted with sugarcane. 2. Sungai Putri planting is somewhat hampered because the location of the land is often flooded by water, so it is necessary to build a drainage channel on the land. 3. Sungai Awan Kiri members of the farmer group independently make compost and POC from the mentoring activity, a harvest activity has taken place in the demonstration plot area. 4. Suka Maju harvesting mustard greens and reprocessing land and planting corn on demonstration plots.

#	Month	Day	Location	Meeting topic	#P	Details on activity
287		14	Sungai Putri	Rice seeds	13	Activities are carried out by sowing rice seeds. The activity was carried out by the Sungai Putri women's Jenjemut farmer group. The activity is carried out for the use of land with an area of 675 m2.
288		18	Tanjung Baik Budi	Technical training on planting mangroves	16	The training materials contain appropriate techniques in selecting suitable seeds for planting, the best location to start planting, techniques for transporting seeds and care after planting.
289		21	Tanjung Baik Budi	Freshwater fish farming	7	Making Floating Nets for Freshwater Fish Cultivation
290		21-22	Kuala Tolak	Participatory land use planning	32	Communities identify problems and threats to Natural Resources and find solutions and plans to reduce these threats

#	Month	Day	Location	Meeting topic	#P	Details on activity
291		21 & 24	Ketapang (Tanah Kayong)	Meeting the land management plan with a mechanical system and planning for the Construction of the Reservoir.	6	1. Land processing can be done using mechanical equipment. First, land clearing is done using an excavator, then the land is cleared with a jonder, 2. Use of Excavator rental system 3. The use of Jonder was loaned from the chairman of LPPNU 4. If the activity goes well, the rice processing machine in Tempurukan will be pulled to the land in Sungai Awan Kiri. 5. RAB of the reservoir from Mr. Iwan. The budget required for the reservoir for fish and without fish has a different value.

#	Month	Day	Location	Meeting topic	#P	Details on activity
292		26	Kantor YIARI (LC)	Meeting timeline for hornbill island activities	5	1. Obtaining the crops to be planted, including livestock feed, plantations, secondary crops, horticulture, and livestock. 2. Acquiring 7 buildings to be constructed on Rangkong Island (greenhouse, compost house and warehouse, cattle pen, goat pen, portal gate for agricultural machinery bridge). 3. Stages of the timeline analysis that have been conducted include land clearing, land preparation, and infrastructure analysis in the design opening of Rangkong Island.

#	Month	Day	Location	Meeting topic	#P	Details on activity
293	Nov-21	1-30	1. Ulak medang 2. Suka maju 3. Sungai awan kiri 4. Tempurukan 5. Sungai putri 6. Tanjung baik budi 7. Kuala tolak 8. Kuala satong	Patrol and identification of forest and land fires	20	Fire patrols are carried out by the village facilitators together with MPA/fire volunteers, and are routinely carried out for 21 days. There have been several land discussions due to dry land conditions
294		1-30	Sungai Putri	Maintenance of mangrove seedlings	3	Seedlings are regularly watered, and protect seedlings from pests and diseases
295		1-18	Desa Sungai Putri	Mangrove replanting	8	Planting 5,250 mangrove seedlings
296		9	Tanah Kayong cafe	FGD on the proposal of the Rimba Alam Lestari Group to be facilitated for the management of fire-prone land belonging to the group covering an area of 58 ha	7	- Submission of group proposals - Discussion on group proposal - Equal perception of cooperation - Planned follow-up meeting is the second FGD which will discuss the cooperation agreement

#	Month	Day	Location	Meeting topic	#P	Details on activity
297		9	Tanah Kayong cafe	FGD on the proposal of the Rimba Alam Lestari Group to be facilitated for the management of fire-prone land belonging to the group covering an area of 58 ha		Submission of group proposals;Discussion on group proposals;Equal perception of cooperation;The plan for The follow-up meeting is a FGD for the cooperation agreement
298		10	Kuala Tolak	RKD (Village Activity Plan): Prepare a plan for cooperation activities between the Village and MPK		FGD to discuss cooperation between the Village and MPK. The result was a document detailing activities between the Village and MPK
299		16	Suka Maju	RKD (Village Activity Plan): Prepare a plan for cooperation activities between the Village and MPK		FGD to discuss cooperation between the Village and MPK. The result was a document detailing activities between the Village and MPK

#	Month	Day	Location	Meeting topic	#P	Details on activity
300		12-21	Tempurukan, Suka Maju, Sungai Putri, Tanjung Baik Budi and Sungai Awan Kiri	YIARI Agriculture and Plantation Demonstration Assistance		Capacity building related to plant protection from pests and diseases in horticultural and food crops
301		13-20	Ulak Medang	Fish catch survey	19	The survey was conducted to gather information on catches over the last 10 years in Ulak Medang, Tanjungpura and surrounding areas. Information gathered included species caught around the Sungai Pawan watershed, species which can be farmed, price per species fetched in markets and traditional methods of acquaculture

#	Month	Day	Location	Meeting topic	#P	Details on activity
302		15	LC	1. Market Analysis 2. Agricultural assistance 3. Scouts	7	1. Market Analysis Presentation from Hendri regarding data on rice production and consumption needs in Ketapang. 2. How demand for food in ketapang markets can be met by the community group 3. Team work, market certainty, cooperation system arrangement 4. Scout Education and Development 5. The number of training participants ready for scouting coaches is 25 people and ready with trainers. 6. Estimated execution time: 4 days 3 nights.

#	Month	Day	Location	Meeting topic	#P	Details on activity
303		16	Kebun YIARI, Sungai Awan Kiri	Making Bokashi fertilizer from chicken manure	6	1. The initial stage of making compost is mixing chicken manure with rice husk and bran into a 30 cm compacted layer. 2. After that the layer is stirred repeatedly by re-flushing with 10 Lt of water + EM4 (effective microorganisms 4) 10 + 10 spoons of sugar. 3. Repeat until raw materials are mixed and moist. 4. The final stage of the bokashi is to tightly package it with a tarpaulin for 4 days (incubation period). The process of making compost takes 14 days.

#	Month	Day	Location	Meeting topic	#P	Details on activity
304		17-19	Kebun YIARI, Sungai Awan Kiri	Bokashi Fertilizer Mixing	4	Bokashi fertilizer at this stage is moist so that there is no need for watering and the ingredients for the bokashi fertilizer are not evenly mixed. The bokashi fertilizer material is brown in color and the mixture of dirt is black in color. The smell of bokashi fertilizer still smells of urine (ammonia) from the chicken droppings. After the bokashi is finished, it is turned or stirred and then closed tightly again with a tarpaulin. The first composting activity is complete.

#	Month	Day	Location	Meeting topic	#P	Details on activity
305		19	Tempurukan, Suka Maju, Sungai Putri, Tanjung Baik Budi and Sungai Awan Kiri	YIARI Agricultural and Plantation Demonstration Assistance		Repairing the embankment with an estimate of 10 days. Repairing 2 small embankments and 1 large embankment. The local community is very grateful and supportive as the repairs will substantially improve their wellbeing
306		20	Kebun YIARI, Sungai Awan Kiri	matching supply and demand for the vegetable market	3	bananas are in short supply compared to the need, but are produced in Mrs Maimun's property
307		21	Desa Suka Maju	Coordination of development impacts with Suka Maju village facilitator	4	

#	Month	Day	Location	Meeting topic	#P	Details on activity
308	Dec-21	1, 17, 18, 19, 20	Sei Awan Kiri, Tanjung Baik Budi, dan Suka Maju	Penguatan Kelompok Tani, Pembuatan Pupuk Organik Cair, Kunjungan Joel ke Demplot Sekolah Lapang	54	1. Activities on December 17, 2021: training for strengthening the PKK women's group in Muara Pawan sub-district, Sei Awan Kiri village, trining for making compost and making anti-rat POC. 2. Activities on December 18, 2021: training on strengthening the Suka Maju village youth group, training for making compost and making anti-rat POC fertilizer. 3. Activities on 18 and 19 December 2021: feasibility study of using unproductive land, sampling was carried out in the village of Tanjung Baik Budi, the first day was carried out in Hamlet 1 and the second day was carried out in Hamlets 2, 3, 4. Public land was selected. The collection activity began with drilling using a peat drill, then taking samples with aluminum foil which was weighed with samples being taken at a depth of 50 cm to test the pyrite content in the soil. After sampling, the sample is stored in the sample box ready for analysis.

#	Month	Day	Location	Meeting topic	#P	Details on activity
309		1-31	1. Ulak medang 2. Suka maju 3. Sungai awan kiri 4. Tempurukan 5. Sungai putri 6. Tanjung baik budi 7. Kuala tolak 8. Kuala satong	Patrol and Identification of Forest and Land Fires	45	Fire patrols are carried out by the village facilitators together with MPA/fire volunteers, and are routinely carried out for 21 days. There have been several land discussions due to dry land conditions
310		1-27	Tanjung Baik Budi	Community Based Mangrove Conservation	3	Planting
311		1-27	Tempurukan	Community Based Mangrove Conservation	3	Planting
312		1-27	Sungai Awan Kiri	Community Based Mangrove Conservation	2	Planting

#	Month	Day	Location	Meeting topic	#P	Details on activity
313		5, 6 & 12	Sei Awan Kiri, Tanjung Baik Budi, dan Sampit.	Mr. Daniel Johan's visit to YIARI, Technical Guidance on Fertilizer use in Organic Agriculture, and a Visit to Al Ikhlas Islamic Boarding School	14	Daniel Johan is a Member of the House of Representatives Commission 3 of the Indonesian House of Representatives. His visit this time was as well as technical guidance on the protection of pests and diseases of agricultural crops and aquaculture. At the same time visiting and learning from the community (farmers and fishermen)
314		9	Desa Mayak	Participatory mapping and land use planning	38	Coordination related to agreeing the date for a Participatory Mapping Seminar. However, the village has not yet approved the implementation of the activity

#	Month	Day	Location	Meeting topic	#P	Details on activity
315		12	Dusun Sepahan Desa Sungai Kelik	RKD (Village Activity Plan): Prepare a plan for cooperation activities between the Village and MPK		FGD to come up with a cooperative plan between village and MPK
316		17	Ulak Medang	FGD with the Alam Lestari Group with MPK on cooperation in reforestation of concession land		FGD on the joint plan for reforestation activities in the concession of MPK. There is a document detailing the Agreement on reforestation activities in the concession area of MPK in Ulak Medang Village

#	Month	Day	Location	Meeting topic	#P	Details on activity
317		20	Head Office of Matan Hilir Utara	Discussion on the results of participatory mapping activities, submission and printing of indicative maps of Kuala Satong, Tanjung Baik Budi and Lamang Satong Villages.	2	The discussion went smoothly, and the community was supportive of YIARI's proposed activities.
318		23	JM cafe Ketapang	FGD on the management of fire-prone unused land which belongs to the Rimba Alam Lestari group (58 Ha)	4	Meeting minutes available

#	Month	Day	Location	Meeting topic	#P	Details on activity
319		27	Tanjung Baik Budi	RKD (Village Activity Plan): Prepare a plan for cooperation activities between the Village and MPK		Meeting minutes available
320	Jan-22	Jan-31	1. Suka maju 2. Sungai awan kiri 3. Tempurukan 4. Sungai putri 5. Tanjung baik budi 6. Kuala tolak 7. Kuala Satong 8. Ulak medang	Patrol and Identification of Forest and Land Fires	25	Fire patrols are carried out by village assistants together with MPA/firefighter volunteers, and routinely in fire-prone areas, patrols are carried out for 21 days. Socializing the community about Land Clearing Without Burning (PLTB).

#	Month	Day	Location	Meeting topic	#P	Details on activity
321			9. Kebun YIARI (Sei Awan Kiri)	POC Blackmail	2	Squeezing liquid organic fertilizer (POC) and how to apply it
322		6	Tanjung Baik Budi	Monitoring Demonstration Plots and Harvesting of Horticultural Crops	7	Harvesting is done at 15.00 WIB – finished. With the results: 200 kg of cucumber, 35 kg of long beans and 10 kg of water pumpkin. Then continued with the packaging stage.
323		8	Suka Maju	Corn crop harvest	8	The harvest was carried out at 10.00 WIB - finished. After harvesting, it was then weighed. So the results obtained weighed 500 kg.
324		11	Suka Maju	Discussion with the Karang Taruna Tunas Baru group regarding making compost fertilizer	6	Conduct discussions to determine the composting schedule and the materials needed.

#	Month	Day	Location	Meeting topic	#P	Details on activity
325		13, 18,	Kalibaru (Sungai Awan Kiri), Tempurukan	Coordination and monitoring of rice farming field school demonstration plots	3	Performing rice plant maintenance. Providing stages in subsequent maintenance and finding out what obstacles are experienced by rice farmers.
325		19	Kuala Tolak	Observation of agricultural land for field school demonstration plots	2	Conducting land checks with an area of 30*100 m² and 60*600 m² and is productive land which is included in the classification of land that will be used as an agricultural demonstration plot.
326		28	Kebun YIARI (Sei Awan Kiri)	Horticultural plant nursery	2	Determining the location of the nursery. The location of the land is in YIARI, precisely in front of the staffhouse office with a land area of 10 * 10 m ² . The nursery place / container uses ecopolybags.

#	Month	Day	Location	Meeting topic	#P	Details on activity
327		28	Tanjung Baik Budi	Coordination and Discussion on Mangrove Nursery	15	The mangrove group agreed on the procurement of mangrove nurseries. The first stage of procurement of mangrove seedlings is 5,000 seedlings. And the collection of seedlings will begin in February 2022.
328		21, 27, 28	1. Suka Maju 2. Sei Awan Kiri 3. Tempurukan 4. Sei Putri 5. Tanjung Baik Budi 6. Ketapang	Diversification of Agricultural Businesses of Communities Around the Area	9	Conduct market surveys on agricultural and livestock commodities to determine market opportunities.
364		31	Suka maju	Patrol and Identification of Forest and Land Fires and extinguishing training	8	- Routinely and periodically carry out direct patrols in areas considered prone to forest and land fires.

#	Month	Day	Location	Meeting topic	#P	Details on activity
			Tempurukan			- Look for hotspots that are prone to fire
			Sungai putri			- Socializing the community to open land without burning
			Tanjung baik budi			- Carrying out land wetting activities to prevent fires.
			Kuala tolak			
			Kuala Satong			
			Ulak medang			
			Tanjung pura			
329	Feb-22	10, 22, 23, 24	Desa Suka Maju	Socialization of the impact of El Nino and forest and land fires	171	The socialization of El Nino and forest and land fires was carried out by BMKG, BPBD, Manggala Agni, Muara Pawan District, Matan Hilir Utara District and YIARI. The socialization includes natural disasters, weather changes, handling of forest and land fires and reporting mechanisms in the event of natural disasters, forest and land fires.
			Desa Tempurukan			
			Desa Kuala Tolak			

#	Month	Day	Location	Meeting topic	#P	Details on activity
			Desa Kuala Satong			
330		Jan-28	Sungai Awan Kiri, Tempurukan, Sungai Putri dan Tanjung Baik Budi	Mangrove Restoration	4	Monitoring the development of mangrove plants
331		Jan-28	Suka maju, Sungai awan kiri, Tempurukan, Sungai putri, Tanjung baik budi, Kuala tolak, Kuala Satong, Ulak medang, Tanjung pura,	Patrol and Identification of Forest and Land Fires	20	Fire patrols are carried out by village assistants together with MPA/firefighter volunteers, and routinely in fire-prone areas. Socializing the community about Land Clearing Without Burning (PLTB). Looking for hotspots that are prone to fire.

#	Month	Day	Location	Meeting topic	#P	Details on activity
332		8, 9	Tanjung Baik Budi, Kuala Tolak	Community empowerment cooperation activity planning meeting through agricultural activities	23	Community empowerment cooperation through agricultural activities. Making a plan for cooperation activities between the Tanjung Baik Budi and Kuala Tolak Village Agricultural Groups with MPK for agricultural activities
333		11	Sungai Putri	Monitoring and checking of agricultural demonstration plots	10	Checking the growth of rice. The rice planted is Algo rice with an area of 3 meters or 675 m2. The rice has entered the fruiting or *generative period* and is planned to be harvested in late February or early March.

#	Month	Day	Location	Meeting topic	#P	Details on activity
334		11	Suka Maju	Handover of agricultural equipment	15	The handover of agricultural equipment, namely hand tractors, was given by members of the House of Representatives Commission IV to the Tunas Baru youth group of Suka Maju village and MPK only accompanied the handover of the equipment. The number of members of the youth group who received hand tractor assistance was 15 people.
335		12	Suka Maju	Strengthening training for Karang Taruna groups towards environmentally friendly organic farming	14	Making compost fertilizer with the materials used, namely 1 ton of rice husks, 1 ton of animal manure, 1 ton of green fodder, and 4 bottles of EM4. The height of the compost produced is 165 cm.

#	Month	Day	Location	Meeting topic	#P	Details on activity
336		13-15	Pontianak	Kuala Satong Pokdarwis Work Program Audience with West Kalimantan Province OPD	4	Syakrani, as the head of the Kuala Satong Pokdarwis, explained the history, activities that have been carried out and work programs that will be carried out at the Kuala Satong Tourism location which aims to publish Mangrove Tourism in Kuala Satong. Most of the invitees responded positively to the mentoring program from YIARI for the Kuala Satong Pokdarwis Group.

#	Month	Day	Location	Meeting topic	#P	Details on activity
337		14	Cafe Genio Ketapang	BA Communication Agreement between Farmers and YIARI-MPK	2	The activities carried out were discussions and direct delivery from representatives of farmer groups to YIARI-MPK regarding the points of agreement in the minutes that had been made. The things that were discussed from the BA points, one of which was the role of YIARI-MPK and the role of farmer groups were still not understood by the farmer groups.

#	Month	Day	Location	Meeting topic	#P	Details on activity
338		16, 22	Café AK Ketapang, Sungai Awan Kiri (Pematang Merbau)	Agrofrestry Kali Baru Farming	10	The activity was carried out on February 16, 2022, which was attended by the BPD Sungai Awan Kiri, group leaders and the head of the Lestari Natural Forest group. The activity was carried out with an introduction from the farmer group and the YIARI-MPK team. The activity aims to obtain an agreement on the first land survey. on February 22, 2022 with Survey of land conditions of 58 Ha in Pematang Merbau Hamlet KM 7 and checking the condition of the prospective rice farming land of 20 Ha and checking simple soil samples and obtaining pH values: 4.54 TDS (total dissolved solids): 36 ppm EC (concentration in solution: 73 uS/cm, Salt: 0 and Temperature 24.8 ^{0} c

#	Month	Day	Location	Meeting topic	#P	Details on activity
339		23	Kebun YIARI	Environmentally friendly organic farming	5	Making compost from the materials used, namely chicken manure and green fodder.
340		26	Suka Maju	The process of decomposing solid organic fertilizer (compost)	16	The condition of the compost fertilizer is dry with a temperature of 42 ^{0}C, and a compost pH of 7.5. The height of the compost after turning is 140 cm, this means that the compost has shrunk by 25 cm.
341		Jan-31	Sungai Awan Kiri, Tempurukan, Sungai Putri dan Tanjung Baik Budi	Mangrove Restoration	4	Monitoring the development of mangrove plants. After being monitored for 3 months, the life level is ± 97 % .
342	Mar-22	Jan-31	Sungai Awan Kiri	Patrol and Identification of Forest and Land Fires and fire extinguishing training in Sungai Awan Kiri	64	1. Patrolling fire-prone areas,
			Suka maju			2. Socialization with the community regarding forest and land fires,
			Tempurukan			3. Provide advice to the community to manage land that is prone to fire.

#	Month	Day	Location	Meeting topic	#P	Details on activity
			Sungai putri			4. There was a 1-day theoretical and practical fire extinguishing training attended by 22 people.
			Tanjung baik budi			
			Kuala tolak			
			Kuala Satong			
			Ulak medang			
			Tanjung pura			
343		Jan-28	Desa Ulak Medang	Socialization of the impact of El Nino and forest and land fires	34	The socialization of El Nino and forest and land fires was carried out by BMKG, BPBD, Manggala Agni, Muara Pawan District, Matan Hilir Utara District and YIARI. The socialization includes natural disasters, weather changes, handling of forest and land fires and reporting mechanisms in the event of natural disasters, forest and land fires.

#	Month	Day	Location	Meeting topic	#P	Details on activity
344		03-May	Ulak Medang	Land Survey and Observation in Ulak Medang	8	Land survey and observation. Discussion with the woodworking community (loggers) that farming cannot be done because the land conditions are often flooded.
345		7	Sungai Putri	Rice Harvest	15	The harvest of Algo variety rice with an area of 0.04 Ha began in the morning until the afternoon. The harvest yield was around 60 bushels. 9 people cut/scythe the rice, 3 people transported the harvest, 4 people threshed it with a machine.

#	Month	Day	Location	Meeting topic	#P	Details on activity
346		9	Suka Maju	Compost Fertilizer Turning	8	The 2nd stage of compost turning was carried out by members of the Karang Taruna group with a total of 8 people. The resulting compost fertilizer was 120 cm high, 200 cm wide and 200 cm long. The compost temperature reached 42 ^{0} C and the soil pH reached 6.5.
347		11	Tanjung Pura	FGD Formation of logger groups	19	The formation of a logger group consisting of 19 people and stated in the Minutes of the formation. The logger community wants to be facilitated in agriculture, plantations and fisheries.
348		15	Tanjung Baik Budi	Submission of Land Feasibility Analysis Results	7	The activity began with a meeting with several community members. involved in land feasibility analysis activities, activities begin with

#	Month	Day	Location	Meeting topic	#P	Details on activity
						delivery of the overall analysis results, namely the land of 10 residents that was checked
						The depth of the peat is still below 2 meters. And the pH content ranges from 2-3.
349		16	Tanjung Pura	Agricultural Assistance for Logger Groups	16	The plant commodities needed by the market that can be planted in Tanjungpura village are corn, pumpkin, cassava leaves, long beans, and nipah bananas. Land clearing for the field school demonstration plot example will use heavy equipment, namely excavators.

#	Month	Day	Location	Meeting topic	#P	Details on activity
350		19	Kuala Tolak	Group Strengthening & Technical Guidance for Making Compost Fertilizer and Anti-Rat POC	19	This meeting began with group strengthening by Mr. Eko Sukamto, then continued with the technical aspects of making compost and liquid organic fertilizer, after which it was continued with a discussion with the farmer group.
351		23	Tanjung Baik Budi	Visit of KLHK and IFAD	16	The activities carried out are to see the processing of existing agricultural land and the designation of land use and verification of peat land or mineral land. As well as
						coordination for what plants are suggested by residents to be restored
						non-productive peat land.
352		25	Suka Maju	Planting Plants in the Yard	12	The activity was carried out by planting 1,000 corn plants and
						planting 450 mustard greens seedlings.

#	Month	Day	Location	Meeting topic	#P	Details on activity
353	Apr-22	Jan-30	Suka maju	Patrol and Identification of Forest and Land Fires and extinguishing training	8	1. Patrolling fire-prone areas,
			Tempurukan			2. Socialization with the community regarding forest and land fires,
			Sungai putri			3. Provide advice to the community to manage land that is prone to fire.
			Tanjung baik budi			
			Kuala tolak			
			Kuala Satong			
			Ulak medang			
			Tanjung pura			
354		06-Jul	Ulak medang	Tilapia fish farming	3	Providing capacity building to group members on how to feed fish. And monitoring of 7 dead tilapia seeds.
355		8	Kuala Tolak	Mangrove Restoration	9	Raising awareness about the importance of maintaining the mangrove ecosystem for sustainability and preventing coastal abrasion and forming groups.

#	Month	Day	Location	Meeting topic	#P	Details on activity
356		12, 14	Suka Maju dan Sungai Awan Kiri	Assessment of suitability of business type for group	25	Discussion with the Srikandi Berjaya group regarding plant commodities that will be cultivated by groups or individuals, discussion with the Karya Baru group regarding plant commodities that will be cultivated by groups or individuals.

#	Month	Day	Location	Meeting topic	#P	Details on activity
357		15	Tanjung Pura	Strengthening of Joint Hijrah Groups and Technical Guidance for Making Organic Fertilizer	12	group strengthening training Hijrah Bersama which begins with material related to the need for groups that can be learned from ant colonies that find food and can only be carried in groups. Next is material related to the main roles & functions of the group. then discusses the process of growing group cooperation in building an economic togetherness system. The final stage is the delivery related to the manufacture of organic fertilizer.
358		16	Suka Maju	Detailed Plan of Agricultural Activities in Suka Maju Village	18	- delivery regarding the assistance of RDKD activities from Mr. Wasis, namely the purpose of the deliberation.

#	Month	Day	Location	Meeting topic	#P	Details on activity
						- The activity discussion discussed the division of roles between the Karang Taruna group and MPK in agricultural activities.
						- Determination of witnesses of the cooperation agreement activity, namely one from the village apparatus; village secretary, 1 from MPK; facilitator of Suka Maju village and 2 members of the Karang Taruna group.
359		17.18	Tanjung Baik Budi	Monitoring of sugarcane plants	2	Sugarcane plants can be harvested in an estimated 2-3 months. Sugarcane plant growth is less than optimal due to the need for the addition of chemical fertilizers.

#	Month	Day	Location	Meeting topic	#P	Details on activity
360		21	Tempurukan	Rice harvest	12	The visit to this harvest was non-formal, only symbolic at the harvest with members of the Karya Baru group in Mr. Saupi's rice field. The previous results obtained were 3.5 tons with the use of chemical fertilizers. However, after the assistance of the transition from using chemical fertilizers to organic fertilizers with increased results, namely 6 tons per 27 measurements (6,912 m2).

#	Month	Day	Location	Meeting topic	#P	Details on activity
361		23, 25	Tanjung Pura dan Ulak Medang	Conflict resolution with the Tanjung Pura and Ulak Medang communities	44	The discussion was held regarding The role and responsibilities of Imam Fardhu kifayah so far in Tanjung Pura Village. - discussion was conducted regarding illegal logging that is still happening in Ulak Medang. The result of The discussion was that The community, especially The logger group that had been trained, was willing to help reduce and invite other illegal loggers to reduce or even stop carrying out illegal logging in The Ulak Medang area.
362	########	19,21,24	Sungai Awan Kiri (kebun organik YIARI) Tanjung Pura, Kuala Tolak	Training in making compost and POC fertilizer	32	- Practice of making liquid organic fertilizer and introduction of organic in YIARI garden

#	Month	Day	Location	Meeting topic	#P	Details on activity
						- Making compost from banana stems, wood husks and cow dung in Tanjung Pura
						- Making solid organic fertilizer from rice husks, rice straw, banana stems, toothpaste and hibiscus leaves
363		9, 17, 18, 19, 22, 23	Sungai Putri dan Tanjung Baik Budi	Mangrove Restoration (planting and sowing seedlings)	6	- Determining the location point
						- Planting 513 mangrove seedlings in Sungai Putri
						- Construction of a nursery in Tanjung Baik Budi and sowing of mangrove seedlings.
364		Jan-31	Suka maju	Patrol and Identification of Forest and Land Fires and extinguishing training	8	- Routinely and periodically carry out direct patrols in areas considered prone to forest and land fires.
			Tempurukan			- Look for hotspots that are prone to fire

#	Month	Day	Location	Meeting topic	#P	Details on activity
			Sungai putri			- Socializing the community to open land without burning
			Tanjung baik budi			- Carrying out land wetting activities to prevent fires.
			Kuala tolak			
			Kuala Satong			
			Ulak medang			
			Tanjung pura			
365		10	Sungai Putri	Planting rice plants in the JENJAMUT group	14	- This rice planting was carried out on the land of Jenjamut group members with a land area of 1,920 m2.
						- The rice seeds planted are 21-day-old rice seeds. Planting each hole is 3-4 stems with a planting distance between plants of 20 x 20 cm.
366		20	Kantor Camat Delta Pawan Ketapang	FGD on Handling Illegal Logging in the Sentap Kancang Area	5	- Introduction regarding MPK and its history and the types of business currently being carried out

#	Month	Day	Location	Meeting topic	#P	Details on activity
						- Approval to conduct joint patrols with YIARI, MPK and KPH Selatan as the authorized parties.
367		21	Ulak Medang	Tilapia fish farming	3	- Monitoring the development of tilapia in Ulak Medang
						- The size of the tilapia has reached 7 to 10 cm. with a water pH of 6.01 and a temperature of 27°
368		18,24,26	Tanjung Baik Budi, Sungai Putri dan Suka Maju	Sukamaju group meeting, Monitoring and Donor Sell visits	34	- Conducting meetings in the rice planting plan. Discussing the average land area of farmers. As well as poor drainage management
						- Donor sell visit to Sungai Putri to see the jenjamut group in making ecopolybags.
						- Preparation for the MAPAGAMA group's sugarcane harvest which will be carried out in June 2022

#	Month	Day	Location	Meeting topic	#P	Details on activity
369	Jun-22	Jan-31	Suka maju	Patrol and Identification of Forest and Land Fires and extinguishing training	8	- Routinely and periodically carry out direct patrols in areas considered prone to forest and land fires.
			Tempurukan			- Look for hotspots that are prone to fire
			Sungai putri			- Socialize the community to open land without burning
			Tanjung baik budi			- Carry out land wetting activities to prevent fires.
			Kuala tolak			
			Kuala Satong			
			Ulak medang			
			Tanjung pura			
370		4,8,16,21	Tanjung Pura dan Kuala Tolak	The process of decomposing solid organic fertilizers (Compost and Green)	57	- Compost Fertilizer Reversal Phase I and II in Tanjung Pura
						- Compost Fertilizer Reversal Phase I and II in Tanjung Pura
						- Reversal of Phase I and II Green Manure in Kuala Tolak

#	Month	Day	Location	Meeting topic	#P	Details on activity
						- Making anti-rat POC fertilizer in Kuala Tolak
371		06-Sep	Ulak Medang	Tilapia fish farming	4	- Monitoring the development of tilapia in Ulak Medang
						- The size of the tilapia has reached 13 to 14 cm. with a water pH of 6.01 and a temperature of 25°
						- The average weight of the fish is around 12.5 grams/tail.
372		10	Suka Maju	Sowing chili seeds	20	- This activity is carried out by filling the seed planting media (soil mixed with compost) into polybags. Furthermore, planting each polybag 1 seedling and after completion the polybags are arranged in a place that is somewhat protected from rainfall. The sowing of 500 chili plant seedlings with the Lentera variety

#	Month	Day	Location	Meeting topic	#P	Details on activity
373		16	Tanjung Pura	Technical guidance for making ecopolybags	20	- Explanation of the procedures or techniques for making Ecopolybags
						- First stage of ecopolybag procurement 2,500 ecopolybags
						- Size 10 diameter, height 17 cm,
						- A total of 20 ecopolybag weavers,
						- Agreeing on the making of ecopolybags in the Minutes.
374		17	Sungai Putri	Technical guidance for making ecopolybags	13	- Second stage of ecopolybag procurement 2,500 ecopolybags
						- Diameter size 7, height 14 cm for ecopolybag
						- Agreement with ecopolybag price Rp. 2,500 per piece ready to plant
375		19	Kuala Tolak	Technical guidance for making ecopolybags	22	- Procurement of ecopolybags 2,500 ecopolybags

#	Month	Day	Location	Meeting topic	#P	Details on activity
						- Explanation of the procedures or technical aspects of *making Eco polybags*
						- Size 7 diameter, height 14 cm,
						- A total of 20 ecopolybag weavers,
						- Agreeing on the making of ecopolybags in the Minutes.
376		20-21	Tanjung Baik Budi dan Sungai Putri	Planting and sowing seedlings	16	- Mangrove seedling care
						- Replacing dead mangrove seedlings
						- Counting the number of dead mangrove seedlings

#	Month	Day	Location	Meeting topic	#P	Details on activity
377		26	Tanjung Baik Budi	Sugarcane Harvest at Tanjung Baik Budi demonstration plot	42	- The activity began with a meeting at the sugarcane demonstration plot location and after the gathering, it was continued with a symbolic sugarcane harvest carried out by Mrs. Karmele as Director of YIARI and Kang Ginanjar as Acting General Manager.
						- The next plan is to increase the area of land for cultivating sugar cane.
						- The sugar cane harvest yielded 21,000 stalks.
378		27	Kantor desa Sungai Awan kiri	Discussion on participatory mapping	6	1. The Head of Sungai Awan Village asked for assistance from MPK to assist in mapping the administrative area of Sungai Awan Kanan Village,

#	Month	Day	Location	Meeting topic	#P	Details on activity
						2. The mapping requested by the Village Government is, namely, a village administrative boundary map which includes village boundaries, hamlet boundaries and RT boundaries, then a land use map, public facility map, social facility map, forest and land fire hazard map and forest area status map.
						3. The Sungai Awan Kanan Village Government asked the PMDH team to teach how to operate a mapping tool in the form of GPS.
379		Jan-31	Suka maju	Patrol and Identification of Forest and Land Fires	16	- Routinely and periodically carry out direct patrols in areas considered prone to forest and land fires.
			Tempurukan			- Look for hotspots that are prone to fire

#	Month	Day	Location	Meeting topic	#P	Details on activity
			Sungai putri			- Socialize the community to open land without burning
			Tanjung baik budi			- Carry out land wetting activities to prevent fires.
			Kuala tolak			
			Kuala Satong			
			Ulak medang			
			Tanjung pura			
380		11,18,25	Sungai Putri, Tanjung Baik Budi dan Kuala Tolak	Monitoring and Construction of Nursery Houses	9	- Checking the mangroves that were planted last year in the rice fields near the salt water embankment in Sungai Putri
						- Monitoring of mangrove seedlings (total 5,000 seedlings, 371 dead seedlings and 4,629 alive seedlings) in Tanjung Baik Budi

#	Month	Day	Location	Meeting topic	#P	Details on activity
						- Construction of a mangrove nursery in Kuala Tolak with an area of 4 x 6 meters, and will be enlarged again
						- Filling mud and planting Mangrove seeds into ecopolybags to be sown as many as 1000 propagules (the initial target was 2500), there are still 1500 propagules left in Kuala Tolak village.
381		12.19	Sungai Putri dan Tempurukan	Land assessment, natural resource data & human resources of farmer groups	19	- Collection of data for natural resource and human resource assessment and land assessment of Tempurukan village
						- The discussion discussed commodities that will be cultivated both by groups and individuals in Sungai Putri village.

#	Month	Day	Location	Meeting topic	#P	Details on activity
382		13,14,22	Ulak Medang dan Tanjung Baik Budi	Tilapia fish farming	11	- Conducting monitoring of the development of tilapia fish in Ulak Medang and Tanjung Pura
						- The size of tilapia in Ulak Medang has reached 15 to 18 cm. with a water pH of 6.01 and a temperature of 25°
						- There was a death of 85% of tilapia fish seeds in Ulak Medang due to a lack of oxygen in the water and due to the poison from palm oil fertilizers that followed the water flow from the ditch.
						- The average weight of the fish is around 25 grams/tail
						- In Tanjung Baik Budi, they are currently installing a fence around the pool.

#	Month	Day	Location	Meeting topic	#P	Details on activity
383		15-18	Balai pelatihan pertanian, Anjungan, kab. Mempawah	Field School Training for Indonesian Clean Air Cadres from FIELD	6	- On July 14-15, 2022, depart for Mempawah Regency Pavilion.
						- On July 16, 2022, participating in the introductory presentation activities, haze videos, mulching without tillage, side-by-side comparative trial land design and photo taking techniques by the FIELD Indonesia team and finally the FIELD Indonesia profile presentation.
						- July 17, 2022 , farmer field school presentation training activities, practice guiding the Indonesian clean air field school

#	Month	Day	Location	Meeting topic	#P	Details on activity
						- July 18, 2022, preparation of the Indonesian Clean Air field school plan, presentation of the Indonesian Clean Air field school plan, financial management of the Indonesian Clean Air field school and the closing ceremony of the Clean Air training activities in Anjungan sub-district.
						- July 18-19, 2022, departing back to Ketapang.

#	Month	Day	Location	Meeting topic	#P	Details on activity
384		18	Dinas Perkim LH Ketapang	Coordination of preparation of UKL-UPL documents	2	- In this discussion, it is discussed regarding the preparation of UKL-UPL documents that need to be provided with environmental permits from YIARI. However, if there is no permit, it is necessary to carry out the stages of environmental permits
385		21	Tanjung Baik Budi	Discussion of follow-up plans for land clearing for sugarcane plants and sugarcane harvesting	5	- Sugar cane harvest of 150 stalks with an average of 1 stalk weighing 1.5-2 kg.
						- Conducting discussions for follow-up plans for land clearing
386		22	Tanjung Pura	Socialization and discussion regarding the draft PKS with the Joint Hijrah group and the Tanjung Pandan group	50	- Presentation of the draft cooperation agreement
						- Discussion regarding the draft cooperation agreement
						- Explanation of the stages and activities to be carried out

#	Month	Day	Location	Meeting topic	#P	Details on activity
387		20, 24	Kuala Tolak	Monitoring and harvesting of organic fertilizer POC and green fertilizer	11	- On July 20, 2022, monitoring of POC fertilizer that has been made and is ready to be harvested. - The result of the POC harvest was 15 liters - On July 24, 2022, 1,160 kg of green manure was harvested and each member was given 280 kg/person.
388		27-29	Learning Center YIARI desa Sungai Awan Kiri	Aquaponic and 4P Mix Marketing Training by Kopernik	72	1. July 27, 2022, First day of training with Aquaponics material, training in the form of theory in session 1 and practical preparation in session 2. A total of 27 participants took part.

#	Month	Day	Location	Meeting topic	#P	Details on activity
						2. July 28, 2022, Second day of training with 4P Mix Marketing material, training in the form of theory and practice in each session which makes all participants active. A total of 28 participants took part for the second day.
						3. July 29, 2022, Training on the third day as a preparatory training for trainers with 2 sessions and each session 1 theme. Participants who participated were 17 participants for the third day of training in the ToT room
389	Aug-22	Jan-31	Suka maju	Patrol and Identification of Forest and Land Fires	16	- Routinely and periodically carry out direct patrols in areas considered prone to forest and land fires.
			Tempurukan			- Look for hotspots that are prone to fire

#	Month	Day	Location	Meeting topic	#P	Details on activity
			Sungai putri			- Socialize the community to open land without burning
			Tanjung baik budi			- Carry out land wetting activities to prevent fires.
			Kuala tolak			
			Kuala Satong			
			Ulak medang			
			Tanjung pura			
390		Jan-25	Kuala Tolak, Sungai Putri, Tanjung Baik Budi	Group mentoring and mangrove monitoring	7	- Mangrove planting care in Sungai Putri. Of the 2500 mangrove seedlings that were sown, 870 were successfully planted. The remaining 1670 seedlings died because they were eaten by crabs.
						- Checking and recording mangrove seedlings in Tanjung Baik Budi. A total of ± 4300 mangrove seedlings are ready to be planted

#	Month	Day	Location	Meeting topic	#P	Details on activity
						- Care of mangrove seedlings in Kuala Tolak. On September 25 2022, of the 2500 mangrove seeds that were sown, there were 3 to 10 seedlings that died but had been replanted and there were additional 2500 seedlings. The total number of seeds sown was 5000.
391		4	Ulak Medang	Fish growth check	2	Care and data collection on the development of tilapia fish
392		7,9,10,15,16	Sungai Putri, Tanjung Baik Budi dan Kuala Tolak	Group mentoring and mangrove monitoring	22	- Monitoring mangroves in Sungai Putri, mangroves planted the previous year had a good growth rate. - Of the 2,500 mangrove seedlings planted in Sungai Putri, 30 died. - Monitoring of seedlings in Tanjung Baik Budi and the seedlings are ready to be planted.

#	Month	Day	Location	Meeting topic	#P	Details on activity
393		10,12,13	Tanjung Baik Budi	creation of new demonstration plots for fisheries	7	Finalization of the construction of fish farming ponds (Demplot)
394		11	Laman Satong	Socialization of the impact of El Nino and forest and land fires	34	- Greetings from the Head of Laman Satong Village. The village head also hopes for the establishment of MPA and the equipment needed for extinguishing if a fire occurs.
						- Head of BMKG; During the last 30 years, weather changes have been uncertain and in the last 5 years have tended to be weak to moderate so that they do not cause a long dry season.
						- Wasis; The remaining forests are now the only ones who guard or protect our areas or villages from flooding.
395		22	Kuala Tolak	Assistance for Rice Commodities and Farmer Groups	6	- Sowing rice seeds of the Umbang Serai variety with the Partners group

#	Month	Day	Location	Meeting topic	#P	Details on activity
						- Survey of land for prospective demonstration plots for the Joint Partner group
396	Sep-22	Jan-30	Suka maju	Patrol and Identification of Forest and Land Fires	15	- Routine patrols in the Sentap Kancang Village area
			Tempurukan			- Routinely and periodically carry out direct patrols in areas considered prone to forest and land fires.
			Sungai putri			- Look for hotspots that are prone to fire
			Tanjung baik budi			- Socializing the community to open land without burning
			Kuala tolak			- Carrying out land wetting activities to prevent fires
			Ulak medang			- Carrying out land wetting activities to prevent fires
			Tanjung pura			
397		7.15	Suka Maju dan Kuala Tolak	FGD with assisted groups on Participatory Welfare Analysis	39	- Discussion with Village Facility
						- Coordination to determine the date and time of the activity

#	Month	Day	Location	Meeting topic	#P	Details on activity
						- Meeting with community groups regarding Participatory Welfare Analysis
398		19	Tanjung Baik Budi	Making a video of the sugarcane harvesting process to marketing the sugarcane	9	Making a video of the harvest process up to the sale of sugar cane, followed by a discussion of plans to open new land with an area of 5 hectares.
399		19.21	Kuala Tolak dan sungai putri	FGD agreement on determining implementation of planting	30	- This meeting discussed the planned implementation time for planting corn commodities in Kuala Tolak village by the Semangat Jaya Bersama group and the Jenjamut group from Sungai Putri. This meeting began with a joint agreement with the group as stated in the Minutes of the Joint Agreement of the Community Group.

#	Month	Day	Location	Meeting topic	#P	Details on activity
400		26	Sungai Awan Kiri	FGD on the formation of mangrove and ecopolybag weaving groups	10	The formation of mangrove groups and ecopolybag weaving groups, as well as the creation of a letter of agreement for borrowers to use the land as a mangrove nursery center.
401		28 - 29	Ulak Medang dan Tanjung Baik Budi	Monitoring the growth of Tilapia fish	10	- September 28, 2022 at Tanjung Baik Budi, from the first day of spreading tilapia seeds, there were only 6 deaths - 29 September 2022 in Ulak Medang, pond 1: weight per head 40 grams, there is an increase of 9 grams. Pool 2: weight per head is 35 grams, there is an increase of 6 grams. Pool 3: weight per head is 25 grams, there is an increase of 6 grams.
402	Oct-22	Jan-31	Kuala Tolak	Mangrove Seeding and Planting	6	Seeding of 2,500 seedlings in the third batch. Planting of 2,500 mangrove seedlings in the first batch.

#	Month	Day	Location	Meeting topic	#P	Details on activity
403		6	Sungai Awan kiri	Socialization and discussion regarding the draft PKS on the construction of compost houses	12	Presentation of the draft cooperation agreement. Discussion regarding the draft cooperation agreement. Explanation of the stages and activities that will be carried out
404		10	Kuala Tolak	Rice Planting	18	Rice planting on an area of 3,750 m2 with the Umbang Serai seed type. From the area of 3,750 m2, the land given 300 kg of green fertilizer is 450 m2, the rest, namely 3,300 m2, is given 50 kg of green fertilizer
405		Nov-27	Sungai Awan Kiri dan Sungai Putri	Construction of a Mangrove Nursery House	11	Construction of a mangrove nursery in Sungai Awan Kiri and Sungai Putri villages with an area of 10 x 21 meters.

#	Month	Day	Location	Meeting topic	#P	Details on activity
406		17, 23	Ulak Medang dan Tanjung Baik Budi	fish farming	9	Monitoring the development of fish in Tanjung Baik Budi village. There has been a decrease in the number of fish due to being preyed on by pests in the form of kingfishers.
						Security/fencing around the pond has been carried out with netting so that the fish do not escape from the pond due to flooding in Ulak Medang.
407		17	Tanjung Pura	Handover of Agroforestry agricultural tools	13	Handover of Agroforestry tools to the Hijrah Bersama group as many as 10 items. Signing of the receipt letter by the Hijrah Bersama group with MPK.
408		19	Tanjung Pura	Ecopolybag technical guidance and Ecopolybag making	20	Replacement of damaged Eco polybags as many as 2,500. Size 10 diameter, height 17 cm,
						As many as 20 Eco polybag weavers,

#	Month	Day	Location	Meeting topic	#P	Details on activity
						The weavers' group collects Eco polybags at Mr. Aidiwan's house.
409	Nov-22	Jan-28	Sungai Putri dan Kuala Tolak	Mangrove Conservation	9	Cleaning weeds surrounding mangrove trees. Installation of natural mulch in mangrove nursery. Care and recording of mangrove seedlings that are sown
410		4	Café JM,Ketapang	Peatland Infrastructure Development	2	Coordination of signing of cooperation contract with excavator contractor related to 5 ha land clearing activities
411		11, 12,16	Tanjung Pura	Agroforestry Farming Assistance	25	1. Checking the location of the agroforestry demonstration plot
						2. Cultivator accessories assembly
						3. Cleaning of agroforestry land
						4. Install the cultivator blade on the right
						5. Operating the cultivator
						6. How to remove/install tires and steel blades

#	Month	Day	Location	Meeting topic	#P	Details on activity
412		21-30	Lc YIARI	Smart patrol usage training	8	1.Introduction to Smart Patrol 2. Introduction to animals in Sentap Kancang village 3.Smart Patrol usage training
413		30	Ulak Medang dan Tanjung Baik Budi	fish farming	9	Checking the growth of tilapia in Ulak Medang with an average fish weight of 62.5 grams/tail. In Tanjung Baik Budi Village, out of 1,000 tilapia seeds, 10 died.
414	Dec-22	20-24	Sungai putri, Mayak, Tanjung Pura, suka maju, Tempurukan, Tanjung Baik Budi, Kuala Tolak, Ulak Medang, Sungai Awan Kiri dan Laman Satong	Socialization regarding complaints to MPK	204	There are 204 community groups in 10 villages in the Sentap Kancang area who have been socialized in the complaint mechanism, The existence of a complaint mechanism for community groups at MPK, There is socialization regarding complaints against MPK

#	Month	Day	Location	Meeting topic	#P	Details on activity
415		10	Ulak Medang dan Tanjung Baik Budi	Fishery Cultivation	9	Routine monitoring of tilapia fish development in Ulak Medang and Tanjung Baik Budi. 40% of fish ponds have been built in Ulak Medang. Of the 1,000 tilapia seeds in Tanjung Baik Budi, the mortality rate is 20%.
416		Dec-15	Tanjung Baik Budi, Kuala Tolak dan Sungai Putri	Mangrove Conservation	13	Planting 3,500 mangrove seedlings in Tanjung Baik Budi with a total of 9 planters. The number of seeds sown in Kuala Tolak village was 5,000 seeds. Maintenance and installation of mulsar at the location of the mangrove nursery house in Sungai Putri.
417		Feb-24	Tanjung Pura	Agroforestry	19	1. Shipyard Construction 2. Mobilization of NPK and Dolomite Fertilizers 3. FGD on Planting Preparation

#	Month	Day	Location	Meeting topic	#P	Details on activity
						4. Making Planting Holes, Fertilizing and Making Beds and Making Liquid Organic Fertilizer
						5. Plant and Plant Seed Care
						6. Practice operating a hand tractor for high school students
						7. Planting Red Onions and Harvesting POC
418	Jan-23	Jan-29	Kuala Tolak	Social investment (compost house construction)	7	Stages of making a compost house: Cleaning the land 1-7 January 2023,
						Preparation of tools and materials 11-14 January 2023,
						Drilling and making foundations 15-17 January 2023, Making frames and roofing 18-21 January 2023, Cementing the building 22-29 January 2023

#	Month	Day	Location	Meeting topic	#P	Details on activity
419		2, 11	Ulak Medang dan Tanjung Baik Budi	Fishery Cultivation	7	1. Monitoring of tilapia fish in Tanjung Baik Budi: of the 1,000 tilapia fish seeds, only 300 remain, because 700 died. 2. The permanent fish pond in Ulak Medang is in the sedimentation stage to remove the cement smell.
420		5, 11, 18	Sungai Putri	Mangrove Conservation	5	Conducting refreshment to the group before seeding. Filling the mud media in the ecopolybag after that conducting seeding of 5,000 mangrove seedlings.
421		16, 22, 23, 24	Kuala Tolak	Mangrove Conservation	4	1. Cutting bamboo to make stakes. 2. Installing stakes to support mangrove seedlings after planting. 3. Conducting a survey of suitable locations for mangrove planting conducted by MPK and Fasdes Kuala Tolak.

#	Month	Day	Location	Meeting topic	#P	Details on activity
						4. Planting 2,500 seedlings
422		19	Persemaian MPK	Smart Patrol Training	8	1. The 2nd stage of smart patrol training was attended by 8 people from the village facilitators in the Sentap Kancang area.
						2. Village facilitators can now use and run the smart patrol application.
423		23	Tanjung Baik Budi	Agricultural assistance in Tanjung Baik Budi	13	3. Handover of 1 Yanmar brand Hand Tractor unit to the Mapagama group
						4. Land preparation for land processing, and availability of 30 pcs/sack of cement for making ditches"
						5. Land preparation and bed making will be carried out by the group in February and preparation of materials for making compost.

#	Month	Day	Location	Meeting topic	#P	Details on activity
424		25	Kuala Tolak	Rice Farming Assistance	10	1. Handover of hand tractors, sewing machines and shredders 2. Discussion regarding the rice harvest plan in the next 3 weeks with a land area of 512 m²
425		27	Tanjung Pura	Agroforestry Assistance	5	1. Discussion related to plant care scheduling. Plant care scheduling, namely the provision of compost, POC, NPK pearls, fungicides and botanical pesticides. 2. Monitoring the growth of agroforestry plants in the demonstration plot. Around 40% of shallot plants are affected by leaf spot disease.

#	Month	Day	Location	Meeting topic	#P	Details on activity
426	Feb-23	15	Kuala Tolak	Rice Harvest	20	Rice harvesting activity together with Mitra Bersama group in Kuala Tolak Village. Conducted from 9 am until finished. The activity was attended by the Sub-district Head and Sub-district Secretary of MHU, Village Head and Village Apparatus of Kuala Tolak, Mr. Ferian, Mr. Andrian and Harnes MPK, Elly Head of Agriculture Division of Distanakbun and his staff. Babinsa, Bhabinkamtibmas, MHU Police Chief, Mrs. Karmele and Mr. Gavin and friends of comdev. The harvest yield was 562.5 kg / 1,800 m2.

#	Month	Day	Location	Meeting topic	#P	Details on activity
427		18	Suka Maju	Agricultural assistance in Suka Maju	20	Discussion with the Srikandi Berjaya group regarding the commodities to be planted. Then conducting a survey of the land that will be used as a demonstration plot.
428		18	Tanjung Pura	Agroforestry monitoring and production of botanical pesticides	10	The making of pesnab was attended by 6 women and 1 man. The result of making pesnab was 4 liters. Monitoring of agroforestry land by providing organic mulch in the form of leaf litter on chili and onion plants.
429		18	Suka Maju	Discussion with the Srikandi Berjaya group on planting plans	25	The plants to be planted by the group are sweet corn, cayenne pepper, green eggplant, peanuts and sugar cane. Next, survey the land recommended by the Srikandi Berjaya group to be used as a vegetable planting area.

#	Month	Day	Location	Meeting topic	#P	Details on activity
430		20	Tanjung Baik Budi	Assistance in sugarcane and corn farming	6	Reviewing the sugarcane demonstration plot and land expansion for 2 Ha of sugarcane and 3 Ha of corn
431		21	Sungai Awan Kiri	Microbiology propagation training using shaker	24	Microbiology Propagation Training Using Shaker was trained by Kusnadi, Rijal, Vera and also accompanied by Mr. Eko. Conducting pre-test and post-test before and after practice. Delivery of material about trichoderma fungi and beuveria bassiana fungi.
432		22,24,28	Sungai Putri	Mangrove Conservation	5	1. Routine monitoring and checking of live and dead seedlings. 1030 seedlings that were planted died as many as 21 seedlings. 2. Filling mud media into polybags 3. Finding a location point for planting

#	Month	Day	Location	Meeting topic	#P	Details on activity
433		24	Tanjung Baik Budi	Mangrove Conservation	1	1. Monitoring of planted mangrove seedlings. Of the 3,500 planted seedlings, 90% are alive.
434		24	Suka Maju	Socialization of BPJS Employment Program	43	Speaker Mr. Julianto Branch Manager. BPJS Employment Ketapang Regency
435		27	Kuala Tolak	Mangrove Conservation	9	2,500 mangrove seedlings are ready to be planted
436		28	Ulak Medang	fish farming	2	Monitoring and maintenance of tilapia fish. A briefing was conducted with Kusmaheru as a member of the group to separate the young fish from their parents. This aims to maintain the quality of the next tilapia fish.
437	Mar-23	Jan-31	Ulak Medang dan Tanjung Baik Budi	Monitoring the development of Tilapia fish	3	Fish monitoring in Ulak Medang: every morning and evening Mr. Kusmaheru routinely feeds the fish. The tilapia have become broodstock.

#	Month	Day	Location	Meeting topic	#P	Details on activity
438		Jan-31	Suka maju Tempurukan Sungai putri Tanjung baik budi Kuala tolak Ulak medang Tanjung pura Sungai Awan Kiri	Fire prevention patrol and socialization		Patrol and Identification in all areas prone to forest and land fires. Socialize and provide information and examples to farmers and plantation communities so that they open agricultural land not by burning but must use PLTB. Carry out land wetting activities to prevent fires. Monitor water sources in the form of canals and rivers that may be used to overcome forest and land fires or wetting.
439		3	Sungai putri	Mangrove Planting	8	Planting 247 mangrove trees in an area of 247 m² consisting of 8 members, Male = 7 Female = 1. Transporting seedlings using a wheelbarrow along the edge of the rice field.

#	Month	Day	Location	Meeting topic	#P	Details on activity
440		04-Jul	Kuala Tolak	Compost House Construction	7	The construction of the compost house continued on March 4-8, 2023. The construction of the compost house was adjusted to the activities of the community group and 100% of the compost house was completed properly and neatly.
441		7	Tanjung Pura, Sungai Putri dan Tanjung Baik Budi	Socialization of BPJS Employment Program	84	Speaker Mr. Ardiyan from BPJS Ketenagakerjaan Ketapang Regency. Meeting with KUB member communities. The community has been informed about the benefits of BPJS Ketenagakerjaan membership. FGD for BPJS Ketenagakerjaan registration agreement.

#	Month	Day	Location	Meeting topic	#P	Details on activity
442		7,18, 24	Suka Maju, Sungai Putri, Tanjung Pura dan Tanjung Baik Budi	Socialization of Ayo Bang Usman Program	173	FGD for Ayo Bang Usman registration agreement and requirements that must be completed by prospective participants. Participants who attended were 48 people from Sungai Awan Kiri village, 43 people from Suka Maju, 41 people from Tanjung Pura and 41 people from Tanjung Baik Budi
443		10	Tanjung Pura	Red Onion Harvest with the Hijrah Bersama Group	18	The red onion harvest was carried out together with the joint hijrah group, PT.MPK, Mrs. Tia and Doctor Karmele. The harvest was 10 kg and will still be harvested later. There were obstacles due to rain.
444		13	Sungai Awan Kiri (Kalibaru)	Monitoring of new farmer groups	3	The new work group is still in the rice harvest stage on a land area of 1,125 m²

#	Month	Day	Location	Meeting topic	#P	Details on activity
445		13-16	Kuala Tolak	Mangrove Planting	3	1500 trees with an area of 1500 square meters consisting of 3 members, 3 men and also inviting Mrs. Karmele and Mrs. Tia.
446		15	Tanjung Baik Budi	Making water gates	2	Two water gates have been made with dimensions of T = 2 m and l = 1.5 m, while the size of the dam crossing of the water gate is 2 x 3 m. The making of these gates was carried out by the Mapagama group.
447		16	LC YIARI Ketapang	Technical Guidance (BIMTEK) for Village Applications	10	Technical Guidance for village applications to operators from 3 three villages, Suka Maju Village, Tj. Baik Budi and Ulak Medang Village. The technical guidance was trained by the application developer, Mr. Nouval.

#	Month	Day	Location	Meeting topic	#P	Details on activity
448		17	Sungai Putri	Mangrove Seeding	5	Planting 2200 mangrove seedlings from a target of 5000. Due to the limited number of seedlings in Sungai Putri Village, group members looked for them in Tanjung Baikbudi Village.
449		20-22	Kuala Tolak	Mangrove seeding	4	Filling ecopolybags with mud media for sowing 2500 mangrove seedlings involving 4 members, Male = 4
450		22	Tanjung Baik Budi	Making Liquid Organic Fertilizer (POC)	15	Prepare the ingredients for making POC, namely 8 liters of rice washing water, 8 liters of coconut water, 8 bela fruits, 4 kg of mengkudu fruit, 1 bunch of ripe bananas and legume plants. The result of making POC is 20 liters.

#	Month	Day	Location	Meeting topic	#P	Details on activity
451		24	Tanjung Baik Budi	Monitoring the development of Tilapia fish	3	Monitoring of tilapia in Tanjung Baik Budi: of the remaining 300 tilapia, 286 were moved to ponds and the remaining 14 are still in cages.
452		27	Kuala Tolak	Discussion of the results of the Semangat Jaya Bersama group's rice harvest	6	1. Evaluation of harvest results and constraints and problems of group rice plants. 2. The total rice harvest was 1,350 kg with a land area of 1,800 m² .
453	Apr-23	Jan-31	Suka maju Tempurukan Sungai putri Tanjung baik budi Kuala tolak Ulak medang Tanjung pura Sungai Awan Kiri	Fire prevention patrol and socialization	8	Patrol and identification of forest and land fires Activities Collecting hotspot data and how to overcome them. Facilitating forest and land fire prevention patrols and facilitating meetings on the use of land prone to forest and land fires for agriculture/plantations

#	Month	Day	Location	Meeting topic	#P	Details on activity
454		1	Suka Maju	Making compost fertilizer	21	Preparation of tools and materials in making compost. Next, make a mold from 2 pieces of board with a size of 1x1 m2 and a height of 50 cm. After all the ingredients are mixed together, the compost is covered with a tarpaulin for 14 days of incubation.
455		4.16	Tanjung Pura	Chili harvest	12	- The chili harvest was carried out by the Hijrah group together with MPK and YIARI on April 4, 2023. The chili harvest yielded 6.5 kg on 63 beds. - On April 16, 2023, the Hijrah Bersama group carried out another chili harvest, with the chili harvest yielding 4.4 kg.
456		4,7,9,12,15,17	Sungai Putri	Mangrove monitoring	9	Seedlings sown 3210. Alive 3162 dead 48

#	Month	Day	Location	Meeting topic	#P	Details on activity
						There were 382 deaths recorded (still clearly visible remains of the stakes). Watering using the Robin machine. Filling Ecopolybags with mud media assisted by the mothers of the jenjamut group. Sorting seeds that are ready to be planted.
457		6	Tanjung Baik Budi	Mangrove Monitoring	1	There will be deaths of 10% of the 3700 implanted by the end of 2022
458		8,10,11,12	Tanjung Baik Budi, Kuala Tolak, Sungai Putri, Tempurukan	Socialization of the impact of climate change	57	Socialization and discussion of the impact of climate change in Sentap Kancang village. Activities were carried out in each village and on different days. There were 57 participants in the activity. With details of 39 from the community and 18 from the village government of Tanjung Baik Budi, Sungai Putri and Tempurukan.

#	Month	Day	Location	Meeting topic	#P	Details on activity
459		Dec-14	Tanjung Baik Budi	Forest and Land Fire Prevention	19	1. Coordinate with related parties because there is a fire, 2. Carrying out extinguishing operations in agricultural areas owned by residents, 3. Fire monitoring via drone, 4. Wetting the area that has been burned, 5. There was a fire that occurred at 09.00 WIB in Tanjung Baik Budi village and was extinguished until 17.30 WIB. The fire covered an area of 4 hectares. 6. Crosscheck for fire damage, 7. Routinely and periodically carry out direct patrols in areas considered prone to forest and land fires,

#	Month	Day	Location	Meeting topic	#P	Details on activity
						8. Socialize the community to open land without burning
460		15	Suka Maju	Compost turning stage 1	16	Before the compost turning begins, a briefing is first carried out from the facilitator to the group to always measure the pH and see the changes in the color of the compost and the height of the compost. The next stage is to turn the compost and move it to a new container and install 2 pieces of PVC pipe for the compost to breathe.

#	Month	Day	Location	Meeting topic	#P	Details on activity
461		15-16	Ulak Medang	Aquaponics assessment and fish monitoring	2	The assessment conducted for the creation of aquaponics on the tilapia fish pond demonstration plot is: per 2x2 pond, 8 aquaponic planting media pipes will be installed, 1 pond will be planted with kale and 2 ponds will be planted with mustard greens. With a total of 152 planting holes. Purchase of 2 pairs of toman parents and Cleaning the fish body from parasites.
462		18	Kuala Tolak	Mangrove Monitoring	4	1500 seedlings planted in March were mostly uprooted by waves and floating nets from fishermen and Nipah trees were swept away by river currents affected by the ebb and flow of sea water.

#	Month	Day	Location	Meeting topic	#P	Details on activity
463		18	Tanjung Baik Budi	Assistance in Sugarcane & Corn Farming	4	Directing for land clearing using a non-burning cultivation method. The stages that group members do are spraying the land using herbicides. The next stage is to use a hand tractor to cultivate the land on agricultural land.
464		19-20	Sungai Awan Kiri	Agricultural assistance	2	Monitoring the rice harvest results of the Karya Baru group in Sei Awan Kiri village. Utilization of secondary metabolites that will be applied to Agroforestry land

#	Month	Day	Location	Meeting topic	#P	Details on activity
465		19-20	Tanjung Pura	Silaturahmi and breaking the fast together	15	A gathering activity was carried out with the Hijrah group together (breaking the fast together) and a visit to the house of Mr. Suwandi, a member who was unable to attend due to illness. Training was carried out on the use of secondary metabolites of trichoderma in chili and sour eggplant plants as well as the handover of 1 watering machine and 7 hoses for watering plants.

#	Month	Day	Location	Meeting topic	#P	Details on activity
466		27,28	Sungai Awan Kiri	Mangrove Monitoring	11	Filling mud into 2500 ecopolybags. Before this activity was carried out, a briefing was first conducted for the correct and proper procedure for filling ecopolybags. Filling the ecpolybag with mud must be solid and not full (leaving space of approximately 1-2 fingers) to make it easy to move.
						Transferring seedlings to the nursery
467	######	Jan-31	Sungai Awan Kiri	Mangrove conservation	11	Monitoring and caring for mangrove seedlings. From the results of monitoring the sown mangrove seeds, 36 of the 5,000 seeds sown died.
468		Jan-31	Suka maju	Fire prevention patrol and socialization	29	- Routine patrols in the Sentap Kancang Village area
			Tempurukan			- Look for hotspots that are prone to fire

#	Month	Day	Location	Meeting topic	#P	Details on activity
			Sungai putri			- Conduct direct visits to areas prone to forest and land fires, especially residents' plantation areas that are dry and easily burned.
			Tanjung baik budi			- Routinely and periodically carry out direct patrols in areas considered prone to forest and land fires.
			Kuala tolak			- Socialize the community to open land without burning
			Ulak medang			- Carry out land wetting activities to prevent fires.
			Tanjung pura			
			Sungai Awan Kiri			
469		2,3,8,11,15,18,22	Sungai Putri	Mangrove conservation	8	Sorting of 1200 seedlings ready for planting and watering.
						Planting 1200 mangrove trees.

#	Month	Day	Location	Meeting topic	#P	Details on activity
						Land clearing for demonstration plots and sorting of seedlings and watering. Seedling care and watering. Visit by Doc. Karmele and Mrs. Lukmi to the nursery and see the mangrove trees planted in September 2021. Seedling care and watering
470		3	Suka Maju	Compost turning stage 2	24	Performing the second stage of compost turning. Checking the temperature and pH of the compost. Moving the turned compost to a new container. The next step will be harvested on May 15, 2023.

#	Month	Day	Location	Meeting topic	#P	Details on activity
471		4	BPP kecamatan Matan Hilir Utara	Legality discussion of Kuala Tolak farmer group	8	Discussion on the legality of the group in Kuala Tolak village, the activity was attended by 4 agricultural extension workers, the government/NGOs/Private parties involved were 4 agricultural extension workers. BPP is ready to assist the assisted groups and support in borrowing equipment. BPP is ready to attend and assist in the formation of groups assisted by YIARI and MPK.
472		5	Kantor wrumbii YIARI	Increase trichoderma mushrooms	3	The activity was carried out by Konseli D. Vera, staff of YIARI and 2 interns from the Faculty of Forestry, Tanjungpura University. This activity produced 20 petri dishes and 14 test tubes of trichoderma.

#	Month	Day	Location	Meeting topic	#P	Details on activity
473		6	Tanjung Baik Budi	POC (liquid organic fertilizer) filtration	9	The direction from the agricultural assistant is that we can filter or harvest the new POC after 14 days of making the POC. The next step is the POC filtering process and storing it in a bottle. The results of the POC squeezing obtained were 20 liters with a pH of 3.10
474		9	Sungai Putri	Village Regulation Discussion	10	Discussion related to Discussion on Village Regulations and activities of MPK Sungai Putri Village, the activity was attended by 6 Village Staff
						The government/NGOs/private sector involved 4 people from the government.
						1. There is cooperation in creating Environmental Village Regulations with the Village Government,

#	Month	Day	Location	Meeting topic	#P	Details on activity
						2. The Village Government supports activities in Sungai Putri Village such as Agriculture, Mangroves and Handling of Forest and Land Fires,
						3. For cooperation in making environmental village regulations, the village government is still waiting for the election of a definitive village head so that it can plan to make village regulations.
475		9.18	Kuala Tolak	Mangrove conservation	9	routine watering of mangrove seedlings planted by 2 group members. 1500 seedlings planted in March, 112 stems remain. For seedlings planted in January 2023, 26 stems remain and the remaining ones have very good growth, a 90% chance of survival if not hit by wood waste.

#	Month	Day	Location	Meeting topic	#P	Details on activity
476		10.11	Tanjung Baik Budi dan Suka Maju	Monitoring and evaluation of village applications	6	village to the operator in Tanjung Baik Budi Village, the Operator understands how to operate the village application used for village administration activities for community services. The Operator already understands how to operate the Village Application
477		10-Dec	Ulak Medang	Aquaponics installation	3	Installation of aquaponic equipment and sowing of kale and mustard greens seeds.
478		12	Kuala Taolak	Monitoring of rice fields	3	Monitoring the sales results of Mr. Asmad's rice, a member of the Semangat Jaya Bersama group, totaling 160 kg, at a price of 12,000/kg. The Semangat Jaya Bersama group has sown 6 gantang or 16.2 kg of rice seeds, with the Bramo variety of seeds

#	Month	Day	Location	Meeting topic	#P	Details on activity
479		15	Panen kompos	Like to Advance	21	Before harvesting the compost, the facilitator gave directions to the group. The compost that was ready to be harvested was 34 days after the first fertilizer was made. The compost produced was 1,150 kg with a pH value of 7.
480		16	Kuala Tolak	Production of secondary metabolites of Trichoderma sp. fungi	8	The making of secondary metabolites of Trichoderma fungi begins with preparing tools and materials. The activity was carried out by Konseli D. Vera and Kusnadi, staff of YIARI and 2 interns from the forestry faculty of Tanjungpura University. There were 11 jerry cans containing 2.7 liters of secondary metabolites of Trichoderma

#	Month	Day	Location	Meeting topic	#P	Details on activity
481		16	Tanjung Baik Budi	Mangrove conservation	1	Checking and monitoring of seedlings that have been planted in December 2022. The results are still the same as last month, namely mortality at 10%.

#	Month	Day	Location	Meeting topic	#P	Details on activity
482		19.26	Tanjung Baik Budi	Land processing using a hand tractor	7	Before this activity began, there were several directions given, namely that land processing should not be done by burning and we implement land processing without burning using hand tractor land processing agricultural tools. This activity was carried out by spraying the land first on May 6-7, 2023 on the land, then continued with land processing using a hand tractor tool covering an area of 5,000 m2. Continued on May 26, 2023, land processing with an area of 5,000 m² , so the total land processed was 10,000 m² and or 1 hectare.

#	Month	Day	Location	Meeting topic	#P	Details on activity
483		19	Tanjung Pura	Agroforestry Farming	2	Direction and application of fungicides in plants. Spraying fungicides on chili plants & sour eggplant. Then sowing chili plants in potrays as many as 3,000 seeds.
484		22	Kuala Tolak	Monitoring and planting of rice	3	Planting rice plants on the land of Semangat Jaya Bersama group members. Rice planted on land with an area of 450 m²
485		25-30	Desa Ulak Medang, Desa Tanjung Pura, Desa Suka Maju, Desa Sungai Awan Kiri, Desa Sungai Putri Desa Kuala Tolak	Assessment of program usefulness	113	Conducting FGD activities on the benefits of the program in 6 villages in the Sentap Kancang area. The activities were carried out for 6 days in each village (6 villages). There were 113 communities who were members of business groups in six villages who participated in the program's benefit assessment workshop. S8 of them worked as active loggers in Ulak Medang and Tanjung Pura villages.

#	Month	Day	Location	Meeting topic	#P	Details on activity
486		27	Suka Maju	Preparation of PLTB agricultural land	24	Briefing before carrying out land clearing activities. Land preparation begins with spraying grass using herbicides. The area of land used as a demonstration plot has an area of 2,500 m ²
487		29	Sungai Awan Kiri	Application of secondary Trichoderma metabolites in chili plants	10	Briefing from the assistant regarding the function of trichoderma on plants and the procedure for using trichoderma. Applying 150 ml of secondary metabolites mixed with 8 liters of water to chili plants.
488	Jun-23	Jan-31	Suka maju Tempurukan Sungai putri Tanjung baik budi Kuala tolak Ulak medang Tanjung pura	Fire prevention patrol and socialization	8	Conducting routine patrols in the area around Sentap Kancang Forest, activities during patrols are: Monitoring, monitoring fire-prone land and socialization

#	Month	Day	Location	Meeting topic	#P	Details on activity
			Sungai Awan Kiri			
489		9,16,22	Kuala Tolak	Monitoring and evaluation of village regulations	52	Conducting socialization of village regulations in Kuala Tolak with 3 target groups, namely: village government, KTPA and the community. This activity was carried out for 3 days from 9, 16 and 22 June 2023. The groups that were socialized amounted to 52 people consisting of: Village government amounting to 13 people, KTPA amounting to 10 people and the community amounting to 19 people.
490		10 – 19	Sungai Putri	Monitoring and planting mangroves	8	1. Planting 1,400 mangrove seedlings 2. Monitoring of mangroves that had been planted in May, as many as 1,200 trees, saw 40 trees die and in June, as many as 1,400 trees, saw 2 trees die.

#	Month	Day	Location	Meeting topic	#P	Details on activity
491		12	Sungai Awan Kiri	Plowing and planting rice	7	Plowing the land and planting rice with a land area of 11,250 m² . This activity was also covered by BBC media.
492		13	Tanjung Baik Budi	Audio visual production with the BBC media team	13	Land plowing activities to loosen the soil were carried out on a 1-hectare plot of land belonging to the Mapagama group on June 14, 2023. This activity was covered by the BBC and interviewed Mr. Ahsani to provide information about the background of planting sugarcane on land that is often burned, the motivation for liking to plant horticultural crops and the meaning of horticulture for his life.

#	Month	Day	Location	Meeting topic	#P	Details on activity
493		13-16	Kuala Tolak	Monitoring and planting mangroves	6	monitoring of mangroves planted in March as many as 1500, only 27 trees survived and 1473 died. Because the mud at the planting location disappeared dragged by the waves. planting (patching) in the same location as many as 1500 seedlings, and planting in spots that looked empty as many as 1000 seedlings. The total planting in June 2023 was 2500 mangrove trees with the Rhizophora Stylosa species.

#	Month	Day	Location	Meeting topic	#P	Details on activity
494		14	Tanjung Pura	Making botanical pesticides for pest control	14	The first activity was a briefing from Mr. Eko and Vera to the members of the Hijrah Bersama group regarding the materials that need to be prepared in making botanical pesticides and how to make botanical pesticides. Next, the activity of making POC was carried out. The results of Organic Pesticides made from (Betel leaves, ginger, galangal, garlic, EM4, Sugar, 10 liters of water) were 12 liters.

#	Month	Day	Location	Meeting topic	#P	Details on activity
495		16	Kuala Tolak	Making green fertilizer with the Semangat Jaya Bersama group	8	The briefing activity began with Mr. Eko's presentation regarding the tools and materials needed in making green fertilizer. Then Vera explained what group members should do to close the green fertilizer tightly so that the decomposition process occurs properly and reminded them to do the first turning after 14 days from the manufacturing stage. The initial stage is the process of making a mold from boards, and continuing to process the materials for making compost.
496		21	Tanjung Baik Budi	Mangrove monitoring	1	Of the 3500 seedlings planted in December 2022, 525 trees (15%) died.
497		30	Ulak Medang	Monitoring Aquaponics and fisheries	2	1. Water spinach seeds have been put into 48 netpots of aquaponics.

#	Month	Day	Location	Meeting topic	#P	Details on activity
						2. The assessment of the cultivation plan in Ulak Medang is to try cultivating snakehead fish in cages.
498		30	Sungai Awan Kiri	Mangrove monitoring	5	There were 5000 seeds sown. off 315, on 4685.
499	Jul-23	Jan-31	Sungai Putri	Fire prevention patrol and socialization	184	- Routine patrols in the Sentap Kancang Village area
			Tanjung Baik Budi			- Socialization to 176 communities in 8 villages
			Tempurukan			- Look for hotspots that are prone to fire
			Ulak Medang			- Conduct direct visits to areas prone to forest and land fires, especially residents' plantation areas that are dry and easily burned.
			Kuala Tolak			- Routinely and periodically carry out direct patrols in areas considered prone to forest and land fires.

#	Month	Day	Location	Meeting topic	#P	Details on activity
			Suka Maju			- Socialize the community to open land without burning
			Tanjung Pura			- Carry out land wetting activities to prevent fires.
			Sungai Awan Kiri			
500		2.14	Kuala Tolak	Solid organic fertilizer reversion	5	- The first turning was carried out on July 2, 2023, after 14 days of completing the green fertilizer production. The results showed that the fertilizer pH reached 5.5 and the temperature was 35 °c and the fertilizer height was 60 cm.
						- The second green manure turning on July 14, 2023 produced a pH of 6.5. The temperature was 44 °c with a compost height of 45 cm.
501		6	Suka Maju		6	- Checking land conditions before planting

#	Month	Day	Location	Meeting topic	#P	Details on activity
				Monitoring of agricultural land		- There are old cottages that can be renovated for rest on the farmland.
502		8	Sungai Putri	Mangrove monitoring and maintenance	8	- The number of planted Mangrove seedlings increased by 1200 to 4047 stems. The number of seedlings that died in the nursery increased by 60 to 422 stems. The number of seedlings that died at the planting location was 40 stems. The remaining Mangrove seedlings in the nursery were 1091 stems.
503		10	Ulak Medang	Discussion with fisheries group	10	- reassessment of the benefits of the program carried out in Ulak Medang Village - This meeting aims to find out the obstacles and problems that exist in fisheries in Ulak Medang
504		11	Kuala tolak	Monitoring rice plants	4	- Monitoring rice plants in Mr. Asmad's land. Rice growth is very good.

#	Month	Day	Location	Meeting topic	#P	Details on activity
						- Pests have started to attack rice leaves.
505		12	LC YIARI	Fire Fighting Training	18	- This training was delivered by Mr. Dadi as the speaker. And after that a question and answer process was carried out.
						- This activity involved 18 participants from the “parang” team, one of the firefighting teams from YIARI.
						- All participants who took part came from within YIARI.
506		Nov-23	Kuala Tolak	Land Processing “Docker Making”	7	- land processing with an area of 15x50 m
						- construction of 25 shipyards
						- The shipyard is 80 cm wide, 35 cm high and 15 m long

#	Month	Day	Location	Meeting topic	#P	Details on activity
						- Land processing was carried out by 8 community group members (including village facilitators) of Kuala Tolak Village.
						- The land that has been managed will be planted with sugar cane
507		12,13,14,15,16, 22	Kuala Tolak, Tanjung Baik Budi, Sungai Awan Kiri, Ulak Medang	Stump survey (FGD with logger)	31	- Interview with loggers who work in the PT concession area. MPK
						- The number of loggers interviewed was 32 loggers who were divided into several villages, namely: 3 loggers (Kuala Tolak village), 7 loggers (Tanjung Baik Budi village), 1 logger (Sungai Awan Kiri village), 20 loggers (Ulak Medang village).
						- Discussion with loggers about work in the forest,

#	Month	Day	Location	Meeting topic	#P	Details on activity
						- Fill out the questionnaire provided,
508		13	Ulak Medang	Monitoring aquaponic plants	3	- Reviewing the aquaponics in Ulak Medang, discussing with Mr. Kusmaheru at the location - Checks were carried out for several parameters as follows: water pH 7.53, water salinity 0.01%, dissolved solids 184 ppm, solution concentration 369 us/cm and water temperature 28.9 oC.
509		13	Tanjung Pura	Monitoring agroforestry plants	4	- The chili plants that have been planted are not growing optimally. This is caused by the hot weather and the lack of nutrient availability.

#	Month	Day	Location	Meeting topic	#P	Details on activity
						- before planting chili seeds, the empty land will be sterilized first with trichoderma or fungicide. As well as making solid organic fertilizer.
510		14	Tanjung Baik budi	Mapagama group agricultural monitoring	3	- This activity is carried out in preparation for planting corn kernels,
						- Prepare 4,500 sugarcane seed cuttings (2,500 sugarcane seed cuttings for Kuala Tolak village, 2,000 sugarcane seed cuttings for Tanjung Pura)
						- Providing 30 sacks of animal manure in preparation for planting corn
511		14	Ulak Medang	FGD on snakehead fish cultivation	13	- It has been agreed to switch from tilapia cultivation to snakehead fish cultivation.
						- Making a budget plan

#	Month	Day	Location	Meeting topic	#P	Details on activity
						- Assessment of constraint mitigation and overcoming them.
512		17	Suka Maju	Sweet Corn Planting	21	- Before planting, soak the seeds for 1 day (24 hours), then remove the seeds and soak them again in tobacco water (approximately 5 minutes), then plant them in soil that has been given compost.
						- The number of corn plants planted was 800 seeds.
						- Planting holes are made with a planting distance of 80x20 cm.
513		24	Kuala Tolak	Sugarcane Planting	7	- Sugarcane planting was carried out in Kuala Tolak Village
						- 1,900 cuttings in 19 shipyards

#	Month	Day	Location	Meeting topic	#P	Details on activity
						- The distance between sugarcane plants is 80 cm per row, with the position of the shoots facing upwards in a slanted to flat position.
						- After planting the sugarcane seeds, cover them with litter or soil around the plant.
514		25	Sungai Awan Kiri	Mangrove monitoring and maintenance	5	There were 5000 seeds sown. 315 dead, 4685 alive. In the near future, mangrove seedlings will be sorted again.
515		26	Sungai Awan Kiri	Monitoring rice plants	7	1. Pak Supi's rice plants on an area of 11,250 m2 have:
						- Rice height 65 cm
						- Number of offspring 25-30
						- Attacks by rats and stem borers
						2. Mr. Amad's rice plants covering an area of 1,408 m2 have:

#	Month	Day	Location	Meeting topic	#P	Details on activity
						- Rice height 50 cm
						- Number of shoots 25-30 clumps
						- Mole beetle pest attack
516	Aug-23	Jan-31	Sungai Putri	Fire prevention patrol and socialization	196	- Routine patrols in the Sentap Kancang Village area
			Tanjung Baik Budi			- Socialization to 188 communities in 8 villages
			Tempurukan			- Look for hotspots that are prone to fire
			Ulak Medang			- Conducting direct visits to areas prone to forest and land fires, especially residents' plantation areas which are seen to be dry and easily burned.
			Kuala Tolak			- Routinely and periodically carry out direct patrols in areas considered prone to forest and land fires.
			Suka Maju			- Socializing the community to open land without burning

#	Month	Day	Location	Meeting topic	#P	Details on activity
			Tanjung Pura Sungai Awan Kiri			- Carrying out land wetting activities to prevent fires
517		Jan-31	Sungai Kelik (Sepahan)	Stump survey (FGD with logger)	9	Interview of loggers working in the concession area of MPK, totaling 9 people, located and domiciled in Sungai Kelik Village, Sepahan Hamlet, Nanga Tayap District, Ketapang Regency. There are 9 active loggers who have been interviewed. - FGD with the Team determines the target/target location, - Assessment of location and logger community, - Discussion with loggers about work in the forest,

#	Month	Day	Location	Meeting topic	#P	Details on activity
518		Jan-31	Tanjung pura	Stump survey (FGD with logger)	24	Interview of loggers working in the concession area of MPK, totaling 24 people, located and domiciled in Sungai Kelik Village, Sepahan Hamlet, Nanga Tayap District, Ketapang Regency. There are 24 active loggers who have been interviewed.
						- FGD with the Team determines the target/target location,
						- Assessment of location and logger community,
						- Discussion with loggers about work in the forest,
519		2	Sungai awan Kiri	Mangrove monitoring	5	There were 5000 seeds sown. dead 387, alive 4613. Early September planting will take place.
520		4	Suka Maju	Srikandi Berjaya Group Mentoring	23	1. An example of applying organic mulch to corn plants is 1 plot.

#	Month	Day	Location	Meeting topic	#P	Details on activity
						2. Installation of netting rope around the plants with a net length of 95 meters (1 roll more)
						3. Watering sweet corn plants
						4. Land cultivation without burning 1 bed.
						5. Fertilize with 1 ounce (1 handful) of compost per corn plant.
521		4	Tanjung Baik Budi	Mangrove monitoring	3	Post-planting mangrove monitoring has been conducted. The survival rate of 2800 (80%) of the 3500 mangrove trees planted in December 2022.
522		8	Tanjung Baik Budi	Construction of Farmland Route Bridge	6	The activities carried out were the MAPAGAMA group working together to build a bridge at the location leading to the corn field. The bridge was made from local wood.

#	Month	Day	Location	Meeting topic	#P	Details on activity
523		10	Suka Maju	Corn plant monitoring	2	The activity carried out is monitoring corn plants. Corn plants grow well, but they need watering every day when there is less rainfall (dry season) and fertilization must be carried out again.
524		Oct-15	Tanjung Baik Budi	Corn planting	32	- Joint planting activities between the Mapagama group and government agencies.
						- This planting activity was attended by 32 people.
						- The commodity planted is corn kernels.

#	Month	Day	Location	Meeting topic	#P	Details on activity
						- This planting activity was attended by the Acting Head of Tanjung Baik Budi Village, the Head of the Tanjung Baik Budi Village BPD, the BPP of North Matan Hilir District, the Babinsa of Tanjung Baik Budi Village, the Babinkamtibnas of Tanjung Baik Budi Village, MPK, YIARI and the MAPAGAMA Group.
525		12	Suka Maju	Fertilizing Corn Plants	15	Fertilization is carried out on sweet corn by administering 5 kg of Urea and Poska (for both Urea and Poska), the application is carried out using a 5 cm hole system from the corn plant per stalk, as much as 1 teaspoon.

#	Month	Day	Location	Meeting topic	#P	Details on activity
526		12	Sungai Awan Kiri	Trichoderma Monitoring	2	1. Observations were made on trichoderma at Mr. Amad's house using 6 bags provided by the agricultural service. 2. The Trichoderma cannot be utilized yet and requires further processing to be ready for harvest.
527		12, 23	Kuala Tolak	Monitoring and Discussion of Agricultural Activities	7	monitoring of sugarcane development by Bang Supriyadi, sugarcane grows less well due to lack of water.
528		13	Tanjung Pura	Making agroforestry land ditches	1	2 ditches were made in the back area of the agroforestry land in preparation for planting chilies. Straight ditches for water drainage

#	Month	Day	Location	Meeting topic	#P	Details on activity
529		14-16	Sungai Putri	Mangrove planting	5	On August 14-16, 2023, 1014 mangrove trees were planted involving 4 members of the TEMBATU group and 1 village facilitator (continuing the previous planting location). The total number of planted seedlings was 5500.
530		15.27	Tanjung Baik Budi	Corn plant monitoring	5	- The activities carried out include monitoring corn plants and observing the plants growing. - Carrying out maintenance for watering corn plants by using a fire engine (robin) to water the corn plants with a water source coming from a large ditch in front of the corn field.

#	Month	Day	Location	Meeting topic	#P	Details on activity
531		16.21	Tanjung Baik Budi	Corn plant monitoring	6	- Watering is carried out on corn plants using a fire engine (robin) to water the corn plants with the water source coming from a large ditch in front of the corn field.
532		18	Tanjung Baik Budi	Corn plant monitoring	6	- The activity carried out is by replanting corn plants that do not grow. By moving corn from 3 clumps per planting hole to 1 clump per planting hole. - Around 100 planting holes did not grow and were replanted with 100 stalks of corn kernels.

#	Month	Day	Location	Meeting topic	#P	Details on activity
533		23	Sungai Putri, Tanjung Baik Budi, Tanjung Pura	Visit of FINCAPES and PT. PMK	7	1. The activities carried out were to see the mothers of the Jenjamut group of Sungai Putri Village in making ecopolybags made from pandan plants. 1 person can produce 20 ecopolybags/day. As well as seeing directly the pandan plants that grow not far from the housing.

#	Month	Day	Location	Meeting topic	#P	Details on activity
						2. The activities carried out were a visit to the corn fields and seeing the sugarcane demonstration plot area, followed by a discussion at the hut with the MAPAGAMA group from Tanjung Baik Budi Village. The discussion was related to the use of non-productive land, which is usually unmanaged land and often burns, to become land that has economic value.

#	Month	Day	Location	Meeting topic	#P	Details on activity
						3. The activities carried out were visits to the joint migration group in Tanjungpura Village with monitoring of agroforestry plants. Explanation of disease attacks that cause agroforestry plants to not grow well, especially vegetables. Determining factors include rainfall, the initial disease carrier of the plant (fusarium attack on chili) and soil conditions that lack organic matter (infertile soil)
534		26	Tanjung Baik Budi	Corn Plant Care	9	Hilling is carried out on corn plants by loosening the soil in the corn plant area using a machete and hoe.
535		28	Tanjung Pura	Monitoring of Sugarcane Plants in Agroforestry Land	1	1. The sugarcane plants that had been planted were attacked by monkeys.

#	Month	Day	Location	Meeting topic	#P	Details on activity
						2. Nearly 50% (around 500 clumps) of sugarcane plants were attacked by monkeys.
						3. Sugarcane plants growing in the field were uprooted by monkeys
536		29	Tanjung Baik Budi	Corn Plant Care	9	1. This was done by spraying Plant Pest Organisms to control armyworm attacks using 15 tanks (248 liters) for a land area of 1 Ha.
						2. Spraying is done by spraying dew on corn plants.
537		29	Sungai Awan Kiri	Monitoring rice plants	1	1. Rice growth is less than optimal due to low rainfall.
						2. Rice has entered the fruiting period and can be harvested in September 2023.

#	Month	Day	Location	Meeting topic	#P	Details on activity
538		30	Tanjung Baik Budi	Monitoring of sugarcane demonstration plots	6	1. 3,000 m2 of sugarcane land has been cleared and re-cultivated for replanting sugarcane plants. 2. Sugarcane rejuvenation has been carried out (by pruning old sugarcane stalks) on an area of 2,000 m2.
539		31	Sungai Awan Kiri	Compost Monitor	1	Observations were made on the compost made by Mr. Amad. The compost was already black, no longer smelled of dirt (it was fragrant) and the compost temperature was 260C (room temperature). The total compost produced by Mr. Amad was 2,000 kg.
540		31	Kuala Tolak	Sugarcane plant care	5	1. Green manure fertilization was carried out as much as 800 kg on sugarcane plants.

#	Month	Day	Location	Meeting topic	#P	Details on activity
						2. Fertilization activities are carried out by providing fertilizer using a sprinkling system on sugarcane shoots that have grown.
541	Sep-23	Jan-31	Sungai Putri	Fire prevention patrol and socialization	203	- Routine patrols in the Sentap Kancang Village area
			Tanjung Baik Budi			- Socialization to 195 communities in 8 villages
			Tempurukan			- Look for hotspots that are prone to fire
			Ulak Medang			- Conducting direct visits to areas prone to forest and land fires, especially residents' plantation areas which are seen to be dry and easily burned.
			Kuala Tolak			- Routinely and periodically carry out direct patrols in areas considered prone to forest and land fires.

#	Month	Day	Location	Meeting topic	#P	Details on activity
			Suka Maju			- Socializing the community to open land without burning
			Tanjung Pura			- Carrying out land wetting activities to prevent fires
			Sungai Awan Kiri			
542		6,10,21,22,23,24,25,26,27,28	Sungai Putri	Coordination and Making of Trench Dividers	23	- Coordination of Sungai Putri Village Government
						- Coordination of Tanjung Baik Budi Village Government
						- Coordination of the Tempurukan Village Government
						- Construction of Ditch Blockages in Sungai Putri Village, Tanjung Baik Budi and Tempurukan
						- Coordination and permission from the land owner to make ditch dividers

#	Month	Day	Location	Meeting topic	#P	Details on activity
						- Coordination and permission from the Village to make ditch dividers
						- FGD with the village government and other parties regarding the construction of ditch dividers
						- Construction of ditch barriers in Tanjung Budi Village, Sungai Putri and Tempurukan
						- The agreement between the land owner and PHL was completed within 2-3 days.
543		14	Sungai Awan Kiri	Monitoring the results of Pak Supi's rice harvest from the new work group	2	- The rice harvest on Mr. Supi's land with an area of 11,250 m2 was 530 bushels. One bushel weighs 2,021 kg.
						- Total rice 1,071, 13 kg with a selling price of 12,000/kg. Total money earned Rp. 12,853,650,-

#	Month	Day	Location	Meeting topic	#P	Details on activity
544		15-28	Ketapang, LC YIARI	Legalization of Ayo Bang Usman Group Business	35	- Coordination of Making Group Notary Deeds
						- Coordination of Group MPWP Creation
						- Coordination of Joint Account Creation
						- Completing the Requirements for Submitting KUB Business Capital
						- KUB Bang Usman Capsity Building and Penungasan Workshop
						- Submission of Legality of Group Business to the relevant agencies
545		18.25	Tanjung Baik Budi	Monitoring of Corn and Sugar Cane	4	- Monitoring the growth of corn kernels with today's age, 39 days.
						- The fertilizers used are NPK 16.16.16 Mutiara, NPK 12.12, Montap (for pests) in September. Fertilizer is given 3 times during corn planting.

#	Month	Day	Location	Meeting topic	#P	Details on activity
546		21	Tanjung Pura	Chili Plant Care and Perennials	1	- sowing and maintenance was carried out on 2 sachets (3,000 seeds) of caliber chili plants
547		22	Suka Maju	Assistance in making POC	21	- making liquid organic fertilizer in Sukamaju Village - process of materials and processing of mixed materials in making POC
548		25	Kuala Tolak	Sugarcane plant care	2	- Monitoring sugarcane growth, sugarcane plant height is 85 cm. Sugarcane growth is not optimal in bed 1, only 4 plants grow and in bed 2 19 plants grow. - Checking the soil pH, the soil pH value there is 7 with a temperature of 34 °c
549		26	Suka Maju	Corn plant care	13	- Cleaning plants from weeds by clearing the grass around the sweet corn plants - Watering corn plants

#	Month	Day	Location	Meeting topic	#P	Details on activity
550		25	Sungai Awan Kiri	Mangrove monitoring and maintenance	7	Care and watering of mangrove seedlings and planting. On the first and second day, 2500 mangrove trees were planted involving 4 members of the mangrove group and 2 members of TPOM.
551		29	Tanjung Pura	Socialization of Forest and Land Fires in Junior High Schools and Senior High Schools in Tanjung Pura Village	51	1. There was a socialization activity regarding forest and land fires facilitated by State Senior High School 1 Muara Pawan, Tanjung Pura Village, 2. There were 51 participants from SMA N 1 Muara Pawan from students in grades 10 to 12, with 21 women and 30 men,
552	Oct-23	Jan-31	Sungai Putri	Fire prevention patrol and socialization	190	- Routine patrols in the Sentap Kancang Village area
			Tanjung Baik Budi			- Socialization to 182 communities in 8 villages

#	Month	Day	Location	Meeting topic	#P	Details on activity
			Tempurukan			- Look for hotspots that are prone to fire
			Ulak Medang			- Conducting direct visits to areas prone to forest and land fires, especially residents' plantation areas which are seen to be dry and easily burned.
			Kuala Tolak			- Routinely and periodically carry out direct patrols in areas considered prone to forest and land fires.
			Suka Maju			- Socializing the community to open land without burning
			Tanjung Pura			- Carrying out land wetting activities to prevent fires
			Sungai Awan Kiri			
553		01-Dec	Sungai Awan Kiri	Rice harvest	2	- The harvest on Mr. Amat's land was 1,980 kg on a land area of 3,854 m²

#	Month	Day	Location	Meeting topic	#P	Details on activity
554		01-May	Areal Lanskap Sentap Kancang	Submission for Establishment of Legality of Group Business	10	- Creating a joint group account (10 KUB) - Signing of the Notary Deed of the group (group leader) - There are 5 villages that have joint accounts, namely Kuala Tolak, Tj. Baik Budi, Sungai Awan Kiri, Suka Maju and Tj. Pura.
555		2,9,16,23,30	Tanjung Baik Budi	Corn plant monitoring	3	1. Height growth of 136 cm and 152 cm, 10% healthy plants, 10% dead, 80% already attacked by pests. 2. The height of the corn grows to 196 cm and 216 cm. Corn hairs are starting to appear on the second bed. 3. Corn height 191 cm and 246 cm 4. 15% of corn plants died, 30% were healthy and 55% were sick.

#	Month	Day	Location	Meeting topic	#P	Details on activity
						5. The length of corn fruit growth is 24 cm and 26 cm. The average length of corn fruit growth is around 20-30 cm. Corn fruit is also attacked by caterpillar pests.
						6. Corn plants average 120 cm - 125 cm. Corn development has entered the fruiting period, the length of the corn fruit ranges from 30-35 cm.
556		4	Tanjung Pura	Socialization of Forest and Land Fires at State Middle School 01 Tanjung Pura Village	59	1. There was a socialization activity regarding forest and land fires facilitated by SMP Negeri 01 Muara Pawan, Tanjung Pura Village,
						2. There were 59 participants from SMP Negeri 01 Muara Pawan from students in grades 7 to 9, with 28 females and 31 males.

#	Month	Day	Location	Meeting topic	#P	Details on activity
557		7	Suka Maju	Corn crop harvest	22	1. Sweet corn harvest with a yield of 64 kg, harvesting activities were attended by the Srikandi Berjaya group 2. The harvest results are less than optimal due to less than optimal growth.
558		13,23,26	Kantor wrumbii YIARI	Propagation of Trichoderma Fungus	3	Making trichoderma secondary metabolites for agricultural crops. There were 13 petri dishes and 14 successful trichoderma test tubes and 7 stained dishes and 1 test tube that had contaminants.
559		19	Tanjung Baik Budi	Corn plant care	14	plant care by cleaning weeds around corn plants
560		20	Suka Maju	POC Harvest	21	Liquid Organic Fertilizer Harvest, POC yield is 65 liters. This activity was carried out by the Sikandi Berjaya group.

#	Month	Day	Location	Meeting topic	#P	Details on activity
561		22	Tanjung Pura	Chili harvest	1	Chili Harvest with a Yield of 2 kg. This harvest is for personal consumption and shared with neighbors.
562		27	Tanjung Pura	Monitoring agroforestry plants	4	The activities carried out are monitoring activities in agroforestry land, the results of the monitoring. The growth of perennial plants such as durian, jengkol and petai need to be fertilized.
563		31	Desa mayak	Coordination of Participatory Mapping of Mayak Village	3	- Before the MPK Team arrived, the village government had held a joint discussion with the RT, Hamlet and community leaders regarding participatory mapping. There is an agreement between the Village Government and the MPK Team to conduct participatory mapping 03 to 07 November 2023.

#	Month	Day	Location	Meeting topic	#P	Details on activity
564	Nov-23	Jan-30	Tanjung Baik Budi	Fire prevention patrol and socialization	157	- Routine patrols in the Sentap Kancang Village area
			Tempurukan			- Socialization to 149 communities in 7 villages
			Ulak Medang			- Look for hotspots that are prone to fire
			Kuala Tolak			- Conducting direct visits to areas prone to forest and land fires, especially residents' plantation areas that are dry and easily burned.
			Suka Maju			- Routinely and periodically carry out direct patrols in areas considered prone to forest and land fires.
			Tanjung Pura			- Socializing the community to open land without burning
			Sungai Awan Kiri			- Carrying out land wetting activities to prevent fires

#	Month	Day	Location	Meeting topic	#P	Details on activity
565		3	Desa Mayak	Participatory mapping (socialization and FGD)	23	The stages before conducting participatory mapping socialization, first coordinate with Muara Pawan sub-district and Mayak village. Furthermore, on November 3, 2023, a participatory mapping seminar was held at the Mayak village office, this seminar was attended by 23 participants.
566		04-Jun	Desa Mayak	Area survey and taking coordinate points	12	1. Taking coordinate points for land use or land cover, 2. Taking coordinate points of land ownership, 3. Taking the coordinates of the village administrative boundaries, 4. Taking coordinate points of village public facilities,

#	Month	Day	Location	Meeting topic	#P	Details on activity
						5. Taking coordinate points of village social facilities,
						6. Taking coordinate points of important areas for the community and
						7. Taking coordinates of socially vulnerable points.
567		6	Kantor Desa Mayak	Mapping data validation and verification	17	Verifying data from participatory mapping and compiling data as a report
568		6,13,30	Tanjung Baik Budi	Monitoring of corn kernels	3	1. The height growth of corn is 234cm and 209cm.
						2. Many corns have already flowered, around 95%.
						3. Corn that has less stable growth (small) has also flowered.
						4. Corn has entered the post-harvest period, but due to unstable weather conditions, the post-harvest period for corn is getting longer.

#	Month	Day	Location	Meeting topic	#P	Details on activity
569		6,7,20	Sungai Awan Kiri (dusun Kalibaru)	Coconut oil making	10	The ingredients used are 10 coconuts that have been cleaned and grated. The process carried out for processing is by cooking and filtering so that it becomes oil. The result of 10 coconuts becomes 1.5 liters of oil
570		13	Sungai Awan Kiri	FGD ecopolybag	13	FGD and technical guidance with the weaving mothers of Sungai Awan Kiri Village while weaving ecopolybags which are used as a reference for making ecopolybags.
571		14	Sungai Putri	FGD ecopolybag	10	FGD and technical guidance with the weaver mothers of Sungai Putri Village while weaving ecopolybags which are used as a reference for making ecopolybags.

#	Month	Day	Location	Meeting topic	#P	Details on activity
572		21	Kuala Tolak	Agricultural monitoring	3	This monitoring activity includes the growth of rice plants, these plants have started to have shoots ranging from 15-20 shoots. Meanwhile, sugarcane plants have started to be weeded around the sugarcane and replanting as many as 200 sugarcane cuttings
573		21	Tanjung Baik Budi	Agricultural monitoring	3	The watermelon harvest was 200 kg and was carried out 3 times, the watermelon yield was shared with neighbors and 100 kg was sold to watermelon collectors in Tanjung Baik Budi Village.
574		22	Suka Maju	Making other than pineapple	15	Making Pineapple Jam in Sukamaju Village with the Sukamaju Village TPOM Group. The pineapple jam produced was 1 kg involving 15 members.

#	Month	Day	Location	Meeting topic	#P	Details on activity
575		29	Kantor desa Suka Maju	Public Consultation in the Village Regulation Program	39	1. The implementation of public consultation activities attended by Village Assistants, Sub-district Officials, Village Government, BPD and the Suka Maju Village community, 2. There were 39 people who participated in the public consultation activities regarding the Village Regulation on Forest and Land Fires, 3. The Suka Maju Village community who were present agreed to the existence of a Village Regulation that regulates forest and land fires,
576	Dec-23	Jan-31	Tanjung Baik Budi Tempurukan	Fire prevention patrol and socialization	157	- Routine patrols in the Sentap Kancang Village area - Socialization to 150 communities in 7 villages

#	Month	Day	Location	Meeting topic	#P	Details on activity
			Ulak Medang			- Look for hotspots that are prone to fire
			Kuala Tolak			- Conducting direct visits to areas prone to forest and land fires, especially residents' plantation areas which are seen to be dry and easily burned.
			Suka Maju			- Routinely and periodically carry out direct patrols in areas considered prone to forest and land fires.
			Tanjung Pura			- Socializing the community to open land without burning
			Sungai Awan Kiri			- Carrying out land wetting activities to prevent fires

#	Month	Day	Location	Meeting topic	#P	Details on activity
577		2	Tanjung Baik Budi	Training in making popcorn	10	Training on making 1 kg of popcorn produced 1 large bowl of results (popcorn) consumed together and shared with group members who attended the training. The activity involved 4 wives of MAPAGAMA group members.
578		4,6	Tanjung Pura	Agroforestry farming assistance	5	- December 4, 2023, Plant care carried out in the form of installing nets to prevent monkey pests from entering the demonstration plot. The net installed was 80 meters long, Fencing activities were carried out around the sugar cane plants
						- On December 6, 2023, monitoring agroforestry plants. Plants grow well, except for shallots which are not good.

#	Month	Day	Location	Meeting topic	#P	Details on activity
579		8,12,19	Sungai Putri	Mangrove group mentoring	3	Discussion on searching for mangrove seedlings and cleaning the seedling house. After completing the ecopolybag making, group members will search for mangrove seedlings around Sungai Putri Village and Tanjung Baik Budi Village periodically
580		14,17	Kuala Tolak	Monitoring and maintenance of sugarcane plants	1	- Monitoring sugarcane plants by observing the growth of sugarcane plants. The results of observations of sugarcane growth are not good, land clearing and fertilization of sugarcane plants must still be carried out.
						- Caring for sugarcane plants by cleaning weeds around the sugarcane plants

APPENDIX 5: LIST OF NATIONAL LAWS AND REGULATION RELEVANT TO THE PROJECT

Regulation Name	Relevance and Compliancy of the Project
Law Number 6 of 2023 on the Stipulation of Government Regulation in Lieu of Law Number 2 of 2022 on Job Creation into Law.	The regulation governs the ease, protection, and empowerment of cooperatives and micro, small, and medium enterprises, the enhancement of the investment ecosystem, and the acceleration of national strategic projects, including the improvement of worker protection and welfare.
Law Number 16 of 2016 on Ratification of the Paris Agreement on the United Nations Framework Convention on Climate Change	The regulation is an acknowledgment of the national commitment to reduce emissions from various sectors, forest conservation, the enhancement of renewable energy, and the involvement of local communities and indigenous peoples in climate change mitigation.
Law Number 18 of 2013 on The Prevention and Eradication of Forest Destruction	The purpose of this regulation is to govern the Prevention and Eradication of Forest Destruction by individuals, legal entities, and/or corporations that obtain permits for forest utilization, which results in damage to social, cultural, and environmental aspects, as well as an increase in global warming.
Law Number 24 of 2011 on the Social Security Organizing Agency (BPJS)	The national social security system is a state program aimed at providing certainty of protection and social welfare.
Law Number 32 Year 2009 on Environmental Protection and Management; October 3, 2009	The purpose of this Law is to create an environmentally sustainable development through means of an environmental planning policy, and the rational exploitation, development, maintenance, restoration, supervision and control of the environment.

Regulation Name	Relevance and Compliancy of the Project
Law Number 40 of 2004 on the National Social Security System (SJSN)	The national social security system is a state program aimed at providing certainty of protection and social welfare.
Law Number 13 of 2003 on Manpower.	The purpose of this regulation is to govern the protection of labor and to guarantee the fundamental rights of workers/laborers, ensuring equal opportunities and treatment without discrimination of any kind to achieve the welfare of workers/laborers and their families while taking into account the progress of the business world.
Law Number 41 of 1999 on Forestry	The purpose of this regulation is to optimize the various functions of forests, including conservation functions, protective functions, and production functions, to achieve balanced and sustainable environmental, social, cultural, and economic benefits.
Law Number 5 of 1990 on the Conservation of Biological Natural Resources and Their Ecosystems	This regulation aims to achieve the sustainability of biological natural resources and the balance of their ecosystems in order to better support efforts to enhance the welfare of the community and the quality of human life.
Law Number 1 of 1970 on Worker Safety Rules	The purpose of this regulation is to ensure the safety of every individual at the workplace and to require that every production resource is used and utilized safely and efficiently.
Government Regulation in Lieu of Law Number 2 of 2022 on Job Creation.	This Government Regulation in Lieu of Law on Job Creation includes: 1) the enhancement of the investment ecosystem and business activities; 2) employment; 3) the ease, protection, and empowerment of cooperatives and micro and small enterprises; 4) business facilitation; 5) support for research and innovation; 6) land procurement; 7) economic zones; 8) central government investment and the acceleration of national strategic projects; 9) the implementation of government administration; and 10) the imposition of sanctions.

Regulation Name	Relevance and Compliancy of the Project
Government Regulation Number 36 of 2024 dated September 30, 2024, on Types and Tariffs for Non-Tax State Revenues Applicable to the Ministry of Environment.	This regulation establishes the Types and Tariffs for Non-Tax State Revenues applicable to the Ministry of Environment and Forestry.
Government Regulation in Lieu of Law Number 2 of 2022 on Job Creation.	This regulation governs the ease, protection, and empowerment of cooperatives and micro, small, and medium enterprises, the enhancement of the investment ecosystem, and the acceleration of national strategic projects, including the improvement of worker protection and welfare.
Government Regulation Number 21 of 2021 on the Implementation of Spatial Planning; 02 February 2021.	New regulation as set out in the Omnibus Law to allow clearer and streamlining of Spatial Planning. Mayas Project need to follow this regulation for its spatial plan
Government Regulation Number 22 of 2021 on Environemental Protection, Organisation and Management-	This regulation governs systematic and integrated efforts undertaken to preserve environmental functions and prevent pollution and/or environmental damage, including planning, utilization, control, maintenance, supervision, and law enforcement.
Government Regulation Number 23 of 2021 on the Implementation of Forestry; 02 February 2021.	New regulation as set out in the Omnibus Law to regulate the implementation forestry practices in Mayas Project. New multi-business scheme in forestry practices is first introduced in this regulation
Government Regulation Number 24 of 2021 Procedure for Imposing Administrative Sanctions and Procedures for Non-Tax State Revenues Derived from Administrative Fines in the Forestry Sector 02 February 2021	Non-Tax State Revenues (PNBP) are charges paid by individuals or entities that receive direct or indirect benefits from services or the utilization of resources and rights obtained from the state.
Government Regulation Number 35 of 2021 on Fixed-Term Employment Agreements, Outsourcing, Working Hours and Breaks, and Termination of Employment.	This regulation governs: 1) Fixed-Term Employment Agreements (PKWT) based on a specified duration or completion of specific work; 2) the types and nature of work activities, duration, and limits on the extension of PKWT;

Regulation Name	Relevance and Compliancy of the Project
	3) compensation for PKWT Workers/Laborers; 4) protection of Workers/Laborers and business licensing in outsourcing activities; 5) working hours in certain business sectors or jobs; 6) Overtime Work and Overtime Pay; 7) limitations on certain Companies that can implement long breaks; 8) procedures for Termination of Employment; and 9) the provision of severance pay, service award pay, and compensation for rights.
Government Regulation Number 36 of 2021 on Wages.	This regulation governs wage policies, the determination of wages based on time units and/or output units, wage structure and scale, minimum wages, lowest wages for micro and small enterprises, wage protection, forms and methods of wage payment, items that can be accounted for with wages, wages as the basis for calculating or paying other rights and obligations, wage councils, and administrative sanctions. Wages consist of the following components: 1) wages without allowances; 2) basic wages and fixed allowances; 3) basic wages, fixed allowances, and variable allowances; or 4) basic wages and variable allowances.
Government Regulation Number 37 of 2021 concerning the Implementation of the Job Loss Guarantee Program.	This regulation governs participation, contributions, benefits, and the organization of the Job Loss Guarantee (JKP) program, which is integrated into an effective system, funding sources, and administrative sanctions. The JKP is a social security program provided to Workers/Laborers who experience termination of employment in the form of cash benefits, access to labor market information, and job training. Employers are required to include Workers/Laborers as participants in the JKP program. The JKP program is organized to maintain a decent standard of living when Workers/Laborers lose their jobs. The JKP is administered by the BPJS Ketenagakerjaan and the central government.

Regulation Name	Relevance and Compliancy of the Project
Government Regulation Number 57 of 2016 concerning Amendments to Government Regulation number 71 of 2014 concerning Protection and Management of Peat Ecosystems; December 2, 2016	An amendment to the previous regulation on peat protection and management. Mayas Project use this regulation to comply with government policy on peat management and protection
Government Regulation Number 71 of 2014 concerning Protection and Management of Peat Ecosystems; 12 September	Mayas Project use this regulation to comply with government policy on peat management and protection
Government Regulation Number 50 of 2012 on Occupational Health and Safety Management System	This regulation governs all activities aimed at ensuring and protecting the safety and health of workers through efforts to prevent occupational accidents and work-related illnesses.
Regulation of the President of The Republic of Indonesia Number 98 of 2021 on The Implementation of Carbon Pricing to Achieve the Nationally Determined Contribution Target and Control over Greenhouse Gas Emissions in the National Development	This regulation governs the use of carbon economic value as an instrument to fulfill the Government's obligations in contributing to the reduction of greenhouse gas emissions, by selecting the most efficient, effective, and equitable mitigation and adaptation actions, without compromising the achievement of nationally determined contribution targets.
Presidential Decree Number 32 of 1990 on Management of Protected Areas; July 25, 1990	The objective of this Presidential Regulation aims to prevent damage to environmental sector. The goal is managing the protection of the nature, climate, plants and animals and the cultural heritage as well as the historical and cultural values of the nation. It seeks to maintain plant diversity, animals, system types, and natural uniqueness. Mayas Project use the regulation as the main principle for protection of environment and its biodiversity
Presidential Instruction Number 3 of 2020 on Forestry and Land Fire Management	This regulation governs efforts to control forest and land fires, including prevention activities, fire suppression, post-fire management of forest and land, as well as law enforcement

Regulation Name	Relevance and Compliancy of the Project
	actions against criminal acts related to forest and land fires.
Minister of Environment and Forestry Regulation Number 7 of 2023 concerning Procedures for Carbon Trading in the Forestry Sector	Procedures for Carbon Trading in the Forestry Sector.
Minister of Environment and Forestry Regulation Number 21 of 2022 on the Guidelines of Carbon Economic Value Implementation	This regulation governs the achievement of nationally determined contribution targets and the control of greenhouse gas emissions.
Minister of Environment and Forestry Regulation Number 11 of 2022 on the Profession and Competence of Forest Management Technical staff	This regulation stipulates that every holder of a business license for the utilization of production forests and protected forests is required to have and/or employ technical forestry management personnel.
Minister of Environment and Forestry Regulation Number 9 of 2021 on Management of Social Forestry	This regulation provides guidelines for the granting of management rights, licensing, partnerships, and Indigenous Forests in the field of Social Forestry. The guidelines also address tenure issues and justice for local communities and customary law communities located within or around forest areas, aimed at enhancing community welfare and preserving social functions.
Minister of Environment and Forestry Regulation Number 8 of 2021 on the Forestry Management and the Preparation of Forestry Management Plan, as well as Forestry Utilization in Protected Forest and Production Forest	This regulation governs Forest Management and the Preparation of Forest Management Plans, as well as the Utilization of Forests in Production Forests
Minister of Environment and Forestry Regulation Number 7 of 2021 concerning Forestry Planning, Changes in the Designation of Forest Areas and Changes in the Functions of Forest Areas, as well as the Use of Forest Areas	This regulation governs the Delimitation of Work Area Boundaries for Business Licensing in Forest Utilization with the aim of providing legal certainty regarding the status, location, boundaries, and area of operation.

Regulation Name	Relevance and Compliancy of the Project
Minister of Environment and Forestry Regulation Number P.10 / Menlhk / Setjen / Kum.1 / 3/2019 concerning Determination, Determination and Management on top of Peat Dome Based on Peat Hydrological Unit; March 20, 2019	This ministerial regulation regulates the determination and appointment of peat dome on peatlands based on PHU and its management as a form of corrective action in protecting and managing the Peat Ecosystem.
Minister of Environment and Forestry Regulation Number P.106/Menlhk/Setjen/Kum.1/12/ 2018 on the Second Amendment to the Regulation of the Minister of Environment and Forestry Number P.20/Menlhk/Setjen/ Kum.1/6/2018 on Types of Protected Plants and Animals	This regulation establishes the types of protected plants and/or the reclassification of protected plants to non-protected plants, taking into account the conservation of biological resources through the utilization of these resources and the factual conditions of plant populations in nature and within communities
Minister of Environment and Forestry Regulation Number P.9 / MENLHK / SETJEN / KUM.1 / 3/2018 concerning Technical Criteria for Forest and Land Fire Preparedness and Emergency Status; March 7, 2018	This regulation serves as a guide in determining the status of forest and land fire preparedness or emergency to improve coordination, synchronization and integration as well as quick response for early efforts to deal with forest and / or land fires.
Minister of Environment and Forestry Regulation Number P.8 / ME NLHK / SETJEN / KUM.1 / 3/2018 concerning Fixed Procedures for Field Checking Information on Hotspots and / or Information on Forest and Land Fires; March 7, 2018	This regulation serves as a guideline for the management unit in field checking activities for hotspot information and / or information on forest and land fires.
Minister of Environment and Forestry Regulation Number P.73 / MENLHK / SETJEN / KUM.1 / 12/2017 concerning Guidelines for Implementation and Reporting of National GHG Inventory; December 29, 2017	The Guidelines for the Implementation and Reporting of GHG Inventories are intended to provide a reference in the implementation of trusted, accurate, consistent GHG emission inventories at the national, provincial and / or district / city levels
Minister of Environment and Forestry Regulation Number P.72 / MENLHK / SETJEN / KUM.1 / 12/2017 concerning Guidelines for Implementation of Measurement, Reporting and Verification and Resources for Climate Change Control; December 29, 2017	Regulation on Measurement, reporting and verification of climate change control actions and resources, to ensure accountability for the achievement of actions and resources in an accurate, transparent and accountable manner.

Regulation Name	Relevance and Compliancy of the Project
Minister of Environment and Forestry Regulation P.71 / MENLHK / SETJEN / KUM.1 / 12/2017 concerning Implementation of the National Registry System for Climate Change Control; December 29, 2017	The National Registry System for Climate Change Control is a system for managing and providing web-based data and information on actions and resources for Climate Change Adaptation and Mitigation in Indonesia which are implemented with various resource support;
Minister of Environment and Forestry Regulation Number P.83 / MenLHK / Kum.1 / 10/2016 concerning Social Forestry; 25 October 2016	This regulation serves as a guideline in granting management rights, permits, partnerships and customary forests in the social forestry sector. This is also to resolve tenurial and justice issues for local communities and customary law communities who live in or around forest areas in the context of community welfare and preservation of social functions.
Minister of Environment and Forestry Regulation Number No. P.32 / MenLHK / Setjen / Kum.1 / 3/2016 concerning Forest and Land Fire Control; 15 March 2015	This regulation regulates general guidelines for managing forest and or land fires, covering business / activity / organizational action, management of human resources and infrastructure as well as operational prevention, extinguishing, post-fire handling, support for evacuation and rescue, and support for forest fire /land control or management
Minister of Environment and Forestry Regulation No. P.16 / MENLHK / SETJEN / KUM.1 / 2/2017 concerning Technical Guidelines for Restoring the Function of Peatland Ecosystems; 9 February 2017	The regulation provides technical guidance for restoration of peat ecosystem function
Minister of Environment and Forestry Regulation No. P.15 / MENLHK / SETJEN / KUM.1 / 2/2017 concerning Procedures for Measuring Groundwater Levels at Peat Ecosystems Compliance Points; 9 February 2017	This regulation regulates the procedure for measuring the groundwater level at the peat ecosystem sampling point as a monitoring control point to determine the damage status of the peat ecosystem.
Minister of Environment and Forestry Regulation No. P.14 / MENLHK / SETJEN / KUM.1 / 2/2017 concerning Procedures for	The regulation provides guidance on implementing the procedures for inventorying and determining the final map of the Peat

Regulation Name	Relevance and Compliancy of the Project
Inventory and Determination of Peat Ecosystem Functions; 9 February 2017	Hydrological Unit and determining the function of the Peat Ecosystem
Minister of Environment and Forestry Regulation P.74 / Menhut-II / 2014: Application of Silvicultural Techniques in Business Utilization and / or Storage of Carbon in Production Forests; 22 September 2014	A basic regulation that sets requirement for Silviculture techniques of carbon in production forest
Minister of Environment and Forestry Regulation P.73 / Menhut-II / 2014: Business Plan for Utilization of Carbon Absorption and / or Storage in Production Forests; 22 September 2014	A basic regulation that sets requirement for business plan of carbon in production forest
Minister of Forestry Regulation Number: P.43 / Menhut-II / 2013 concerning Boundary Arrangement of Forest Utilization Permits Work Area, Principle Approval of Forest Area Use, Principle Approval of Release of Forest Areas and Management of Forest Areas in Forest Management Units and Forest Areas with Special Purpose; 19 August 2013	Follow up from P19/Menhut-II/2011 for determining Work area boundaries should include individual and partnership boundaries.
Minister of Forestry Regulation Number: P. 19 / Menhut-II / 2011 concerning Boundary Arrangement of Forest Utilization Permits Working Area;	The holder of an IUPHHK permit is obliged to carry out the demarcation of the work area no later than 1 year since the SK is issued by the Minister according to the stages stipulated in the regulation. Mayas Project has start the demarcation and currently under process
Minister of Manpower Regulation Number 5 of 2021 concerning Procedures for the Implementation of the Work Accident Insurance, Death Insurance, and Old Age Security Programs	This regulation governs the Procedures for the Implementation of the Work Accident Insurance, Death Insurance, and Old Age Security Programs for employees involved in project activities.
Regulation of the Director General of Climate Change Monitoring Number: P.3 / PPI / SET / KUM.1 / 1/2018 concerning the Establishment	This regulation serves as a guideline and direction for the management unit in the implementation of the formation and development of the Fire Care Community

Regulation Name	Relevance and Compliancy of the Project
and Development of a Fire Concerned Community; 31 January 2018	Group (MPA) to ensure that effort can be carried out effectively and efficiently, including activities to establish, increase knowledge and skills, independence and capacity of MPA members.
Director General of Climate Change Monitoring Number: P. 8 / PPI / PKHL / PPI.4 / 10/2018 concerning Guidelines for Reporting Control of Forest and Land Fires; 12 October 2018	This regulation serves as a guideline / reference for data collection and reporting of forest and land fire control for management units which is carried out in a coordinated, integrated, effective, accurate and accountable manner.
Minister of Environment and Forestry Decree No. SK.130/MENLHK / SETJEN / PKL.0 / 2/2017 concerning the Establishment of the National Peat Ecosystem Function Map; 28 February 2017	The Mayas Project uses this regulation as a reference for determining the function of the peat ecosystem. The Mayas Project is included in the Pawan River - Sungai Tolak Peat Hydrological Unit
Minister of Environment and Forestry Decree No. SK.129 / MENLHK / SETJEN / PKL.0 / 2/2017 concerning the Establishment of the National Peat Hydrological Unit Map; 28 February 2017	The Mayas Project uses this regulation as a reference for determining the function of the peat ecosystem. The Mayas Project is included in the Pawan River - Sungai Tolak Peat Hydrological Unit
Minister of Environment and Forestry Letter No. S.661 / Menlhk-Setjen / Rokum / 2015 regarding Instruction for Peatland Management; 5 November 2015	This circular provides instructions for peatland management
Minister of Environment and Forestry Circular Letter No. SE.494 / MENLHK-PHPL / 2015 concerning Prohibition of Clearing Peatlands dated November 3, 2015; 3 November 2015	This Circular regulates the Prohibition of Clearing Peatlands
Regulation of Director General of Climate Change Monitoring Number P. 8/PPI/PKHL/PPI.4/10/2018 on Guidelines for Reporting Control of Forest and Land Fires	This regulation serves as a guideline/reference for data collection and reporting on forest and land fire control by management units,

Regulation Name	Relevance and Compliancy of the Project
	conducted in a coordinated, integrated, effective, accurate, and accountable manner.
Regulation of the Director General of Climate Change Monitoring Number P.3/PPI/SET/KUM.1/1/2018 on the Establishment and Development of a Fire Concerned Community	This regulation serves as a guideline and directive for management units in the implementation of the establishment and development of Fire Concerned Community (MPA) to be carried out effectively and efficiently, including activities related to the formation, enhancement of knowledge and skills, independence, and capacity of MPA members.
Regulation of the Director General of Sustainable Production Forest Management: P. 3 / PHPL / SET / kum.0 / 2/2017 concerning Guidelines for Periodic Forest Carbon Inventory (IKHB) in Businesses to Utilize Carbon Absorption and / or Storage in Production Forests; 27 February 2017	This regulation regulates guidelines for periodic forest carbon inventory (IKHB) for the utilization of carbon sequestration and / or storage in production forests, the implementation is carried out every 10 years and the results will later form the basis for the preparation of a Business Work Plan (RKUPHHK).
Regulation of the Director General No. P.18 / PSKL / SET / PSL.0 / 11/2016 concerning Guidelines for Preparation of Cooperation Agreement Drafts; 16 December 2016	This regulation serves as a guideline in the preparation of the Cooperation Agreement Text (NKK) in a transparent, participative, accountable and non-discriminatory manner by providing equal opportunities for men and women.
Regulation of the Director General PSKL Number P.23 / PSKL / SET / PSL.3 / 12/2016 concerning: Guidelines for the Role of Business Actors in the Implementation of Environmental and Forestry Protection and Management; December 30, 2016	This regulation serves as a guideline and reference in implementing the role of the business sectors in protecting and managing the environment and forestry for the government, companies, communities / communities and related parties.
Regulation of the Director General of Sustainable Production Forest Management Number: P.14 / PHPL / SET / 4/2016 concerning Standards and Guidelines for Implementation of Performance Assessment of Sustainable Production Forest Management (PHPL) and Verification of Timber Legality (VLK); 29 April 2016	This regulation regulates standards and Guidelines for the Implementation of Sustainable Production Forest Management Performance Assessment (PHPL) and Timber Legality Verification (VLK) on license holders or in Production Forests.

Regulation Name	Relevance and Compliancy of the Project
Regulation of the Director General of Sustainable Production Forest Management No P.5 / PHPL / UHP / PHPL.1 / 2/2016 concerning Guidelines for Potential Mapping and Conflict Resolution in Holders of Business Permits for Utilization of Timber Forest Products (IUPHHK) in Production Forests; 25 February 2016	This regulation serves as a guideline and reference for management units (IUPHHK) in mapping potential and conflict resolution for determination of potential for conflicts and able to formulate systematic, measured efforts to resolve them in order to provide effective and optimal results.
Regulation of the Director General of Forestry Planning Number: P. 5 / VII-KUH / 2011 concerning Technical Guidelines for Implementation of Boundary Arrangement of Forest Utilization Permits; 22 June 2011	This regulation becomes a guideline and reference in demarcating IUPHHK working area boundaries so that the boundaries, sizes and locations of IUPHHK work areas are realized.
Circular Letter of the Minister of Environment and Forestry Number SE.6/MenLHK/Setjen/KUM.1/12/2022 on Approval of Work Plans for Multi-Enterprise Forest Utilization Businesses	This Circular Letter serves as a guideline for the implementation of the approval of the Multi-Business Forestry Utilization Work Plan for Business Licensing in Forest Utilization (PBPH)
Circular Letter of Director General of Sustainable Production Forest Management Bumber SE.7/PHL/PUPH/HPL.1/10/2022 on Protection of Protected Wildlife in the Working Area of Forest Utilization Permits (PBPH)	This Circular Letter provides guidance to PBPH Holders to intensify efforts to protect endangered wildlife within the PBPH areas
Circular Letter of the Director General of Sustainable Production Forest Management No SE.1 / PHPL / IPHH / HPL.4 / 1/2020 concerning Implementation of GANIS PHPL Determination; 29-01-2020	This circular regulates the determination of Technical Staff within License Holders (GANIS-PHPL) based on the GANIS PHPL professional certification obtained through a professional competency test and will be given a register number through SIGANISHUT.
Decree of the Head of the Peatland Restoration Agency No SK.05 / BRG / KPTS / 2016 concerning the Establishment of an Indicative Map for Peat Restoration; 14 September 2016	This regulation establishes an Indicative Peat Restoration Map and serves as a guideline for manager of peat restoration activities
Letter of the Head of the Peatland Restoration Agency No SE.02 / KB / 11/2016 concerning Directions for Pre-Arrangement of Peatlands in the Area of Business Permits for Utilization of	This Circular is to provide directions and directions for pre-structuring peatland activities for IUPHHK holders whose working areas contain peatlands.

Regulation Name	Relevance and Compliancy of the Project
Forest Products in Production Forests; November 11, 2016	

APPENDIX 6: DATA AND PARAMETERS AVAILABLE AT VALIDATION FOR REDD (APDEG AND APD)

Data Unit / Parameter:	Aplanned,i
Data unit:	ha
Value	Aplanned_Deg = 13,134.66 Ha Aplanned_Def = 16,777.07 Ha
Description:	Total area of planned deforestation and degradation over the fixed baseline period for stratum i
Source of data:	Annual planned deforested area adopted from legalized working document (RKU-Rencana Karya Umum)
Justification of choice of data or description of measurement methods and procedures applied:	N/A
Any comment:	N/A

Data/ parameter:	fj(X,Y...)
Data unit:	t d.m. tree-1
Description:	Allometric equation(s) for species j linking measured tree variable(s) to aboveground biomass of living trees
Source of data:	Manuri et.al. 2014. Tree biomass equations for tropical peat swamp forest ecosystems in Indonesia. Forest Ecology and Management 334 (2014) 241–253

Measurement procedures (if any):	N/A
Purpose of data	To estimate tree biomass for C stock calculation of baseline and project scenario
Any comment:	The equation used in the calculation is for mixed PSF tree species with DBH as a single parameter.

Data/ parameter:	CFj
Data unit:	tC·td.m.-1
Description:	Carbon fraction of dry matter for species j
Source of data:	IPCC 2006 default value is used.
Value applied	0.47
Purpose of data	The value used to convert dried weight biomass to carbon
Any comment:	None

Data Unit / Parameter:	CAB_tree,i
Data unit:	t C ha-1
Value	CAB_tree, F stratum1 = 130.22 t C ha-1 CAB_tree, F stratum2 = 167.11 t C ha-1
Description:	Carbon stock in aboveground biomass in trees in the baseline in stratum i
Source of data	Data sheet and the analysis result of C stock of forest strata (stratum 1 and 2)
Module parameter originates in:	Module CP-AB

Any comment:	N/A

Data/ parameter:	VEX,j,i|BSL
Data unit:	m3·ha-1
Description:	Mean volume of extracted timber per unit area for species j in stratum i
Source of data:	The timber harvest plan sets the allowable mean extracted volume from the merchantable volume of timber in the forest inventory (Vj,i|BSL),based on legal limits. The value derived from inventory data collected in 31 Permanent Sampling Plots within the project areas, categorized into two timber classes; dipterocarp and other commercial tree species
Value applied:	Stratum 1 Stratum 2
Measurement procedures (if any):	N/A
Any comment:	N/A

Stratum 1

Tree class (j)	M3/ha
Dipterocarp	52.07
Other Commercial	68.32
Total	120.39

Stratum 2

Tree class (j)	M3/ha
Dipterocarp	35.22
Other Commercial	53.63
Total	88.86

Data/ parameter:	Ai,p
Data unit:	Ha
Value	See sheet A_i,p in the REDD parameter spreadsheet
Description:	Area covered by stratum i over land parcel p
Source of data:	The overlapping of the final AGB stratification map and timber harvest plan.
Measurement procedures (if any):	N/A
Any comment:	It must be assumed ex-ante that land parcel boundaries and strata areas must not change through time

Data/ parameter:	Asp
Data unit:	Ha
Value	8.68 Ha
Description:	Area of sample plots p N total within project area: 31 PSP
Source of data:	Recording and archiving of size of sample plots
Measurement procedures (if any):	Standard procedures for plot delineation in forest timber inventory surveys is applied
Any comment:	Ex-ante the size of the plots will be defined and recorded in the monitoring plan.

Data / Parameter	FRSD|BSL
Data unit	Dimensionless
Description	Residual Stand Damage Factor

Source of data	Pinards and Putz (1996)
Value applied	2.30
Justification of choice of data or description of measurement methods and procedures applied	No specific reference is available on the Residual Stand Damage Factor (RSD) for Indonesia case. Based on this reason, the RSD value applied in the calculation use the RSD value of neighbouring country (Malaysia) as studied by Pinards and Putz in 1996. The similarity in the context of forest characteristic and logging practices between both countries believed to be relevant to ensure the conservativeness of the calculation.
Purpose of Data	Determination of baseline scenario
Comments	-

Data/ Parameter:	Vl,j,i,sp
Data unit:	m3
Value	Forest stratum 1 Dipterocarp : 937.26 M3 Other commercial tree: 1229.79 M3 Forest stratum 2 Dipterocarp : 457.89 M3 Other commercial tree: 697.24 M3
Description:	Merchantable volume for tree l of species j in sample plots p in stratum i
Source of data:	Calculated from volume tables derived from the data of breast height (DBH-at typically 1.3 m aboveground level) and merchantable height (MH).
Measurement procedures (if any):	Available in the Standard Operating Procedur (Annex SOP Biomass Survey in the Annexes)

Any comment:	Merchantable Volume (V) is calculated by using formula commonly applied in timber concession in Indonesia as below: V= 1/4*DBH^2*MV* 0.6. The merchantable volume is calculated in unit of m3. The field data and calculation sheet is available at validation. As suggested by the methodology, the merchantable volume further analysed into two tree classes; Dipterocarpaceae and mixed tree species.

Data/ parameter:	BCEFR
Data unit:	t.d.mm-3
Description:	Biomass conversion and expansion factor applicable to wood removals in the project area
Source of data:	IPCC 2006 INV AFOLU Chapter 4, Table 4.5. Default value BCEF Tonnes Biomass (M3 of wood volume) with the growing stock of 80-120 m3/ha
Value applied	1.5
Measurement procedures (if any):	N/A
Any comment:	N/A

Data/ parameter:	OF, SLF, WW
Data unit:	Kg kg-1
Used in equations:	

Description:	OF, SLF and WW are used for oxidation and the decay of wood product in IFM-LtFP OF = Fraction of wood products that will be emitted to the atmosphere between 3 and100 years after production; SLF = Fraction of wood products that will be emitted to the atmosphere within 3 years of production; and WW = Fraction of extracted biomass effectively emitted to the atmosphere during production Wood Waste fraction (WW): Winjum et al (1998) indicate the proportion of extracted biomass that is oxidized (burning or decaying) from the production of commodities for developing and developed countries. Short-lived fraction (SLF) Winjumetal1998 give decay rates for proportions of wood products, which were converted to with short-term (<3yr) Additional Oxidized Fraction (OF) Winjum et al 1998 gives annual oxidation fractions for each class of wood products. This gives the additional proportion that is oxidized between the 3rd and the 100th.
Source of data:	The source of data is the published paper of Winjum et al.199838
Value applied:	Wood Waste fraction (WW): 24% (for developing countries) Short-lived fraction (SLF)

	Sawn wood: 0.12 Wood base panels: 0.06 Additional Oxidized Fraction (OF) Sawn wood: 0.86 Wood base panel:0.98
Measurement procedures (if any):	N/A
Any comment:	

APPENDIX 7: DATA AND PARAMETERS AVAILABLE AT VALIDATION FOR WRC

Data/Parameter	Aproject
Unit	ha
Value	33,747.28 hectares
Description	Total area used in calculating GHG emissions in this project
Purpose	Calculation of GHG emissions
Source	Ministry of Forestry Decree no SK 216 / Menhut-II / 2008
Justification	Total MPK concession area are actually 36,994.75 hectares, but 3,247.48 hectares are allocated for Community Development as is mandatory by law

Data/Parameter	C or EFCO2-proxy
Unit	tCO2e/ha/y/m-wtd
Value	90
Description	Emission factor used in calculating baseline and WPS CO2 emissions due to microbial decomposition of peat soils, by by using water table as proxy
Purpose	Calculation of baseline emissions in the baseline and project scenarios
Source	Hooijer et al (2006)
Justification	Emission proxy from Hooijer et.al (2006) has been used and proven in various research in drained peat soils for plantations such as acacia and oil palm plantations in Indonesia

Data/Parameter	WTDBSL,i,t
Unit	m
Value	See excel sheet : BSL_WTD.xlsx in the Annexes

Description	Water table depth (measured from soil surface) in the baseline as proxy for calculating CO2 emissions from microbial decomposition of peat soils
Purpose	Calculation of GHG emissions from microbial decomposition of peat soils in the baseline scenario
Source	Hooijer et al 2006
Justification	Data adopted from reviewed publications

Data/Parameter	WTDWPS,i,t
Unit	m
Value	See excel sheet : WPS_WTD.xlsx in the Annexes
Description	Water table depth (measured from soil surface) in the project scenario as proxy for calculating CO2 emissions from microbial decomposition of peat soils
Purpose	Calculation of GHG emissions from microbial decomposition of peat soils in the project scenario
Source	Wosten et.al. (2006), Rais et.al. (2020)
Justification	Data adopted from reviewed publications

Data/Parameter	ABSL,i,t
Unit	ha
Value	See excel sheet : WRC_c_Strata_shp in the Annexes
Description	Area of stratum i at year t in the baseline scenario
Purpose	Calculation of baseline GHG emissions
Source	RKU of the baseline agent
Justification	Official RKU document, that is legally binding to, and would becoame mandatory to be followed by, the baseline agent

Data/Parameter	AWPS,i,t

Unit	ha
Value	No actual stratification, calculated on the fly during model run
Description	Area of stratum i at year t in the project scenario
Purpose	Calculation of GHG emissions in the project scenario
Source	Borrowed from the baseline strata
Justification	WPS strata is dynamic and cannot be determined in advance

Data/Parameter	Depthpeat-BSL,i,t0 and Depthpeat-WPS,i,t0
Unit	meter
Value	See excel sheet : Peat_0.xlsx in the Annexes
Description	Average peat thickness in stratum i in the baseline scenario and the project scenario at the project start date
Purpose	Calculation of carbon stock Tracking PDT during calculation
Source	Field assessment and peatland mapping
Justification	Sufficient sampling points and mapping technique were used to generate peat map of the project area

Data/Parameter	Subinitial-BSL,i
Unit	m/y
Value	See excel sheet : BSL_Sub_c.xlsx in the Annexes
Description	Subsidence in the initial years after drainage in stratum i the baseline scenario
Purpose	Calculation of baseline emissions Tracking PDT during calculation
Source	Modelled based on physical properties of peat soils
Justification	Sufficient field and secondary data and widely accepted subsidence model are used

Data/Parameter	Subinitial-WPS,i
Unit	m/y
Value	See excel sheet : WPS_sub_c .xlsx in the Annexes
Description	Subsidence in the initial years after drainage in stratum i in the project scenario
Purpose	Calculation of project emissions Tracking PDT during calculation
Source	Modelled based on physical properties of peat soils
Justification	Sufficient field and secondary data and widely accepted subsidence model are used

Data/Parameter	Ratepeatloss-BSL,i,t
Unit	m/y
Value	See excel sheets : BSL_Sub_c.xlsx, BSL_Sub_f.xlsx, BSL_Sub_o.xlsx, in the Annexes
Description	Rate of peat loss due to subsidence and fire in the baseline scenario in stratum i in year t;
Purpose	Calculation of baseline emissions Tracking stock changes Tracking PDT
Source	Modelled based on physical properties of peat soils
Justification	Sufficient field and secondary data and widely accepted subsidence model are used

Data/Parameter	Ratepeatloss-WPS,i,t
Unit	m/y
Value	See excel sheets : WPS_Sub_c.xlsx, WPS_Sub_f.xlsx, WPS_Sub_o.xlsx, in the Annexes

Description	Rate of peat loss due to subsidence and fire in the project scenario in stratum i in year t;
Purpose	Calculation of baseline emissions Tracking stock changes Tracking PDT
Source	Modelled based on physical properties of peat soils
Justification	Sufficient field and secondary data and widely accepted subsidence model are used

Data/Parameter	Cvol_lower,BSL,i,t
Unit	kg C m-3
Value	Callculated on-the-fly during model run using Carbon fraction parameter value: 0.5 kg/kg
Description	Volumetric carbon content of the peat below the water table in the baseline scenario in stratum i in year t
Purpose	Calculation of baseline emissions
Source	Modelled based on physical properties of peat soils
Justification	Sufficient field and secondary data and widely accepted model are used

Data/Parameter	Cvol_lower,WPS,i,t
Unit	kg C m-3
Value	Callculated on-the-fly during model run using Carbon fraction parameter value: 0.5 kg/kg
Description	Volumetric carbon content of the peat below the water table in the project scenario in stratum i in year t
Purpose	Calculation of baseline emissions
Source	Modelled based on physical properties of peat soils
Justification	Sufficient field and secondary data and widely accepted model are used

Data/Parameter	GHGpeatsoil-BSL,CO2,i,t
Unit	tCO2e yr-1
Value	See excel sheet : BSL_ECO2_o.xlsx in the Annexes
Description	CO2 emissions from microbial decomposition of the peat soil in stratum i in year t in the baseline scenario
Purpose	Calculation of baseline emissions
Source	Calculated using water table proxy
Justification	Water table proxy model has been widely accepted

Data/Parameter	GHGpeatsoil-WPS,CO2,i,t
Unit	tCO2e yr-1
Value	See excel sheet : WPS_ECO2_o.xlsx in the Annexes
Description	CO2 emissions from microbial decomposition of the peat soil in stratum i in year t in the project scenario
Purpose	Calculation of baseline emissions
Source	Calculated using water table proxy
Justification	Water table proxy model has been widely accepted

Data/Parameter	GHGpeatburn-BSL,CO2,i,t
Unit	tCO2e yr-1
Value	See excel sheets : BSL_ECO2_f.xlsx, BSL_ECH4_f.xlsx, BSL_EN2O_f.xlsx in the Annexes
Description	CO2 emissions from burning of peat within the project boundary in the baseline scenario in stratum i in year t
Purpose	Calculation of baseline emissions
Source	Calculated using default EF and burn scar depth
Justification	Based on published literature and IPCC guidelines

Data/Parameter	GHGpeatburn-WPS,CO2,i,t
Unit	tCO2e yr-1
Value	See excel sheets : WPS_ECO2_f.xlsx, WPS_ECH4_f.xlsx, WPS_EN2O_f.xlsx in the Annexes
Description	CO2 emissions from burning of peat within the project boundary in the project scenario in stratum i in year t
Purpose	Calculation of baseline emissions
Source	Calculated using default EF and burn scar depth
Justification	Based on published literature and IPCC guidelines

Data/Parameter	BDinit
Unit	Kg/m3
Value	112.3 (See excel sheet: Soil_BD_Final_MPK_DSR.xlsx in the Annexes)
Description	Initial bulk density of peat soils
Purpose	Calculation of peat carbon stock Calculation of dry mass burnt Calculation of initial subsidence Calculation of annual subsidence
Source	Survey data
Justification	Data were gathered by following scientific procedures and analyzed by certified laboratory

Data/Parameter	Cc
Unit	g/g
Value	0.5

Description	Carbon content of peat soils in term of unit weight of carbon content per unit dry mass of peat soils
Purpose	Calculation of peat carbon stock Calculation of annual subsidence
Source	Page et.al. (2004)
Justification	Adopted from a peer-reviewed publication

Data/Parameter	Dpeatburnt
Unit	m
Value	Calculated on-the-fly during model run (See excel sheets : f_Table_BSL.xlsx, f_Table_WPS.xlsx in the Annexes)
Description	Burn scar depth as resulted by fires on peatlands in the baseline and the project scenarios
Purpose	Calculation of dry mass burnt Calculation of annual subsidence
Source	Page et.al. (2014)
Justification	Adopted from a peer-reviewed publication

Data/Parameter	Gg
Unit	g/g
Value	See excel sheet: Model_Params.xlsx in the Annexes
Description	Emission factor for GHG gases CO2, CH4 and N2O as resulted from the combustion of peat soils in term of unit mass of gases per unit dry mass of peat soils

Purpose	Calculation of GHG emissions from the combustion of peat soils in the baseline and the project scenarios
Source	Christian, et.al. (2003), Hatano, et.al. (2016)
Justification	Adopted from a peer-reviewed publication

Data/Parameter	GWPg
Unit	-
Value	See excel sheet: Model_Params.xlsx in the Annexes
Description	GHG potential of GHG gases CO2, CH4 and N2O in term of life in the atmosphere relative to GHG CO2
Purpose	Calculation of GHG emissions from the combustion of peats oils in the baseline and the project scenarios
Source	IPCC Fifth Assessment Report, 2014 (AR5)
Justification	Default IPCC value

Data/Parameter	Dupper
Unit	m
Value	0.4
Description	Depth of upper layer of peat soils, where most of microbial decomposition and peat combustion take place
Purpose	Calculation of BDupper of peat soils in the baseline and the project scenarios
Source	Assumption based on estimated maximum depth of plant root zone in peat soils in tropical peatlands
Justification	Transition from peat surface to the lower depth is not abrupt but gradual and the determination of the boundary may be subjective in most cases

Data/Parameter	BDupper-BSL,i,t
Unit	Kg/m3
Value	Calculated on-the-fly during model run based on initial bulk density 112.3 kg/m3 and the magnitude of drainage-induced consolidation of peat soils
Description	Bulk density of upper layer of peat soils in stratum i, year t in the baseline scenario
Purpose	Calculation of GHG emission from the combustion of peat soils in stratum i, year t in the baseline scenario
Source	Modelled based on consolidation and shrinkage of peat soils
Justification	Consolidation and shrinkage models have been widely established in soil mechanics

Data/Parameter	BDupper-WPS,i,t
Unit	Kg/m3
Value	Calculated on-the-fly during model run based on initial bulk density 112.3 kg/m3 and the magnitude of drainage-induced consolidation of peat soils
Description	Bulk density of upper layer of peat soils in stratum i, year t in the project scenario
Purpose	Calculation of GHG emission from the combustion of peat soils in stratum i, year t in the project scenario
Source	Modelled based on consolidation and shrinkage of peat soils
Justification	Consolidation and shrinkage models have been widely established in soil mechanics

Data/Parameter	Aburn-BSL,t
Unit	ha
Value	See excel sheet: f_Sys.xlsx in the Annexes

Description	Annual area burnt in the baseline scenario
Purpose	Calculation of GHG emissions from the combustion of peat soils in the baseline scenario
Source	Estimated based on MODIS and VIIRS fire hotspot history in the proxy area
Justification	Conservative approach has been taken in translating historical fire hotspot in the proxy area and the expected drainage onset into estimated fire area in the baseline scenario

Data/Parameter	Apeatburn-BSL,i,t
Unit	ha
Value	Calculated on-the-fly during model run based on Aburn-BSL,i,t
Description	Simulated fires in peatland area in stratum i, year t in the baseline scenario
Purpose	Calculation of GHG emissions from peat burning
Source	Simulated by using stochastic modelling
Justification	Acknowledging stochastic nature of fire incident as well as taken into account drainage factor in determining susceptibility to fire

APPENDIX 8: DATA AND PARAMETERS AVAILABLE DURING MONITORING FOR REDD (APDEG-APD)

Data / Parameter:	Project Forest Cover Monitoring Map
Data Unit:	
Description:	Map showing the location of forest land within the project area at the beginning of each monitoring period. If within the Project Area some forest land is cleared, the benchmark map must show the deforested areas at each monitoring event
Source of data:	Remote sensing in combination with GPS data collected during ground truthing
Justification of choice of data or description of measurement methods and procedures applied:	The minimum map accuracy must be 90% for the classification of forest/non-forest in the remote sensing imagery. If the classification accuracy is less than 90% then the map is not acceptable for further analysis. More remote sensing data and ground truthing data will be needed to produce a product that reaches the 90% minimum mapping accuracy. Frequency: Must be monitored at least every 5 years or if verification occurs on a frequency of less than every 5 years examination must occur prior to any verification event
Any comment:	Where forest land contains more than one forest class, the map must be stratified into forest classes using Module X-STR.

Data / Parameter:	Degradation PRA Results
Source of data:	PRA
Justification of choice of data or description of measurement	The PRA shall consist of semi-structured interviews / questionnaires.

methods and procedures applied:	The PRA shall evaluate whether timbe harvest (illegal logging) may be occurring in the project area If ≥ 10% of those interviewed/surveyed believe that degradation may be occurring within the project boundary then the limited on-the-ground degradation survey shall be triggered An additional output of the PRA shall be a depth of penetration of degradation pressure. A maximum distance shall be recorded for penetration into the forest from access points (such as roads, rivers, already cleared areas) for the purpose of timber. It is likely that differing distances shall exist for each degradation pressure. If multiple pressures exist in the same stratum the deepest depth of penetration shall be used to define Adeg,i Frequency: every two years
Any comment:	Ex ante, an estimation shall be made of degradation in the with-project case. If the belief is that zero degradation will occur within the project boundaries then this parameter may be set to zero if clear infrastructure, hiring and policies are in place to prevent deforestation.

Data / Parameter:	Result of Limited Degradation Survey
Justification of choice of data or description of measurement methods and procedures applied:	Sampled by surveying several transects of known length and width across the access-buffer area (equal in area to at least 1% of ADeg,i) to check whether new tree stumps are evident or not. Frequency: Must be repeated each time the PRA indicates a potential for degradation
Any comment:	Ex ante, an estimation shall be made of degradation in the with-project case. If the belief is that zero degradation will occur within the project

	boundaries then this parameter may be set to zero if clear infrastructure, hiring and policies are in place to prevent deforestation.

Data / Parameter:	ADegW,i
Data Unit:	ha
Description:	Area potentially impacted by degradation processes in stratum i
Source of data:	GIS delineation and ground truthing
Justification of choice of data or description of measurement methods and procedures applied:	ADegW,i shall be composed of a buffer from all access points (access buffer), such as roads and rivers or previously cleared areas. The width of the buffer shall be determined by the depth of degradation penetration as defined as a PRA output. Frequency: Must to be repeated each time the PRA indicates a potential for degradation
Any comment:	Ex ante, a limited survey can be used to determine a likely depth of degradation penetration

Data / Parameter:	APi
Data Unit:	ha
Description:	Total area of degradation sample plots in stratum i
Source of data:	Ground measurement
Justification of choice of data or description of measurement methods and procedures applied:	The sampling plan must be designed using plots systematically placed over the buffer zone so that they sample at least 3% of the area of the buffer zone. Frequency:

	Shall be monitored at least every 5 years or if verification occurs on a frequency of less than every 5 years examination must occur prior to any verification event
Any comment:	Ex ante, an estimation must be made of area of plots. This must be set to exactly 3% of the buffer zone ADeg,i

Data / Parameter:	CDegW,i,t
Data Unit:	tCO2e
Description:	Biomass carbon of trees cut and removed through illegal logging process from plots measured in stratum i in year t
Source of data:	Field measurement
Justification of choice of data or description of measurement methods and procedures applied:	The diameter of all tree stumps is the designated plots will be measured and conservatively assumed to be the same as the DBH. The above ground carbon stock of each harvested tree must be estimated using the same allometric regression equation for estimating the carbon pool in trees (CP-AB) in the baseline scenario. Frequency: Must be monitored at least every 5 years or if verification occurs on a frequency of less than every 5 years examination must occur prior to any verification event
Any comment:	Ex-ante an estimation shall be made of likely degradation in the with-project case. Such an estimation shall be based on rates of degradation in surrounding areas and the degree of protection that will be in place (e.g. forest guards) in the with-project scenario.

Data / Parameter:	ADefPA,i,u,t
Data Unit:	ha

Description:	Area of recorded deforestation in the project area in stratum i converted to land use u in year t
Source of data:	Remote sensing imagery
Justification of choice of data or description of measurement methods and procedures applied:	Frequency: will be monitored at least every 5 years or if verification occurs on a frequency of less than every 5 years examination would occur prior to any verification event
Any comment:	Ex ante, an estimation shall be made of deforestation in the with-project case. If the belief is that zero deforestation will occur within the project boundaries, then this parameter may be set to zero if clear infrastructure, hiring and policies are in place to prevent deforestation.

APPENDIX 9: DATA AND PARAMETERS AVAILABLE DURING MONITORING FOR WRC

Data/Parameter	AWPS,i,j,t
Unit	ha
Description	Area of project stratum i, cell j, in year t
Description of measurement methods and procedures to be applied:	Actual area of each cell can be calculated in GIS software
Frequency of monitoring	At each monitoring event
Monitoring equipment	GIS software
Purpose of data	Calculation of project emissions
Calculation method	NA
QA/QC procedures to be applied	Best practices in GIS applications
Comments	

Data/Parameter	WTDwps,i,j,t
Unit	m
Description	Yearly average water table depth at stratum i, cell j, year t, in the project area, for use as a proxy in estimating CO2 emissions from microbial decomposition of peat soils
Description of measurement	Spatial and temporal distributions of water table depths in a defined physical boundary of peatlands are the result of dynamics of water

methods and procedures to be applied:	balance, and follow established laws of physics. Measured water table depths distributed over several locations do not by themselves represent the average value(s) from the system, unless unrealistically large number of monitoring devices are in place, which makes it out of option for this project. Water balance modelling is a more appropriate method for estimating spatial and temporal distributions of water table depths. Measured water table depths from dipwells however can be used as useful initial information and indicative values, and, most importantly, as a source of data for model calibration. Water balance model for this project incorporates the following input-output system of water: Daily rainfall (water input) Daily evapotranspiration (water output) Groundwater water flow (water output) Overland flow (water output) Open channel flow (water output) Storage change (water balance) Governing model parameters/variables include: Hydraulic conductivity of aquifer (peat soils) DTM Storage coefficient of aquifer Aquifer thickness Boundary condition: Water levels in canals This water balance model uses the following sub-models: Darcy for groundwater flow Darcy-Weisbach for overland flow Saint Venant for open channel flow

	Daily rainfall will be recorded by at least one rainfall station installed in the project area, and can be further enriched by using additional stations(s) outside project area, such as one from Rahadi Oesman Station in Ketapang. Measured water table depths (WTDo) will be provided by installing at least 50 dipwells distributed over the project area. Water levels of existing canals will be measured by using at least 5 staff gauges. Hydraulic conductivity of peat soils will be sampled at least at 20 random locations by using auger hole (Van Bavel & Kirkham) method and/or inversed auger hole (Porchet) method. Storage coefficient will be sampled at least at 20 random locations by using sample-core saturation method. This water balance model will be schematized with finite difference schematization and will be run in daily time-step. Model output includes water table heads (h) i.e., water table height above mean sea level. Modelled water table depths (WTDm) were calculated by subtracting DTM by h. For calibration purpose WTDm will be compared against WTDo. Parameters storage coefficient, and/or hydraulic conductivity, and/or evapotranspiration will be optimized recursively, in such a way, with the objective of reducing RMSE between WTDm and WTDo. We accept RMSE within 10 percent of WTD range. Final result of daily WTDm will be averaged by year, and can be used as a proxy for calculating CO2 emissions from microbial decomposition of peat soils.
Frequency of recording	Water table depths will be modelled in daily values, and will be averaged by year. Measured water table depths for calibration will be recorded using manual dipwells with 2-weekly interval, and with automatic dipwells with 30-minutes interval.
Monitoring equipment	-Manual dipwells use PVC perforated-screened case with millimeter scale rod -Automatic dipwells use PVC perforated-screened case with HOBO 20-L automatic water level logger

	-Manual staff gauges are custom-built using wooden rod and measuring scale -Automatic staff gauges use PVC perforated-screened case with HOBO 20-L automatic water level logger -Rainfall stations use Davis Weather Station
Purpose of data	Calculation of project emissions
Calculation method	NA
QA/QC procedures to be applied	Responsible staff will be trained well before carrying out any measurement campaign. SOP and standard data sheet will be provided and must be mastered by all operators. Crucial measurements will be documented with photos and/or videos. First-level QC will be performed by field supervisor to ensure appropriate entry and to identifying obvious artefacts such as typos, misreading, etc. Second-level QC will be performed in Bogor for reassuring data quality by using manual/visual inspections, standard statistics, comparison between wells/stations, trend analysis, etc.
Comments	

Data/Parameter	Ratepeatloss-WPS,i,t
Unit	m/y
Description	Rate of peat loss due to subsidence and fire in the project scenario in stratum i in year t
Description of measurement methods and procedures to be applied:	Subsidence from fire can be derived from burn scar depth, based on fire history. Subsidence from microbial decomposition of peat soils can be back-calculated from GHG emissions
Frequency of monitoring	At each monitoring event

Monitoring equipment	Subsidence model
Purpose of data	Calculation of project emissions
Calculation method	Subsidence from 1st fire = 18 cm/y Subsidence from 2nd fire = 14 cm/y Subsidence from >3rd fire = 4 cm/y Subsidence from microbial decomposition of peat soils: $$S_{Oxi-wps,i,j,t} = \frac{GHG_{peatsoil-wps,i,j,t}}{BD_{upper} \times C_c \times 10} \times \frac{12}{44}$$ Where: SOxi-wps,i,j,t : Subsidence due to oxidation of peat soils in parcel j stratum i at time t (m/yr) GHGpeatsoil-wps,i,j,t : CO2 emissions from the peat soil within the project boundary in the baseline scenario in parcel j stratum i at year t* (tCO2e ha-1 yr-1) BDupper : Bulk density of upper layer of peat soils (kg/m3) Cc : Carbon content of peat soils upper layer (g/g) j : 1, 2, 3 … N parcel (unitless) i : 1, 2, 3 … M Strata (unitless) t : 1, 2, 3, … t* time elapsed since the start of the project activity (years)
QA/QC procedures to be applied	
Comments	

Data/Parameter	GHGpeatsoil,CO2,i,t

Unit	tCO2e yr-1
Description	CO2 emissions from microbial decomposition of the peat soil in stratum i in year t
Description of measurement methods and procedures to be applied:	Calculated using water table depth as proxy
Frequency of monitoring	At each monitoring event
Monitoring equipment	Water table depth model
Purpose of data	Calculation of project emissions
Calculation method	$GHG_{peatsoil-CO2,i,j,t} = c \times WTD_{BSL,i,j,t}$ Where: GHGpeatsoil-CO2,i,j,t : CO2 emissions from the peat soil within the project boundary in the baseline scenario in stratum i parcel j at year t* (tCO2e ha-1 yr-1) calculated using a water table proxy up to 1-meter WTD; leveling off to 90 at 1 meter water table depth (Hooijer, et.al., 2006) WTDBSL,i,j,t : Baseline water table depth in stratum i parcel j, at time t (m from soil surface) c : Water table proxy constant, whose value approximately 90 tCO2e ha-1yr-1m-1 (tCO2e ha-1 yr-1 m-1)
QA/QC procedures to be applied	
Comments	

Data/Parameter	GHGpeatburn,CO2,i,t

Unit	tCO2e yr-1
Description	CO2 emissions from burning of peat within the project boundary in the project scenario in stratum i in year t
Description of measurement methods and procedures to be applied:	Calculated based on monitored burn scar area, burn scar depth, BDupper, GHGCO2 and GWPCO2.
Frequency of monitoring	At each monitoring event
Monitoring equipment	Satellite imagery and GPS for tracking burn scar area.
Purpose of data	Calculation of project emissions
Calculation method	$$GHG_{peatburn,CO2,i,t} = \sum_{=1}^{G} \left(P_{i,j,t} \times G_{CO2} \times 10^{-3} \times GWP_{CO2}\right)$$ $$P_{i,t} = D_{peatburn,i,j,t} \times BD_{upper,i,j,t} \times 10^{4}$$ Where: GHGpeatburn-BSL,i,j,t : GHG emissions due to peat burning in the baseline scenario in stratum i parcel j in year t of GHG CO2 (tCO2e ha-1 yr-1) Pi,j,t : Average mass of peat burnt in the baseline scenario in stratum i, parcel j year t (t d.m. ha-1) GCO2 : Emission factor for gas CO2 (kg t-1 d.m. burnt) GWPCO2 : Global warming potential for gas CO2 (t CO2/t g) Pi,j,t : Average mass of peat burnt in stratum i parcel j year t (t d.m. ha-1) Dpeatburn,i,j,t : Average fire scar depth in stratum i in year t (m) BDupper,I,j,t : Bulk density of the upper peat in stratum i parcel j year t (g cm-3)

	i : 1, 2, 3 … M Strata (unitless) j : 1, 2, 3 … N parcel (unitless) t : 1, 2, 3, … t* Time elapsed since the start of the project activity (year)
QA/QC procedures to be applied	
Comments	

Data/Parameter	GHGpeatburn,CH4,i,t
Unit	tCO2e yr-1
Description	CH4 emissions from burning of peat within the project boundary in the project scenario in stratum i in year t
Description of measurement methods and procedures to be applied:	Calculated based on monitored burn scar area, burn scar depth, BDupper, GHGCH4 and GWPCH4.
Frequency of monitoring	At each monitoring event
Monitoring equipment	Satellite imagery and GPS for tracking burn scar area.
Purpose of data	Calculation of project emissions
Calculation method	$$GHG_{peatburn,CH4,i,t} = \sum_{g=1}^{G} \left(P_{i,j,t} \times G_{CH4} \times 10^{-3} \times GWP_{CH4}\right)$$ $$P_{i,t} = D_{peatburn,i,j,t} \times BD_{upper,i,j,t} \times 10^{4}$$ Where:

	GHGpeatburn-BSL,i,j,t : GHG emissions due to peat burning in the baseline scenario in stratum i parcel j in year t of GHG CH4 (tCO2e ha-1 yr-1) Pi,j,t : Average mass of peat burnt in the baseline scenario in stratum i, parcel j year t (t d.m. ha-1) GCO2 : Emission factor for gas CH4 (kg t-1 d.m. burnt) GWPCO2 : Global warming potential for gas CH4 (t CO2/t g) Pi,j,t : Average mass of peat burnt in stratum i parcel j year t (t d.m. ha-1) Dpeatburn,i,j,t : Average fire scar depth in stratum i in year t (m) BDupper,l,j,t : Bulk density of the upper peat in stratum i parcel j year t (g cm-3) i : 1, 2, 3 … M Strata (unitless) j : 1, 2, 3 … N parcel (unitless) t : 1, 2, 3, … t* Time elapsed since the start of the project activity (year)
QA/QC procedures to be applied	
Comments	

Data/Parameter	GHGpeatburn,N2O,i,t
Unit	tCO2e yr-1
Description	N2O emissions from burning of peat within the project boundary in the project scenario in stratum i in year t
Description of measurement methods and procedures to be applied:	Calculated based on monitored burn scar area, burn scar depth, BDupper, GHGN2O and GWPN2O.

Frequency of monitoring	At each monitoring event
Monitoring equipment	Satellite imagery and GPS for tracking burn scar area.
Purpose of data	Calculation of project emissions
Calculation method	$$GHG_{peatburn,N2O,i,t} = \sum_{g=1}^{G} \left(P_{i,j,t} \times G_{N2O} \times 10^{-3} \times GWP_{N2O}\right)$$ $$P_{i,t} = D_{peatburn,i,j,t} \times BD_{upper,i,j,t} \times 10^{4}$$ Where: GHGpeatburn-BSL,i,j,t : GHG emissions due to peat burning in the baseline scenario in stratum i parcel j in year t of GHG N2O (tCO2e ha-1 yr-1) Pi,j,t : Average mass of peat burnt in the baseline scenario in stratum i, parcel j year t (t d.m. ha-1) GCO2 : Emission factor for gas N2O (kg t-1 d.m. burnt) GWPCO2 : Global warming potential for gas N2O (t CO2/t g) Pi,j,t : Average mass of peat burnt in stratum i parcel j year t (t d.m. ha-1) Dpeatburn,i,j,t : Average fire scar depth in stratum i in year t (m) BDupper,l,j,t : Bulk density of the upper peat in stratum i parcel j year t (g cm-3) i : 1, 2, 3 … M Strata (unitless) j : 1, 2, 3 … N parcel (unitless) t : 1, 2, 3, … t* Time elapsed since the start of the project activity (year)

QA/QC procedures to be applied	
Comments	

APPENDIX 10: TABLE LIST OF FAUNA AND FLORA SPECIES IDENTIFIED DURING THE 2018 RAPID BIODIVERSITY ASSESSMENT

Table shows Scientific, Common and Local names. Columns I, C & E indicate IUCN status, CITES Appendix status, and Endemic species, respectively.

Scientific Name	Common Name	Local Name	I	C	E
Mammals					
Macaca fascicularis	Long-tailed macaque	Monyet ekor panjang	VU	II	-
Nasalis larvatus	Proboscis monkey	Bekantan	EN	I	E
Presbytis frontata	White-fronted langur	Lutung jirangan	VU	II	E
Presbytis rubicunda	Maroon leaf monkey	Lutung merah	LC	II	E
Trachypithecus cristatus	Silvery lutung	Lutung kelabu	VU	II	-
Galeopterus variegatus	Sunda flying lemur	Kubung Malaya	LC	-	-
Pongo pygmaeus	Bornean orangutans	Orangutan Kalimantan	CR	I	E
Hylobates albibarbis	Bornean white-bearded gibbon	Kelampiau	EN	I	E
Maxomys surifer	Indomalayan maxomys	Tikus Hutan	LC	-	-
Rattus tanezumi	Oriental house rat	Tikus Hutan	LC	-	-
Callosciurus notatus	Plantain squirrels	Tupai	LC	-	-
Callosciurus prevostii	Prevost's squirrels	Kerabak	LC	-	-
Nannosciurus melanotis	Black-eared squirrels	Bajing	LC	-	-
Sundasciurus lowii	Low's squirrels	Lingsat	LC	-	-

Scientific Name	Common Name	Local Name	I	C	E
Sus barbatus	Bearded pig	Babi jenggot	VU	-	-
Tupaia splendidula	Ruddy treeshrew	Tupai	LC	-	-
Helarctos malayanus	Malayan sun bear	Beruang madu	VU	II	-
Arctogalidia stigmatica	Bornean stripped palm civet	Musang	LC	-	-
Birds					
Acrocephalus stentoreus	Clamorous Reed Warbler	Kerakbasi Rama	LC	-	-
Aegithina tiphia	Common Iora	Cipoh Kacat	LC	-	-
Aegithina viridissima	Green Iora	Cipoh Jantung	NT	-	-
Alcedo meninting	Blue-eared Kingfisher	Raja Udang Meninting	LC	-	-
Anthreptes malacensis	Brown-throated sunbird	Burung-madu Kelapa	LC	-	-
Anthreptes rhodolaemus	Red-throated Sunbird	Burung-madu Leher Merah	NT	-	-
Cacomantis variolosus	Rusty-breasted Cuckoo	Wiwik Uncuing	LC	-	-
Ceyx erithaca	Oriental Dwarf Kingfisher	Udang Api	LC	-	-
Chalcoparia singalensis	Ruby-cheeked Sunbird	Burung-madu Belukar	LC	-	-
Chloropsis cyanopogon	Lesser Green Leafbird	Cica-daun Kecil	NT	-	-
Corydon sumatranus	Dusky Broadbill	Madi Kelam	LC	-	-
Cyanoptila cyanomelana	Blue-and-white Flycatcher	Sikatan Biru-putih	LC	-	-
Cyornis brunneatus	Brown-chested Jungle Flycatcher	Sikatan Rimba Coklat	VU	-	-
Cyornis umbratilis	Grey-chested Jungle Flycatcher	Sikatan Rimba Dada-kelabu	NT	-	-

Scientific Name	Common Name	Local Name	I	C	E
Dicaeum cruentatum	Scarlet-backed Flowerpecker	Cabai Merah	LC	-	-
Dicaeum everetti	Brown-backed Flowerpecker	Cabai Tunggir-coklat	NT	-	-
Dicaeum minullum	Plain Flowerpecker	Cabai Polos	LC	-	-
Dicrurus paradiseus	Greater Racket-tailed Drongo	Srigunting Batu	LC	-	-
Dryocopus javensis	White-bellied Woodpecker	Pelatuk Ayam	LC	I	-
Enicurus ruficapillus	Chesnut-naped Forktail	Meninting Cegar	NT	-	-
Eurylaimus ochromalus	Black-and-yellow Broadbill	Sempur Hujan Darat	NT	-	-
Garrulax lugubris	Black Laughingthrush	Poksay Hitam	LC	-	-
Gracula religiosa	Common Hill Myna	Tiong Emas	LC	II	-
Harpactes kasumba	Red-naped Trogon	Luntur Kasumba	NT	-	-
Hypothymis azurea	Black-naped Monarch	Kehicap Ranting	LC	-	-
Kittacincla malabarica	White-rumped Shama	Kucica Hutan	LC	-	-
Lonchura fuscans	Dusky Munia	Bondol Kalimantan	LC	-	E
Macronus ptilosus	Fluffy-backed Tit-babbler	Ciung-air Pongpong	NT	-	-
Malacocincla sepiaria	Horsfield’s Babbler	Pelanduk Semak	LC	-	-
Meiglyptes tristis	Buff-rumped Woodpecker	Caladi Batu	EN	-	E
Mixornis bornensis	Bold-striped Tit-babbler	Ciung-air Coreng	LC	-	-
Muscicapa griseisticta	Grey-streaked Flycatcher	Sikatan Burik	LC	-	-
Orthotomus ruficeps	Ashy Tailorbird	Cinenen Kelabu	LC	-	-
Orthotomus sericeus	Rufous-tailed Tailorbird	Cinenen Merah	LC	-	-

Scientific Name	Common Name	Local Name	I	C	E
Phylloscopus borealis	Arctic Warbler	Cikrak Kutub	LC	-	-
Platysmurus leucopterus	Black Magpie	Tangkar Kambing	LC	-	E
Prionochilus maculatus	Yellow-breasted Flowerpecker	Pentis Raja	LC	-	-
Prionochilus xanthopygius	Yellow-rumped Flowerpecker	Pentis Kalimantan	LC	-	E
Psilopogon mystacophanos	Red-throated Barbet	Takur Warna-warni	NT	-	-
Ptilocichla leucogrammica	Bornean Wren-babbler	Berencet Kalimantan	VU	-	E
Pycnonotus brunneus	Asian Red-eyed Bulbul	Merbah Mata Merah	LC	-	-
Pycnonotus goiavier	Yellow-vented Bulbul	Merbah Cerukcuk	LC	-	-
Pycnonotus simplex	Cream-vented Bulbul	Merbah Corok-corok	LC	-	-
Rhipidura perlata	Spotted Fantail	Kipasan Mutiara	LC	-	-
Setornis criniger	Hook-billed Bulbul	Empuloh Paruh Kait	VU	-	-
Spilornis cheela	Crested-serpent Eagle	Elangular Bido	LC	II	-
Stachyris nigricollis	Black-throated Babbler	Tepus Kaban	NT	-	-
Terpsiphone paradisi	Asian Paradise Flycatcher	Seriwang Asia	LC	-	-
Trichastoma bicolor	Ferruginous Babbler	Pelanduk Merah	LC	-	-
Trichastoma malaccense	Short-tailed Babbler	Pelanduk Ekor-pendek	NT	-	-
Trichastoma rostratum	White-chested Babbler	Pelanduk Dada-putih	NT	-	-
Halcyon smyrnensis	White-throated Kingfisher	Cekakak belukar	LC	-	-
Pelargopsis capensis	Stork-billed Kingfisher	Pekaka Emas	LC	-	-
Rhinortha chlorophaea	Raffle's Malkoha	Kadalan Selaya	LC	-	-

Scientific Name	Common Name	Local Name	I	C	E
Phaenicophaeus diardi	Black-bellied Malkoha	Cenuk Perut Hitam	NT	-	-
Leptoptilos javanicus	Lesser Adjutant	Bangau tongtong	VU	-	-
Corvus macrorhynchos	Large-billed Crow	Gagak kampung	LC	-	-
Ardea purpurea	Purple Heron	Cangak Merah	LC	-	-
Egretta garzetta garzetta	Little Egret (migrant)	Kuntul kecil	LC	-	-
Dendrocygna javanica	Lesser Whistling Duck	Belibis polos	LC	-	-
Ixobrychus flavicollis	Black Bittern	Bambangan Hitam	LC	-	-
Centropus rectunguis	Short-toed Coucal	Bubut hutan	VU	-	-
Irena puella	Asian Fairy-bluebird	Cucak Biru	LC	-	-
Otus mantananensis	Mantanani Scops Owl	Burung hantu mantanani	NT	II	-
Treron olax	Little Green Pigeon	Punai Kecil	LC	-	-
Treron curvirostra	Thick-billed Green Pigeon	Punai lengguak	LC	-	-
Pernis ptilorhynchus	Crested Honey-buzzard	Sikep-madu asia	LC	II	-
Anhinga melanogaster	Oriental Darter	Pecuk-ular asia	NT	-	-
Amaurornis phoenicurus	White-breasted Waterhen	Kareo Padi	LC	-	-
Aerodramus maximus	Black-nest Swiftlet	walet sarang hitam	LC	-	-
Eurystomus orientalis	Oriental Dollarbird	Tiong-lampu biasa	LC	-	-
Ducula aenea	Green Imperial Pigeon	Lowi Pune	LC	-	-
Psittacula longicauda	Long-tailed Parakeet	Betet ekor panjang	VU	II	-
Psittacula alexandri	Red-breasted Parakeet	Betet biasa	NT	II	-

Scientific Name	Common Name	Local Name	I	C	E
Artamus leucorynchus	White-breasted Woodswallow	Kekep babi	LC	-	-
Merops philippinus	Blue-tailed Bee-eater	Kirik-kirik laut	LC	-	-
Collocalia esculenta	Glossy Swiftlet	Walet sapi	LC	-	-
Asio flammeus	Short-eared Owl	Hantu telinga-pendek	LC	II	-
Prionochilus thoracicus	Scarlet-breasted Flowerpecker	Burung Benalu Utan	NT	-	-
Anorrhinus galeritus	Bushy-crested Hornbill	Enggang klihingan	NT	II	-
Buceros rhinoceros	Rhinoceros Hornbill	Rangkong	VU	II	-
Anthracoceros albirostris	Oriental Pied Hornbil	Kangkareng perut-putih	LC	II	-
Locustella ochotensis	Middendorff's Grasshopper Warbler	Kecici	LC	-	-
Muscicapa dauurica	Asian Brown Flycatcher	Sikatan Bubik	LC	-	-
Trichixos pyrropygus	Rufous-tailed Shama	Burung Cempala Kuning	NT	-	-
Cyornis superbus	Bornean Blue Flycatcher	Sikatan kalimantan	LC	-	E
Sasia abnormis	Rufous Piculet	burung belatuk kecil	LC	-	-
Chrysococcyx xanthorhynchus	Violet Cuckoo	Kedasi Ungu	LC	-	-
Centropus sinensis	Centropus sinensis	Bubut besar	LC	-	-
Rhipidura javanica	Malaysian Pied Fantail	Kipasan belang	LC	-	-
Dicaeum chrysorrheum	Yellow-vented Flowerpecker	Cabai Bunga Api	LC	-	-
Riparia riparia	Sand Martin	Layang-layang Pasir	LC	-	-
Hirundo tahitica	Pacific Swallow	Layang-layang batu	LC	-	-

Scientific Name	Common Name	Local Name	I	C	E
Accipiter soloensis	Chinese Sparrowhawk	Elang-alap Cina	LC	II	-
Charadrius veredus	Oriental Plover	Cerek jawa	LC	-	-
Pitta sordida	Hooded Pitta	Pacat Gembala Pelandok	LC	-	-
Cymbirhynchus macrorhynchos	Black-and-red Broadbill	burung sempur-hujan sungai	LC	-	-
Icthyophaga ichthyaetus	Grey-headed Fish Eagle	Elang-ikan kepala-kelabu	NT	II	-
Prinia flaviventris	Yellow-bellied Prinia	Perenjak rawa	LC	-	-
Chalcophaps indica	Emerald Dove	Delimukan zamrud	LC	-	-
Cissa jefferyi	Bornean Green Magpie	ekek-geling Jawa	LC	-	E
Centropus bengalensis	Lesser Coucal	Bubut alang-alang	LC	-	-
Amphibians					
Ingerophrynus quadriporcatus	Greater Malacca Toad	Bangkong rawa	LC	-	-
Pseudobufo subasper	Peat Swamp Toad	Kodok Rawa Gambut	LC	-	E
Limnonectes paramacrodon	Lesser Swamp Frog	Katak tegalan	NT	-	-
Occidozyga sumatrana	Puddle frog	Bancet Rawa	LC	-	-
Leptobrachium abbotti	Abbott's litter frog	Bangkong serasah	LC	-	E
Gastrophrynoides borneensis	Borneo Narrowmouth Toad		LC	-	E
Kalophrynus pleurostigma	Rufous-Sided Sticky Frog	Katak Lekat Sisi Merah	LC	-	E
Kaloula baleata	Brown Bullfrog	Belentung	LC	-	-

Scientific Name	Common Name	Local Name	I	C	E
Metaphrynella sundana	Borneo tree-hole frog	Percil Pohon Sunda	LC	-	-
Kurixalus appendiculatus	Frilled Tree Frog	Katak pohon berjumbai	LC	-	-
Philautus petersi	Bubble-nest Frog	Katak Semak	LC	-	-
Polypedates colletti	Collet's whipping frog	Katak Pohon	LC	-	-
Polypedates macrotis	Baram whipping frog	Katak Pohon	LC	-	-
Rhacophorus harrissoni	Brown tree frog	Kajau	LC	-	E
Rhacophorus pardalis	Panther flying frog	Katak Pohon Terbang	LC	-	-
Amnirana nicobariensis	Nicobar Island frog	Kongkang Jangkrik	LC	-	-
Chalcorana raniceps	White-lipped Frog	Kongkang Kolam	LC	-	-
Hylarana erythraea	Common green frog	Kongkang Gading	LC	-	-
Pulchrana baramica	Baram river frog	Katak Sungai Baram	LC	-	-
Reptiles					
Acrochordus javanicus	Elephant trunk snake	Ular karung	LC	-	-
Draco sp.	Draco sp.	Kadal	-	-	-
Bungarus fasciatus	Banded krait	Welang	LC	-	-
Bungarus flaviceps	Red-headed krait	Weling	LC	-	-
Cyrtodactylus sp.	Cyrtodactylus sp.	Cicak	-	-	-
Cuora amboinensis	Southeast Asian box turtle	kura-kura batok	VU	II	-
Heosemys spinosa	Spiny turtle	Kura-kura Matahari	EN	II	-
Orlitia borneensis	Malayan giant turtle	Kura-kura Byuku	EN	II	-

Scientific Name	Common Name	Local Name	I	C	E
Enhydris enhydris	Rainbow water snake	Ular-air pelangi	LC	-	-
Enhydris plumbea	Rice paddy snake	Ular Air Kelabu	LC	-	-
Homalopsis buccata	Linne's water snake	Ular Kadut	LC	-	-
Psammodynastes pictus	Painted mock viper	Ular kemuning	-	-	-
Xenochrophis maculatus	Malayan spotted keelback	Ular rumput	LC	-	-
Xenochrophis trianguligerus	Red-sided keelback snake	Ular segitiga merah	LC	-	-
Asthenodipsas laevis	Smooth Slug Snake	Ular mata kucing	LC	-	-
Dasia vittata	Borneo Skink	bengkarung pohon	LC	-	E
Eutropis multifasciata	Common Mabuya	Kadal Kebun	LC	-	-
Lipinia vittigera	Yellow Striped Tree Skink	Kadal Kerdil Garis Kuning	LC	-	-
Varanus rudicollis	Asian water monitor	Bayawak	-	II	-
Varanus salvator	Asian water monitor	Bayawak	LC	II	-
Tropidolaemus subannulatus	Bornean Keeled Green Pit Viper	Ular pohon	LC	-	-
Flora					
Nepenthes bicalcarata	Monkey Cup	Priuk Kera	VU	-	-
Nepenthes gracilis	Monkey Cup	Priuk Kera	LC	-	-
Nepenthes rafflesiana	Monkey Cup	Priuk Kera	LC	-	-
Campnosperma auriculatum	Tarantana	Terentang putih	LC	-	-

Scientific Name	Common Name	Local Name	I	C	E
Campnosperma sp	Tarantana	Terentang	LC	-	-
Mangifere sp	Forest Mango	Mangga hutan	LC	-	-
Combretocarpus rotundatus		Perapat	LC	-	-
Cyathocalyx sp		Kepayang	LC	-	-
Mezzetia leptopoda		Nyatoh	LC	-	-
Mezzetia sp		Nyatoh	LC	-	-
Polyathia sp		Asoka biasa	LC	-	-
Polyalthia glauca		Glodokan	LC	-	-
Xylopia stenopetala		Pokok Jangkang Bukit	LC	-	-
Dyera costulata		Jelutung	LC	-	-
Willughbeia sp		Jantak	LC	-	-
Ilex sp	Hummock holly	Madang	LC	-	-
Santiria sp		Kedondong	LC	-	-
Calophyllum sp		Bintangur	LC	-	-
Mesua sp	Iron Wood	Nagasari	LC	-	-
Laphopetalum sp		Prupuk	LC	-	-
Licania Sp		Bintan	LC	-	-
Garcinia Sp		Manggis Hutan	LC	-	-
Erycibe Sp		Simpur	LC	-	-

Scientific Name	Common Name	Local Name	I	C	E
Dactylocladus stenostachys		Mentibu	LC	-	E
Dillenia exelsa		Simpur	LC	-	-
Shorea leprosula	Light Red Meranti	Meranti Bunga	NT	II	-
Shorea sp	Meranti	Meranti	NT	II	-
Vatica sp		Menungak	LC	-	-
Diospyros sp		Kayu malam	LC	-	-
Elaeocarpus Sp		Sulai	LC	-	-
Blumedendron sp		Pelapi	LC	-	-
Blumedendron tokbrai		Pelapi	LC	-	-
Glochidion sp		Cengok	LC	-	-
Dialium sp		Keranji	LC	-	-
Koompasia malaccensis		Kempas	LC	-	E
Alseodaphne oblanceolate		Medang putih	LC	-	-
Belshmiedia sp		Pancur	LC	-	-
Cryptocarya sp		Tulang Salai	LC	-	-
Lindera sp		Barus	LC	-	-
Litsea sp		Medang	LC	-	-
Nothaphoebe sp		Kamfer	LC	-	-
Barringtonia sp		Butun	LC	-	-
Ctenolopon sp		Pokok Mertas	LC	-	-

Scientific Name	Common Name	Local Name	I	C	E
Magnolia sp		Cempaka	LC	-	-
Sandoricum sp		Kecapi	LC	-	-
Ficus macropylla	Fig Tree	Ara	LC	-	-
Ficus sp	Fig Tree	Ara	LC	-	-
Parathocarpus venenoosa		Purut	LC	-	-
Gymnacranthera sp		Tumih	LC	-	-
Horsfieldia sp		Kumpang bulu	LC	-	-
Knema sp		Darahd-darah	LC	-	-
Myristica sp		Kumpang	LC	-	-
Syzygium sp		Ubah	LC	-	-
Tristaniopsis sp		Pelawan	LC	-	-
Baccaurea sp		Kapul	LC	-	-
Xanthopyllum sp		Langir	LC	-	-
Canthium sp		Akar kait	LC	-	-
Uncaria sp		Gambir	LC	-	-
Ganua motleyana		Ketiau	LC	-	-
Madhuca sp		Kayu Arang	LC	-	-
Palaqium sp		Nyatoh	LC	-	-
Palaquium tenupetiolatum		Nyatoh kelincir	LC	-	-
Tetramerista glabra		Punak	VU	II	-

Scientific Name	Common Name	Local Name	I	C	E
Gordonia sp		Pelempang	LC	-	-
Gonystylus bancanus	Ramin	Ramin	CR	I	-
Gonystulus maingayi	Ramin	Ramin	CR	I	-