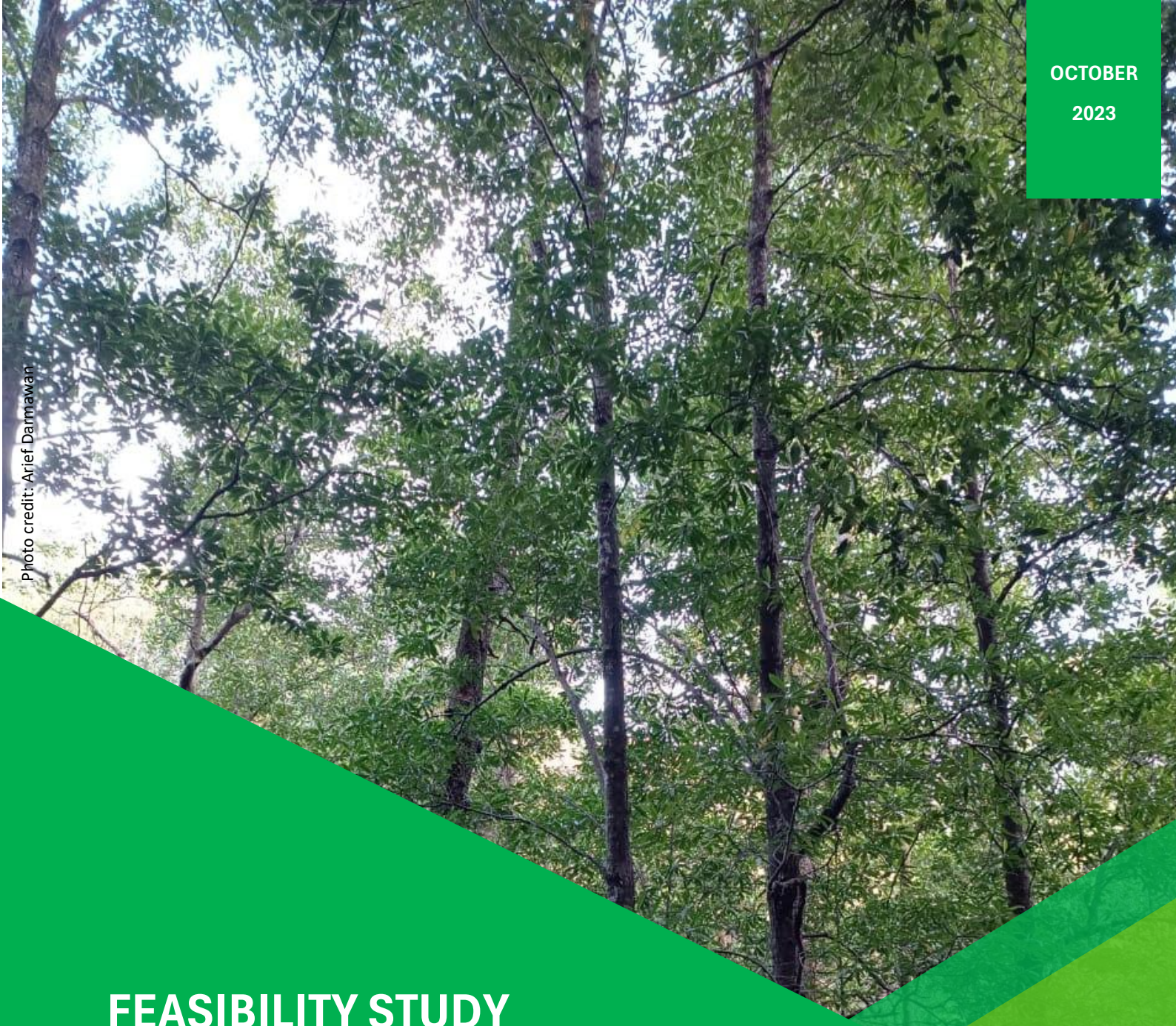

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OCTOBER
2023

FEASIBILITY STUDY FOR BP FOREST CARBON OFFSET PROJECT

FINAL REPORT

IPB University
Bogor Indonesia

bp

KATA PENGANTAR

Laporan Studi Kelayakan Offset Karbon Hutan di Provinsi Papua Barat ini adalah laporan bagian akhir kegiatan kerjasama penelitian antara BP Berau Ltd dengan Fakultas Kehutanan dan Lingkungan IPB sebagaimana diatur dalam Kontrak Kerjasama No. 4420003426 tanggal 13 April 2023 yang berjudul Studi Kelayakan Proyek Offset Karbon Hutan di Provinsi Papua Barat.

BP Berau Ltd adalah perusahaan minyak dan gas yang beroperasi di Kabupaten Teluk Bintuni, Provinsi Papua Barat berkomitmen untuk mengurangi emisi gas rumah kaca dari operasi perusahaannya hingga mencapai 1 juta ton CO2 per tahun. Target pengurangan emisi tersebut sebagian akan diperoleh melalui offset emisi yang berbasis dari praktek pengelolaan hutan di wilayah Papua Barat.

Sejumlah kegiatan telah dilaksanakan mulai dari kegiatan persiapan dan analisis spasial areal potensial offset karbon, workshop dengan pemangku kepentingan di Papua Barat dan identifikasi areal potensial offset karbon, survei lapangan potensi cadangan karbon di areal rehabilitasi DAS Teluk Bintuni dan survei lapangan untuk analisis kelayakan potensi offset karbon di areal pemanfaatan hutan di Papua Barat. Seluruh kegiatan dan hasil-hasil yang dicapai telah dirangkum dalam laporan tersendiri.

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1 BACKGROUND

The Paris Agreement governs global climate change mitigation efforts by the convention through 2030, which put countries in position as the responsible entity to foster efforts not to exceed 1.5^0C global warming by 2030. Countries are invited to submit Nationally Determined Contributions (NDCs) which declare countries targets and commitment including policy and measures to adapt and mitigate climate change by 2030. A larger role of countries is to set out policy and regulation in their country.

Indonesia as a country that ratified Paris Agreement has been taking several steps of policy and measures including submitting NDC, implementing REDD+ as the major climate change mitigation from forestry sector, and setting out domestic policy on carbon economic values (*Nilai Ekonomi Karbon*/NEK). Specific to the latter, many observers associate this policy with Article 6 of Paris Agreement which allows countries to voluntarily cooperate with each other to achieve emission reduction targets set out in their NDCs. This means that, under Article 6, a country (or countries) will be able to transfer carbon credits earned from the reduction of GHG emissions to help one or more countries meet climate targets, through the involvement of private sectors in buying carbon credits from elsewhere to compensate their emission reduction targets.

With a forest area of more than 120 million ha or more than 60 percent of its land area, Indonesia has a great opportunity to implement REDD+. Reducing emissions from deforestation and forest degradation, forest carbon conservation, sustainable forest management and increasing forest carbon stocks (REDD+) in developing countries are climate change mitigation actions according to the UNFCCC with an economic incentive mechanism. Implementing the REDD+ program to reduce GHG emissions from the forestry sector and land use is a strategy to achieve Indonesia's NDC according to the Paris Agreement.

To achieve national GHG emission reduction, the government is also targeting emission reductions in all sectors, including the mining and energy sectors. Based on Government Regulation number 98 of 2021 regarding Carbon pricing, emission reduction targets will be allocated up to management level including the private sector. The private sector is also expected to play a role in efforts to reduce national greenhouse gas emissions. Therefore, the government will set emission limits for all sectors, including the private sector, to maintain emission limits according to the NDC targets. Reducing emissions in the private sector, especially related to industry and energy, will have a big impact to

the business operation. It will have implications for costs and productivity because it involves relatively expensive technology. On the other hand, observers noted that one of the most effective emission reduction efforts is in the forestry and land sector, because they are relatively more cost effective. Therefore, carbon emission offset mechanism in the forestry and land sectors is a good option for the private sector in an effort to achieve its emission reduction targets.

BP Indonesia, one of oil and gas company which operates in Teluk Bintuni District, has a commitment to reduce emissions by around 1 million tons of CO_2 per year. One of an action that have been carried out are rehabilitation activities in an area of 1,000 hectares. However, this action is still far from reaching the emission reduction target. Therefore, these efforts need to be expanded through other mechanisms, such as emission offset mechanism or other mechanisms that are recognized by the central government and the international community. For this reason, BP Indonesia requires studies to make further decisions regarding emission reduction strategies that comply with national regulations or international carbon trading requirements.

Faculty of Forestry and Environment, IPB University is mandated to conduct the feasibility study for BP emission offset project. The deliverables of this study consist of four reports: (i) preliminary report; (ii) mid-term report 1: potential offset area identification and stakeholder engagement; (iii) mid-term report 2: carbon inventory survey; and (iv) final report. This is the final report of the study based on a desk study on national policies as well as field assessment carried out in Papua Barat Province, Indonesia.

2 OBJECTIVES

The objectives of this study are to analyze the potential of carbon offsets in forestry sector in Indonesia related to the existing policies and their potential implementation at sub national or project levels. This final report contains of:

(i) the analysis of project carbon scheme and financing of carbon offsets project implementation; and
(ii) identification of the process or step of forest carbon offset project as well as certification process that meeting the international standard and eligible to become offset project.

3 METHODOLOGY

The overall methodology for this study is following activities in sequence:

1) Data preparation, includes:
    a. Data collection and compilation, and
    b. Desk study of applicable regulations related to carbon offset and stakeholders mapping and spatial data processing.
2) Field survey and stakeholders' engagement
3) Data Analysis and Reporting

Some results from activities 1, 2, and 3 has been presented in the previous reports (preliminary report, mid -term 1 report, and mid-term 2 report), as describes in the general flowchart (Figure 1).

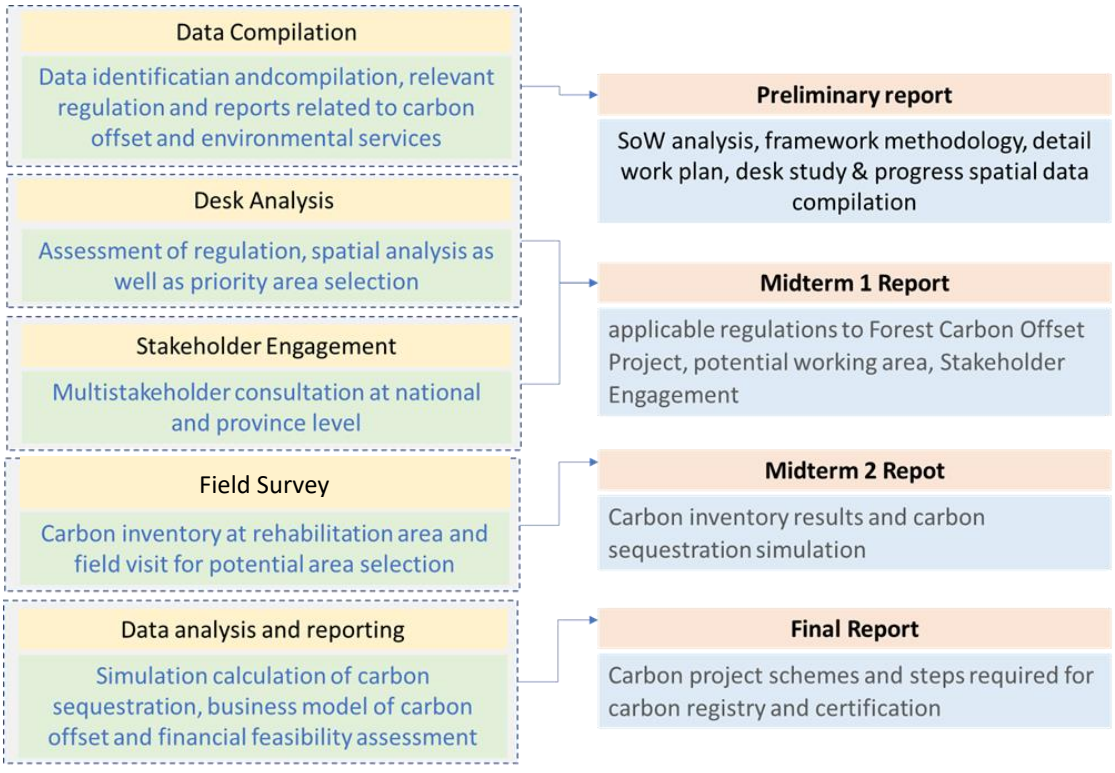

Figure 1 General flowchart for study activities

3.1 DATA PREPARATION

3.1.1 Data Collection and Compilation

Data collection activities include identifying and collecting data related to the regional context, in order to obtain an overview of the study area, its historical change, current situation related to

biophysical and land uses, and to certain extent, future development in the province. This information is important to build an understanding of the area and identify potential areas for carbon offset within the Papua Barat Province.

Spatial data compilation is also carried out at an early stage which was used as the basis for studies for other follow-up analysis, including regional potential assessment, and calculation of emission reduction potential. Spatial data collection is carried out by requesting data to data custodian or related stakeholders. In addition, a compilation of reports related to ecological, social and economic conditions also carried out, including previous relevant studies conducted by BP, universities and other research institutions in the province. A result of the data collection process has been presented in preliminary report.

3.1.2 Desk Study

3.1.2.1 Related Policy and Regulations

Desk study on policy and regulations was carried out mainly to identify number of existing regulations and some consultations at the national level and provincial level. In addition to that, the desk study explores related regulations regarding the potential for carbon offsets, utilization of ecosystem services related to forest carbon and the mechanism of the MRV system.

Alignment between national and sub-national level is also analyzed as it is very important to avoid incompliance issues in the future. The climate change mitigation action is a national program to achieve global commitments but implementation at the site level involves a sizable funding mechanism. Result of the policy and regulation analysis has been presented in preliminary report and mid-term report 1.

3.1.2.2 Spatial and Remote Sensing Data Processing

Spatial and remote sensing data processing were carried out to obtain an overview of forest change and emissions in the Papua Barat Province and to determine several priority locations that are supported as carbon offset locations.

Prior spatial and remote sensing data analysis, we conducted preliminary assessment to ensure the completeness and quality of data received. All data are organized and standardized in geodatabase format. Furthermore, we create a single database consists of related data theme such as forest status, forest planning, critical land, etc. (Figure 2). A result of this process is presented in mid-term 1 report.

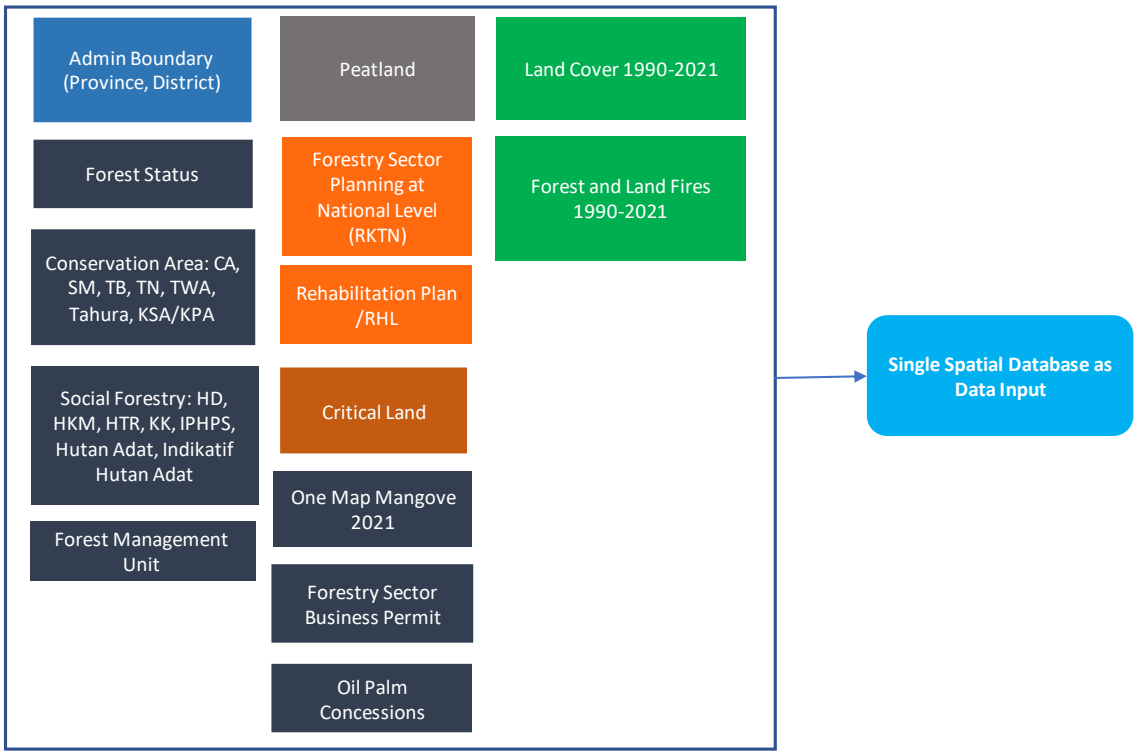

Figure 2 Compilation of spatial data related theme into single database format

3.2 STAKEHOLDERS' CONSULTATION

Stakeholder engagement and consultation strengthen the selection of several potential forest locations for carbon offsets and determine the forest management business model. Result from stakeholder engagement activities is presented in mid-term report 1.

At national level, discussions carried out with parties related to REDD+ policies and climate change mitigation financing schemes. The communications with relevant stakeholders in MoEF are held formally and informally make use of the events in which our team is involved.

At the Province level, stakeholder workshop was carried out on 13-14 June 2023 inviting various stakeholders from national government representatives, local government (including forestry services, KPH), universities, NGOs, private sectors and community representatives.

At site level, a visit to PT Wijaya Sentosa was carried out from 15 – 21 June 2023. PT Wijaya Sentosa is one of a forest concession in Papua Barat Province which still actively operated logging scheme and interested in emission offset in the future.

3.3 Data Analysis and Reporting

Data analysis including analysis of changes in forest and land cover, annual emission level, and potential implementation areas for carbon offsets, especially in Teluk Bintuni District, Teluk Wondama District and Kaimana District.

Data analysis is carried out to identify several inputs and processes required for the design of a carbon project, financing needs and analysis of its feasibility as a management unit for the purpose of forest carbon offsets with reference to standards commonly used in voluntary carbon credit transactions. Recommendations for potential areas were made to provide choices based on ecological, social and risk considerations and the effectiveness of emission reduction efforts. The results are presented in this mid-term report 1 and this report at various level of management unit such as forest management unit, administrative unit, or company management unit.

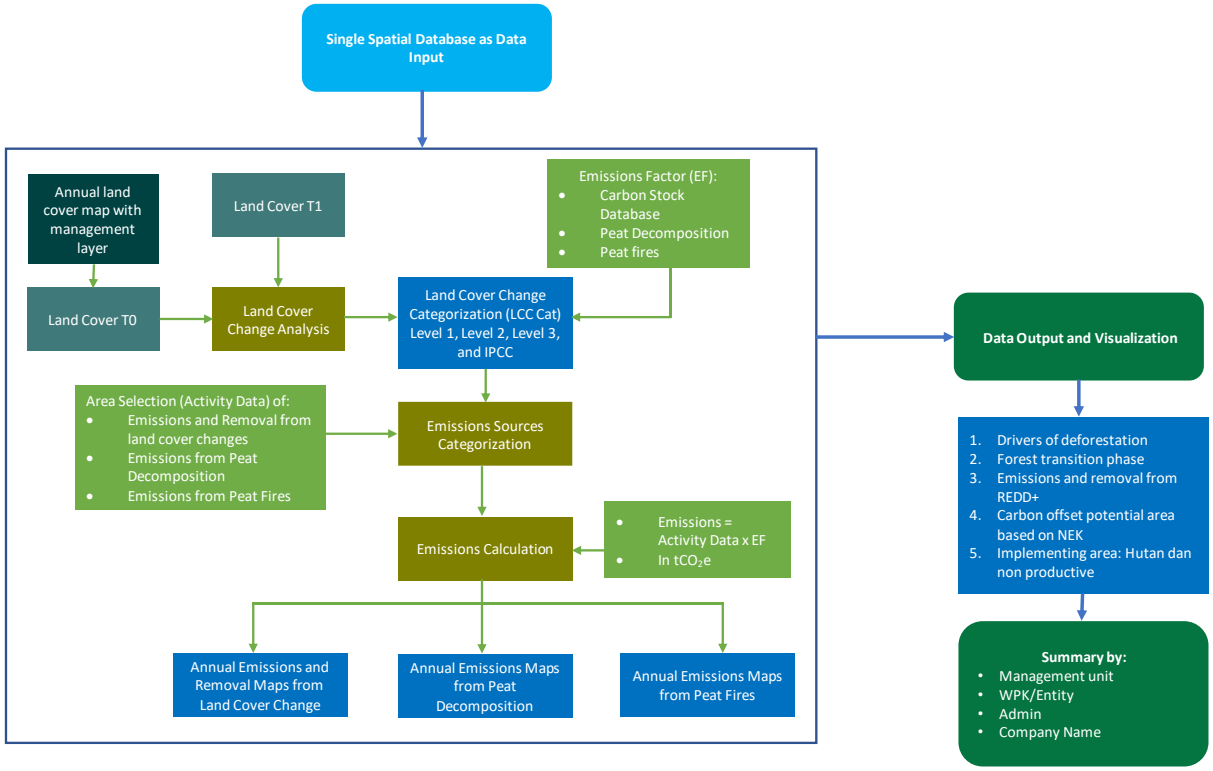

Figure 3 Workflow of spatial data analysis

The workflow of the spatial analysis is presented in Figure 3. All spatial data are collected and compiled during the desk study. In addition to the overlay process, calculation of emissions and categorization of activity data types are carried out during the spatial analysis process. The most important data for this analysis are the annual forest and land cover maps which are used for generating the activity data, such as deforestation, forest degradation and enhancement of forest

carbon stocks, peatland map and burned area maps. In addition, emission factors (EFs) are also incorporated for estimating the emissions and removals from forest and land cover change and peat-related emissions. Lastly, all necessary boundaries of administrative areas, forest functions, land management unit and licenses are included in the database, to allow further analysis based on specific area of management or administrative boundaries.

4 ESTABLISHING THE BASELINE AND POTENTIAL OFFSET IDENTIFICATION IN PAPUA BARAT

4.1 LANDSCAPES PROFILE

Papua Barat Province is located on the western half of the island of Papua, which is part of Indonesia. It shares the island with Papua Province to the east and is bordered by the Pacific Ocean to the north. Out of 9.97 million ha of Papua Barat Province land territory, more than 9.1 million hectares (92%) are still covered with natural forests in 2021. The forests are mostly distributed in all districts. The districts that have the most forests include Teluk Bintuni, Kaimana, Tambrauw and Fakfak with total forest cover of 1.8 million hectares, 1.7 million hectares, 1.1 million hectares and 0.8 million hectares, respectively (Figure 4 and Table 1).

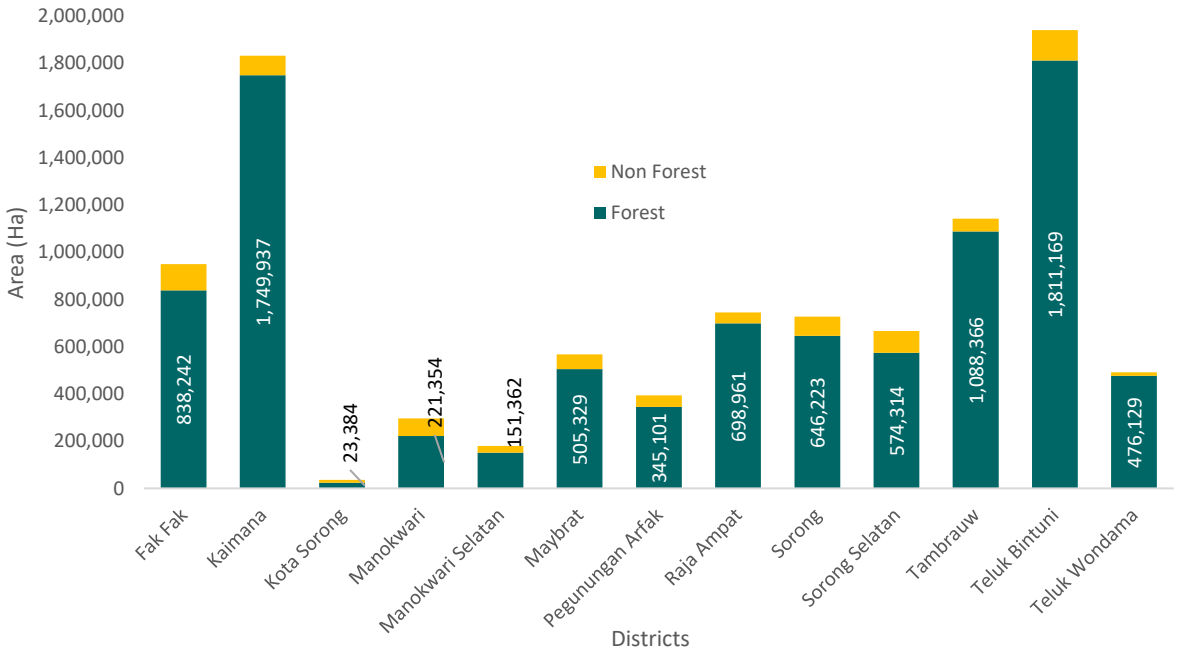

Figure 4 Forest and non-forest cover of Papua Barat Province for each district

Table 1 Forest cover dynamics by forest and land uses in Papua Barat Province

District	Forest						Forest Total (Ha)
	Primary dryland fores	Primary mangrove fores	Primary swamp forest	Secondary dryland forest	Secondary mangrove fore	Secondary swamp forest	
Fak Fak	343,230	3,824	16,744	466,639	1,956	5,849	838,242
Kaimana	1,148,647	47,447	94,032	377,502	6,932	75,377	1,749,937
Kota Sorong		302		21,493	1,589		23,384
Manokwari	159,985		849	60,086	60	373	221,354
Manokwari Selatan	89,270	353	2,580	55,446	714	2,999	151,362
Maybrat	325,142		1,048	169,352		9,787	505,329
Pegunungan Arfak	65,027			280,073			345,101
Raja Ampat	533,343	24,479	1,363	134,608	3,294	1,875	698,961
Sorong	149,449	49,945	35,036	404,427	4,032	3,334	646,223
Sorong Selatan	136,332	76,470	171,197	122,460	7,694	60,161	574,314
Tambrauw	843,881	64	1,591	240,618		2,211	1,088,366
Teluk Bintuni	701,935	171,404	182,067	615,020	90,536	50,206	1,811,169
Teluk Wondama	327,082	3,946	4,278	139,212	1,138	474	476,129
Grand Total	4,823,324	378,234	510,784	3,086,938	117,946	212,645	9,129,871

The largest forest type in Papua Barat Province is dominated by dryland forests (87% of total forests), which include lowland forests and lower montane forests. While mangrove forests and swamp forests cover only 5% and 8% of total forests in Papua Barat Province. Most of the forest areas are still primary forests (63% of all forested areas), which don't have or limited human influence. The secondary forests, which have been utilized and degraded from the primary forests are 37%. In terms of forest type and succession level, the dryland primary forests cover and secondary dry land forests dominate the forest landscape of Papua Barat Province with total area of 4.8 million hectares and 3.1 million hectares, respectively.

In relation to forest function and land use, most of the forests are distributed in production forest with total forested area of 5.2 million hectares. Conservation forests and protection forests have also relatively large, forested areas, with total forest cover of 1.6 million hectares and 1.4 million hectares, respectively. Other land use or non-forest land use harbors only less than 8 % of total forested areas of Papua Barat Province (Figure 5).

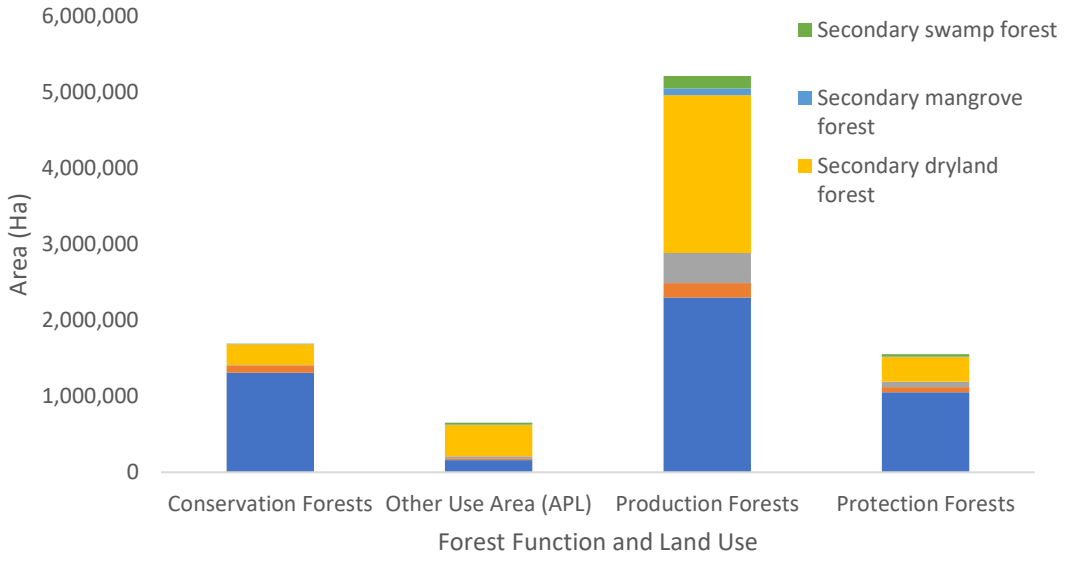

Figure 5 Forest cover 2021 by forest function and land use

4.2 FOREST COVER CHANGE

Papua Barat Province has relatively very low deforestation, compared to the national level. The total deforestation in Papua Barat Province from 2006 – 2021 was 181 thousand hectares or equals to annual deforestation of 12 thousand per year. The annual deforestation at national level from 2006 – 2020 was 599 thousand hectares per year, or 50 times higher than in Papua Barat Province. The contribution of Papua Barat Province deforestation is only 2% to the annual deforestation at the national level (2nd FRL[1]). The largest deforestation occurred in Sorong, Sorong Selatan and Manokwari Districts with total area of 24,843 hectares, 26,296 hectares and 18,703 hectares, respectively (Table 2).

The largest forest dynamics in Papua Barat Province are due to forest degradation, or the degradation of primary forest to secondary forests due to logging. Total forest degradation areas from 2006 to 2021 in Papua Barat Province was 960,840 hectares, or equal to 64 thousand hectares per year (

Table 3). The annual forest degradation at the national level from 2006 to 2020 was 209 thousand hectares. Thus, forest degradation in Papua Barat Province contributes to more than 30% of annual forest degradation at the national level (2nd FRL).

Table 2 Forest cover and land use dynamics by District in Papua Barat Province[2]

District	Deforestation	Forest Degradation	Forest Gain-Natural Forest	Stable Forest	Stable Non Forest	(blank)	Total Area (Ha)
Fak Fak	26,664	91,858	5,342	739,112	83,719	2,320	**949,016**
Kaimana	19,020	89,820	15,747	1,642,381	63,145	2,469	**1,832,582**
Kota Sorong	1,941		425	22,876	10,093	197	**35,533**
Manokwari	18,703	16,183	7,548	197,557	55,680	206	**295,878**
Manokwari Selatan	4,532	12,301	3,971	135,060	23,628	47	**179,539**
Maybrat	13,547	109,590	14,210	381,529	48,592	0	**567,469**
Pegunungan Arfak	4,768	253,057	23,392	68,525	44,038	127	**393,907**
Raja Ampat	9,479	29,136	12,484	651,654	35,628	7,147	**745,528**
Sorong	24,843	50,002	58,213	536,960	56,173	1,287	**727,479**
Sorong Selatan	26,296	94,823	40,294	438,178	63,952	2,170	**665,714**
Tambrauw	10,086	45,770	62,766	979,680	43,836	251	**1,142,391**
Teluk Bintuni	16,450	132,105	17,445	1,659,800	112,118	2,135	**1,940,053**
Teluk Wondama	4,813	36,194	1,340	437,396	10,179	1,442	**491,365**
Total Area	**181,144**	**960,840**	**263,177**	**7,890,710**	**101,690**	**19,799**	**9,966,452**

[1] Available online at https://redd.unfccc.int/submissions.html?country=idn

[2] This data summary was derived from GIS data processing. Entries marked as (blank) indicate data with empty values due to non-overlapping spatial boundaries or the presence of cloud cover in the land cover data. Entries with (blank) are included in the summary but were not considered in the analysis to maintain consistency in total area calculations.

Table 3 Forest cover dynamics by forest and land uses in Papua Barat Province

Forest and Landuse	Deforestation	Forest Degradation	Forest Gain-Natural Forest
Othe land use	77,735	68,847	32,011
Nature reserve	4,733	160,918	41,143
Protected forest	15,922	177,904	64,496
Production forest	21,093	266,944	46,556
Convertible production forest	39,929	122,766	43,102
Limited production forest	16,901	154,596	31,027
Nature forest reserve	181	4,625	105
Wildlife sanctuary	81	1,121	65
National parks	301	301	129
Nature recreation park	167	405	1,254
Water body	4,100	2,314	3,289
(blank)	0	0	0
Grand Total	**181,144**	**960,840**	**263,177**

Total forest gain area, or the conversion of non-forest classes to forest classes, in Papua Barat Province from 2006 to 2021 was 263,177 ha, or equal to 18 thousand hectares per year. The number is relatively higher compared to the deforestation in Papua Barat Province and contributes to more than 20% of annual forest gain at the national level (2nd FRL). Three districts with the largest forest gain in Papua Barat Province include Tambraw, Sorong and Sorong Selatan.

4.3 FOREST TRANSITION

Forest transition curve depicts a theoretical process of the shrinkage of forest cover due to timber extraction, forest conversion for agriculture or other drivers of deforestation to the lowest level before finally increasing due to reforestation efforts (Mather and Needle, 1998). The curve provides phases of forest cover level, which are characterized by the size of remaining forest and the rate of deforestation. The initial phase if less disturbed forest which has high forest cover and low deforestation. The second phase is forest frontiers which still have relatively high forest cover but at the same time, the deforestation rate is also high. The third phase is mosaic forest which is characterized by very low deforestation and very limited forest cover. The last phase is growing forest, where the new plantation forests or regrowth forests are built to provide timber (Figure 6).

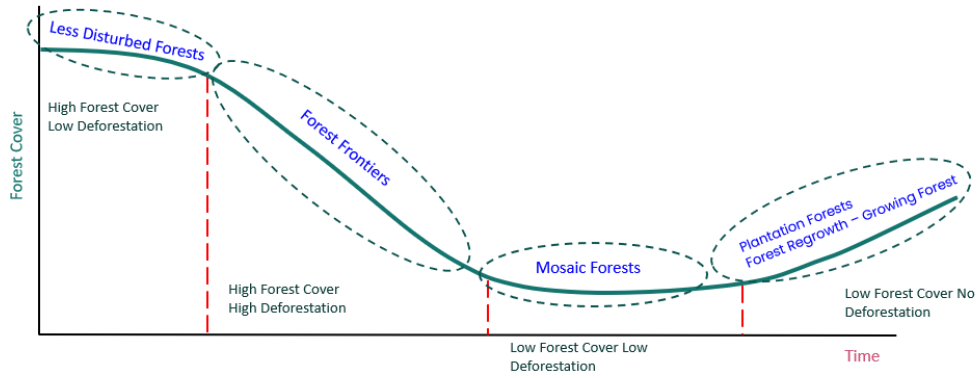

Figure 6 Forest transition phase

The potential program or mitigation action developed for certain areas should consider the phase of the forest transition. For the first phase, protection of remaining forests is crucial that provides ultimate benefit for climate, biodiversity conservation and other environmental services. At the same time maintaining wood production through sustainable forest management is also important to ensure sufficient supply for timber industries. Excluding sustainable timber production will lead to a displacement of emissions through unplanned deforestation triggered by illegal logging to meet the demands. The suitable program based on the type of forest transition phase is presented in Table 4.

Table 4 NCS pathways and programs based on the forest transition phase characteristics

Forest Transition Phase	Characteristics	Program	NCS Pathways
Less Disturbed Forest	High forest cover, low deforestation	Protection of remaining forests, IFM/SFM, biodiversity conservation, environmental services	Protect, Manage
Frontier Forest	High forest cover, high deforestation	Protection of remaining forests, IFM/SFM, biodiversity conservation, ecosystem restoration, agroforestry	Protect, Manage, Restore
Mosaic Forest	Low forest cover, high deforestation	Protection of remaining forests, IFM/SFM, biodiversity conservation, ecosystem restoration, rehabilitation, plantation development, agroforestry	Manage, Restore
Growing Forest	Low forest cover, low deforestation	Rehabilitation, plantation development, agroforestry	Manage, Restore
	Low forest cover, no deforestation	Rehabilitation, plantation development, agroforestry	Manage, Restore

In general, Indonesia is in the frontier forest phase, because it still has relatively high forest cover (50%) but has high deforestation (All districts in Papua Barat Province are in the less disturbed forest phases, which have high forest and low deforestation (Figure 7 A)). Most of the districts have forest cover of more than 80% of their total lands, except Kota Sorong and Manokwari, which are the most populated cities in Papua Barat Province. Similarly, all forest zones (*kawasan hutan*) have the less disturbed forest phases. Although Other land use (APL) has the lowest forest cover, it is still in the less disturbed forest phase (Figure 7 B).

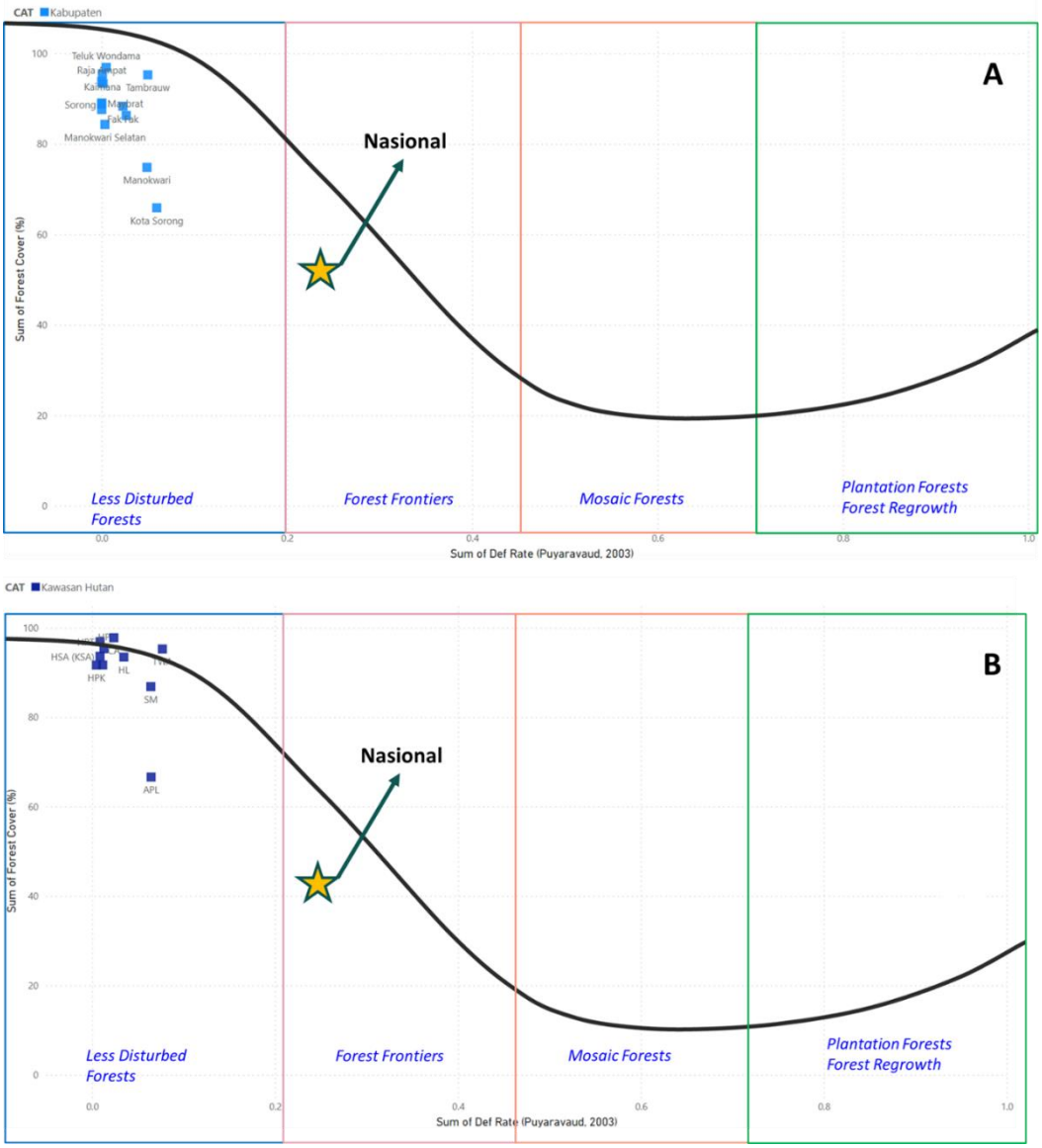

Figure 7 Forest transition phases of various districts (A) and land use functions (B) in Papua Barat Province

Figure 8 depicts the forest transition phases of various land management and licensing units. Most of forest conservation management units are in the less disturbed forest phase, except the Wildlife Sanctuary of Mubrani Kaironi (Figure 8 A). All forest management units (FMUs) of Papua Barat Province are in the less disturbed forest phase (Figure 8 B). Most of the FMUs have forest cover of more than 80%, except KPH Unit XI and KPHK Gunung Meja. However, those FMUs are still in a less-disturbed forest phase.

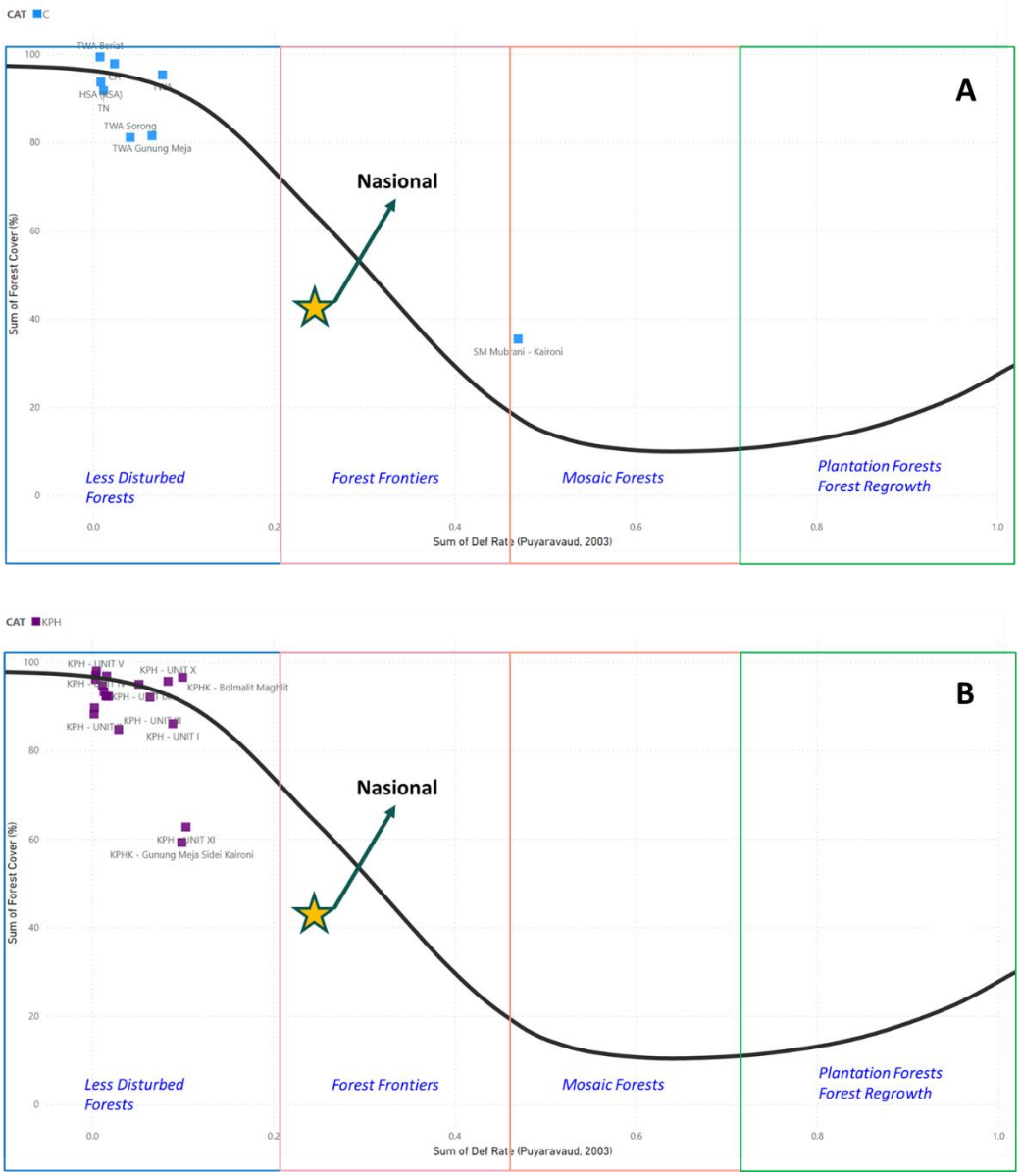

Figure 8 Forest transition phases of types of conservation management (A) and production forest management (B) in Papua Barat Province

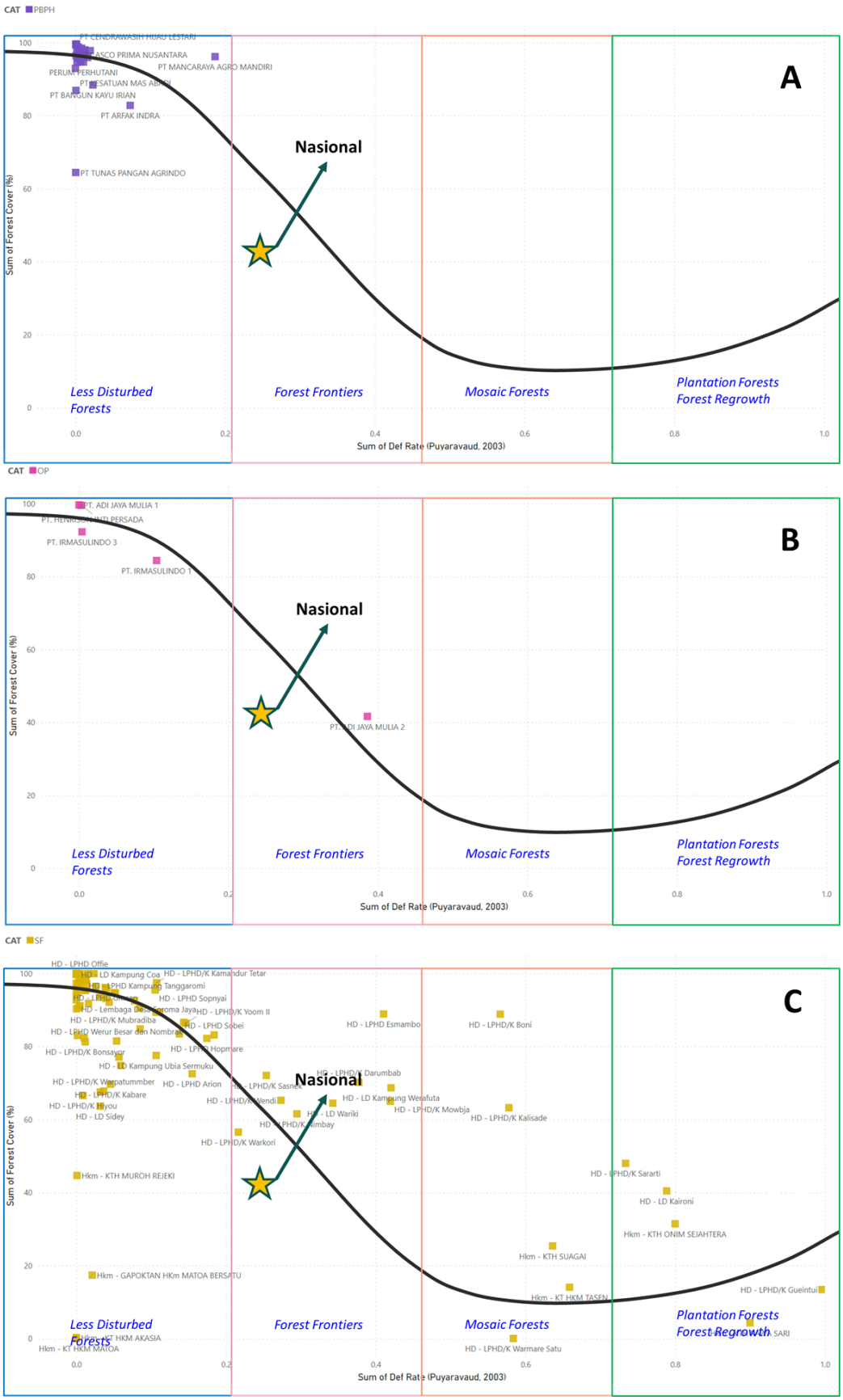

Figure 9 Forest transition phases of forest concessions (A), estate crops concessions (B) and community forestry licenses (C) in Papua Barat Province

All forest concessions are in less disturbed forest phase (Figure 9 A). Most of them have forest cover more than 90%. Only PT Tunas Pangan Agrindo has forest cover less than 70%, although it is still in less disturbed forest phase. Surprisingly, most of the estate crops in Papua Barat Province are still in less-disturbed forest too, except PT Adidaya Mulia, which has about 40% forest cover and high deforestation (Figure 9 B). It seems the company is already clearing the forests for the plantation, while most of the estate crops are not operating yet. In contrast, community forest licenses are very dynamics in terms of forest transition phases, which ranging from less disturbed forest phase to forest regrowth phase (Figure 9 C). Although most of the community forest licenses are in less-disturbed forest phases.

4.4 DRIVER OF DEFORESTATION

The largest drivers of deforestation during the period of 2006 – 2021 are extensive logging and agriculture expansion, which occur to all districts (Table 5). Extensive logging that cuts down trees more than the forest can grow will lead to highly degraded land with low vegetation such as grasslands and shrubs. Logging, both legal and illegal, has become the most prominent driver of deforestation in Papua Barat Province, especially in Fak Fak, Kaimana and Sorong Selatan Districts. Agriculture expansion for croplands, including estate crops is also a significant driver of deforestation in Papua Barat Province, especially in Sorong and Manokwari Districts. Other drivers such as settlement development, mining and infrastructure occurred but remain insignificant.

Table 5 Land cover category after deforestation (Period 2011-2021) by district

District	Aquaculture	Bare ground	Cropland	Infrastructure	Low vegetation	Mining areas	Plantation forest	Settlement	Water body
Fak Fak		1,353	7,296		17,239			688	88
Kaimana		222	1,843		14,684			655	1,616
Kota Sorong		29	438	47	1,373	17		33	4
Manokwari		196	13,245		4,295	36		367	564
Manokwari Selatan		133	2,168		1,963			189	79
Maybrat		62	6,229		6,438			434	385
Pegunungan Arfak		113	391		2,641			1,608	14
Raja Ampat		234	2,600	84	5,613	129		645	175
Sorong	13	1,083	19,043	134	2,637	139		743	1,051
Sorong Selatan		716	9,601	7	13,074		338	1,266	1,295
Tambrauw		251	4,371		4,667	163		375	260
Teluk Bintuni		2,682	4,870		5,976	181		870	1,872
Teluk Wondama		117	939		3,040			667	50
Total Area (Ha)	**13**	**7,193**	**73,032**	**272**	**83,640**	**665**	**338**	**8,540**	**7,452**

Table 6 shows that forest conversion to low vegetation and croplands are mostly occurred in production forests (52 thousand hectares) and other land use – APL (17 thousand hectares). Low vegetation after deforestation in production forests suggests that the logging operation extracts more timber than the forest could grow. Cropland development in production forests might be

linked to encroachment. However, most of the production forests that are deforested were convertible production forests, which potentially related to planned deforestation.

Table 6 Land cover classes after deforestation by forest function (Period 2011-2021) in Papua Barat Province

state Category	Aquaculture	Bare ground	Cropland	Infrastructure	Low vegetation	Mining areas	Plantation forest	Settlement	Water body
Conservation Forests		**123**	**1,396**	**1**	**3,239**	**0**		**324**	**381**
CA		91	1,124	1	2,843	0		298	377
HSA (KSA)		10	155		14			1	0
SM		4	8		66				3
TN		10			268			23	
TWA		7	109		49			3	0
Production Forests	**13**	**3,905**	**15,714**	**51**	**51,985**	**283**	**338**	**2,884**	**2,749**
HP		2,897	3,214	22	13,235		323	441	960
HPK	13	638	8,384	29	28,230	264	16	885	1,470
HPT		369	4,116		10,520	19		1,558	319
Protection Forests		**463**	**3,263**	**7**	**10,791**	**117**		**639**	**643**
HL		463	3,263	7	10,791	117		639	643
Other Use Area (APL)		**2,684**	**52,476**	**212**	**17,132**	**231**		**4,662**	**339**
Water Body		**19**	**183**	**1**	**493**	**33**		**31**	**3,341**
Total Area (Ha)	**13**	**7,193**	**73,032**	**272**	**83,640**	**665**	**338**	**8,540**	**7,452**

4.5 FOREST UTILIZATION BUSINESS LICENSING (*PERIZINAN BERUSAHA PEMANFAATAN HUTAN* (PBPH)) DISTRIBUTION

Of the production forest area in West Papua Province which reaches 5.49 million ha, around 3.10 million ha or 57% of the total production forest area has been allocated for natural forest concession licensing or now called Forest Utilization Business Licensing (PBPH) for the utilization of timber forest products (logging). The number of PBPH units until 2023 is recorded at 25 units, including 25 units for natural forest licenses and 1 unit for industrial plantation forest (Table 7). Most of these natural forest PBPHs are still in operation. Log production over the last 7 years has averaged 648,230 m3/year.

In addition to forest utilization in the form of PBPH, some forest areas in West Papua have also been designated to be managed through social forestry. As of 2023, there are 87 social forest licensing units covering an area of 101,175 ha, mostly as Village Forest.

In line with government regulations that allow PBPH to run multi-business forestry (timber, non-timber and environmental services), there are currently six PBPH companies in Papua Barat Province that are transferring their long-term management plans (RKU) from conventional RKU to multi-business forestry RKU, with one of them including carbon emission (reduction) services.

Table 7 PBPH Distribution in Papua Barat Province

No	Company Name	Non-Timber Forest Product Utilization (HHBK)	Industrial Plantation Forest Utilization (HHK - HT)	Natural Forest Timber Utilization (HHK – HA)	Area (Ha)	Area (%)
1	PERUM PERHUTANI	16,055			16,055	0.54
2	PT Austindo Nusantara Jaya	40,000			40,000	1.34
3	PT Tugu Palma Sejati	55,000			55,000	1.84
4	PT Tunas Pangan Saguindo	54,000			54,000	1.81
5	PT Kesatuan Mas Abadi		87,255		87,255	2.92
6	PT Arfak Indra			177,900	177,900	5.95
7	PT Asco Prima Nusantara			171,270	171,270	5.73
8	PT Bangun Kayu Irian			139,970	139,970	4.68
9	PT Bintuni Utama Murni Wood Industries			82,120	82,120	2.75
10	PT Hanurata			234,470	234,470	7.85
11	PT Kaltim Hutama			161,670	161,670	5.41
12	PT Kurniatama Sejahtera			114,547	114,547	3.83
13	PT Mancaraya Agro Mandiri			97,820	97,820	3.27
14	PT Manokwari Mandiri Lestari			90,980	90,980	3.04
15	PT Megapura Mamberamo Bangun			55,100	55,100	1.84
16	PT Mitra Pembangunan Global			83,950	83,950	2.81
17	PT Multi Wahana Wijaya			107,740	107,740	3.60
18	PT Papua Satya Kencana			195,420	195,420	6.54
19	PT Prabu Alaska			193,240	193,240	6.47
20	PT Rimba Kayu Arthamas			88,910	88,910	2.97
21	PT Teluk Bintuni Mina Agro Karya			237,750	237,750	7.96
22	PT Wanagalang Utama			132,850	132,850	4.45
23	PT Wijaya Sentosa			130,755	130,755	4.38
24	PT Wukirasari			116,320	116,320	3.89
25	PT Yotefa Sarana Timber			123,565	123,565	4.13
Grand Total		165,055	87,255	2,736,347	2,988,657	100

5 REGULATION ON CLIMATE FINANCING

5.1 POLICY AND REGULATION SETTING OF CARBON ECONOMIC VALUE

There is a growing interest in how nature-based solutions (NbS) fit into the framework of Indonesia's carbon market as the country enters an exciting new phase. In the simplest terms, NbS refers to measures that are taken to protect, restore, and sustainably manage natural or human-altered ecosystems in order to provide positive impacts for climate change adaptation and mitigation, including a reduction in greenhouse gas emissions and an increase in carbon sequestration. NbS has grown more well-known in recent years due to the notion that it can be used to generate carbon credits that can be traded on the carbon market.

NbS has the ability to reduce the costs of carbon market compliance. Organizations, for example, can use NbS to offset their emissions, reducing the need of buying carbon credits on the open market. NbS can help to improve the environmental credibility of the carbon market. In this regard, NbS can help to ensure that carbon credits are generated in an approach that genuinely reduced emissions. Given the recent establishment of carbon credit regulations in Indonesia, there are several important issues that merit more examination and analysis, including the following section.

5.2 CARBON ECONOMIC VALUE *(NILAI EKONOMI KARBON* (NEK)) MECHANISM

PR 98/2021 requires for the implementation of carbon economic value (*nilai ekonomi karbon*, or "NEK"), defined as the monetary value for each unit of GHG emission caused by human and economic activity. The rule sets multiple procedures for implementing NEK in order to meet the NDC, including (i) carbon trading, (ii) result-based payment, (iii) carbon taxes, and/or (iv) other mechanisms determined by the MOEF (Figure 10).

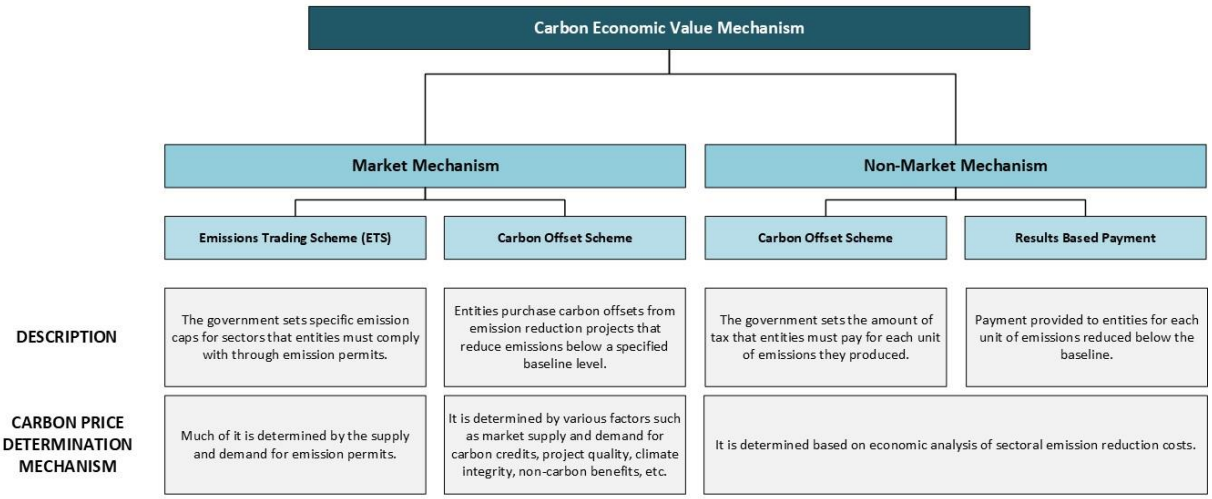

Figure 10 Carbon economic value mechanism in Indonesia

5.2.1 Carbon Trading

PR 98/2021 regulates carbon trading, which is a market-based method for reducing GHG emissions by selling and buying carbon units in both domestic and international transactions. Carbon trading takes place in accordance with the following provisions: (i) on the basis of the relevant Indonesian National Registry System for Climate Change Control (SRN PPI)[3]; or (ii) by prioritizing the use of GHG Emission Reduction Certificates issued from national emission reductions[4].

Carbon trading can be carried out through the following mechanism:

1) Emission Trading

   A transaction mechanism between business actors whose emissions exceed the allowed GHG Emission Limit is termed as emission trading[5]. Businesses and/or activities with a GHG Emission Limit participate in emission trading[6]. Such emission trading can be carried out if it can be found that there are firms and/or activities that are carrying out mitigation steps with emissions that are above or below the authorized GHG Emission Limit, and Emission trading includes the transfer of carbon units[7].

2) GHG Emission Offset

   GHG emission offsets are reductions in GHG emissions carried out by businesses and/or activities to compensate for emissions that occur elsewhere[8]. GHG emission offset is carried out if a business and/or activity does not have a GHG Emission Limit.

[3] Article 1 of PR 98/2021
[4] Article 48 of PR 98/2021
[5] Article 1 of PR 98/2021
[6] Article 50 of PR 98/202
[7] Article 51 of PR 98/2021
8 Article 1 of PR 98/2021

5.2.2 Result-Based Payment

Result-based payment is a payment incentive based on verified and/or certified GHG emission reduction results and validated non-carbon benefit[9]. Result-based payment is carried out for the performance/benefit of GHG emission reduction that ministries/institutions, local government, or business actors carry out based on the verification results of GHG emission reduction and/or conservation/increment of carbon stock that is carried out by specific business and/or activity[10]. However, result-based payment does not result in carbon ownership transfer[11]. A MOEF Regulation will further define the method for introducing carbon trading and performance-based payments.

5.2.3 Carbon Levies

Carbon levies may be in the form of tax, customs duty, or other government levy. These levies are based on carbon content, estimated carbon emissions, total carbon emissions, and/or climate change mitigation action performance[12] In relation to the carbon tax, the Indonesian government recently enacted Law No. 7 of 2021 on Harmonization of Tax Regulations (*Harmonisasi Peraturan Perpajakan* or "HPP Law").

5.2.4 Project Registration in SRN PPI MOEF

PR 98/2021 incorporates a comprehensive system for measuring, reporting, and verifying NEK activities (Figure 11). The NEK implementer carries out these measurements to achieve three key objectives:

1) Attaining technical approval for the GHG Emission Limit.
2) Determining the precise quantity of GHG emissions or removals.
3) Establishing the extent of GHG emission reductions or increases.

In addition to this, businesses are required to report their DRAM within their respective business units or areas, as specified in the SRN PPI. These reports serve as the foundation for the verification process and must be conducted at least once annually[13]. Furthermore, the MOEF will undertake the validation and verification of reports that have been registered in the SRN PPI[14]. In the specific context of carbon trading and result-based payment, it is compulsory to include the outcomes of

[9] Article 1 of PR 98/2021
[10] Article 55 of PR 98/2021
[11] Article 55 of PR 98/2021
[12] Article 58 of PR 98/2021
[13] Article 67 of PR 98/2021
[14] Article 68 of PR 98/2021

independent validation and verification processes[15]. Business entities are obligated to register and report their NEK implementation within the SRN PPI. Failing to fulfill this requirement may result in various administrative sanctions, including:

1) Issuance of a written warning.
2) Government enforcement to ensure compliance.
3) Imposition of administrative fines.
4) Suspension of the GHG Emission Reduction Certificate.
5) Revocation of the GHG Emission Reduction Certificate.

Regarding the SRN PPI, procedures related to reporting, validation, verification, and the competence standards for validators and independent verifiers will be further detailed in a forthcoming MOEF Regulation.

PR 98/2021 has introduced a mandatory requirement for businesses to document and report all of their NEK activities within the SRN PPI. The MOEF Regulation 21/2022 has outlined the specific details and requirements for these records and reports, which include the following:

1) For Emission Trading, the following components are recorded in the SRN PPI:[16]
    a. Data on the actor or activity's description, identity, and proposal for PTBAE-PU;
    b. The PTBAE-PU;
    c. PTBAE-PU transaction results;
    d. Monitoring plan and implementing evaluations of climate change mitigation actions;
    e. Results of emission reduction achievements in the PTBAE-PU's Compliance Period;
    f. Verification results;
    g. SPE-GRK;
    h. Domestic or international transfers of SPE-GRK; and
    i. Transfer of emission reduction results among PTBAE-PU holders
2) For GHG Emission Offset, the following components are recorded in the SRN PPI[17]:
    a. Data on the actor or activity's description, identity, and proposal for PTBAE-PU;
    b. GHG emission reduction achievement report;
    c. Validation results;

[15] Article 86 of PR 98/2021
16 Article 44 of MOEF Regulation 21/2022
[17] Article 46 of MOEF Regulation 21/2022

d. Verification results;
e. Amount of SPE-GRK than can be traded through GHG Emission Offset;
f. Domestic SPE-GRK transfers;
g. First transfer of international SPE-GRK transfers; and
h. Direct trading results of SPE-GRK.

3) In the context of Result-Based Payment, the reporting within the SRN PPI encompasses several crucial elements. This includes the reporting of the GHG emission baseline, the emission reduction target, planning documents, and the final report pertaining to climate change mitigation actions. Additionally, validation and verification reports, as well as the outcomes of Result-Based Payments, are also part of the reporting requirements in the SRN PPI[18].

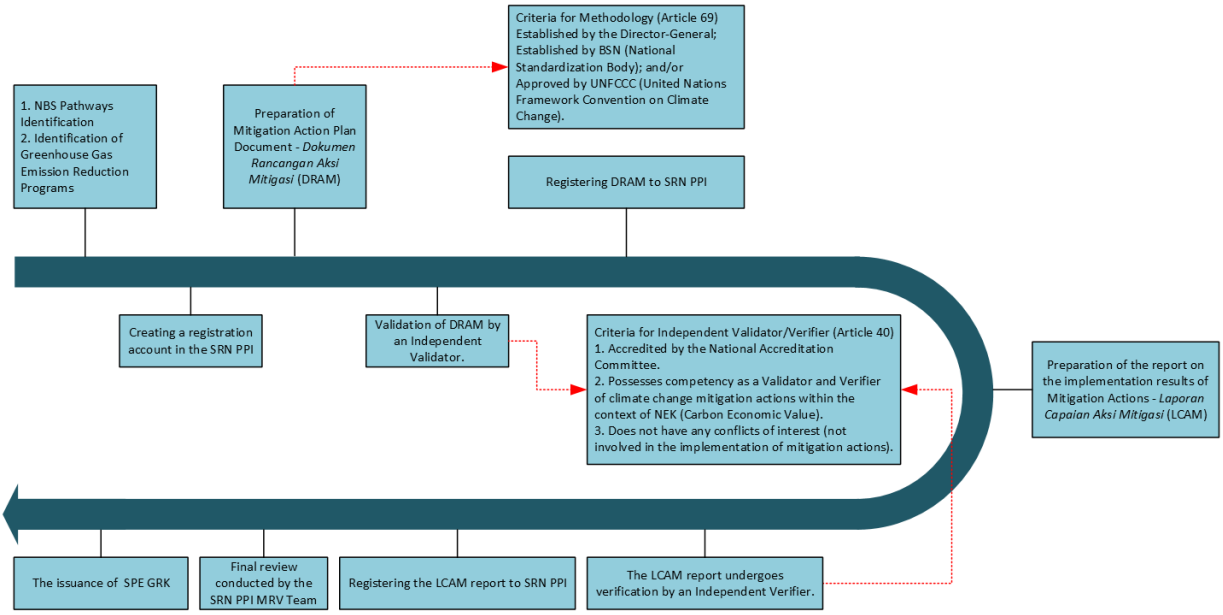

Figure 11 Carbon project registration process of NEK implementation within the SRN PPI

5.2.5 GHG Emission Reduction Certificates (*Sertifikasi Pengurangan Emisi* GRK – SPE-GRK)

MOEF Regulation 21/2022 provides detailed regulations for the certification of GHG emission reductions, resulting in the issuance of GHG Emission Reduction Certificates, commonly referred to as "Sertifikat Pengurangan Emisi GRK" or SPE-GRK. These certificates represent a reduction in GHG emissions or an increase in GHG absorption equivalent to one ton of carbon dioxide equivalent (CO_2e). SPE-GRK can be issued for achievements stemming from a business actor's emissions reductions, including those achieved beyond their upper limit.

[18] Article 48 of MOEF Regulation 21/2022

The process to obtain an SPE-GRK, also known as Indonesia Certified Emission Reduction (ICER), involves submitting an application to the Directorate General of Climate Change Control within the MOEF through the SRN PPI[19]. Importantly, GHG emission reductions applied to SPE-GRK cannot be concurrently registered as carbon credits in other emissions reduction schemes. This ensures the exclusivity and integrity of the certification process in Indonesia[20].

5.2.6 Transition Provision

There are sections in PR 98/2021 that deal with the transition procedures for carbon trading and result-based payments that took place before the regulation was passed. Prior to PR 98/2021 taking effect, parties that have participated in carbon trading or result-based payments were required to comply with particular registration and reporting requirements through the SRN PPI. This requirement period is one year after the rule was passed. The inability to sell any remaining carbon units in their possession will result from failure to meet this commitment. Additionally, only carbon units that have been registered and verified in SRN PPI are allowed to be sold in the carbon trading market[21].

5.3 Carbon Trading Regulation to Complement the Forestry Regulation System

The Forestry regulatory framework underwent revisions as a result of new implementing regulations stemming from the Omnibus law[22]. These changes were detailed in Government Regulation No. 23 of 2021, which focused on aspects such as the utilization of forest areas, forest management, and the promotion of social forestry. Within the scope of the Forestry regulations, forest utilization activities, including carbon sequestration and storage, have been officially recognized. However, it's important to note that the regulations do not incorporate provisions related to carbon trading. Therefore, individuals or entities embarking on carbon projects are obliged to adhere to PR 98/2021 and MOEF Regulation 21/2022 in addition to complying with the Forestry regulations. For a clearer understanding of how these regulations interrelate, please refer to the simplified illustration Figure 12, which highlights the connections between the Forestry regulations, NEK, and Carbon Trading regulations, specifically concerning Forest Utilization businesses and Social Forestry initiatives aimed at carbon sequestration activities.

19 Article 62 of MOEF Regulation 21/2022
20 Article 60 of MOEF Regulation 21/2022
21 Article 86 of PR 98/2021
22 Government Regulation in Lieu of Law on Job Creation

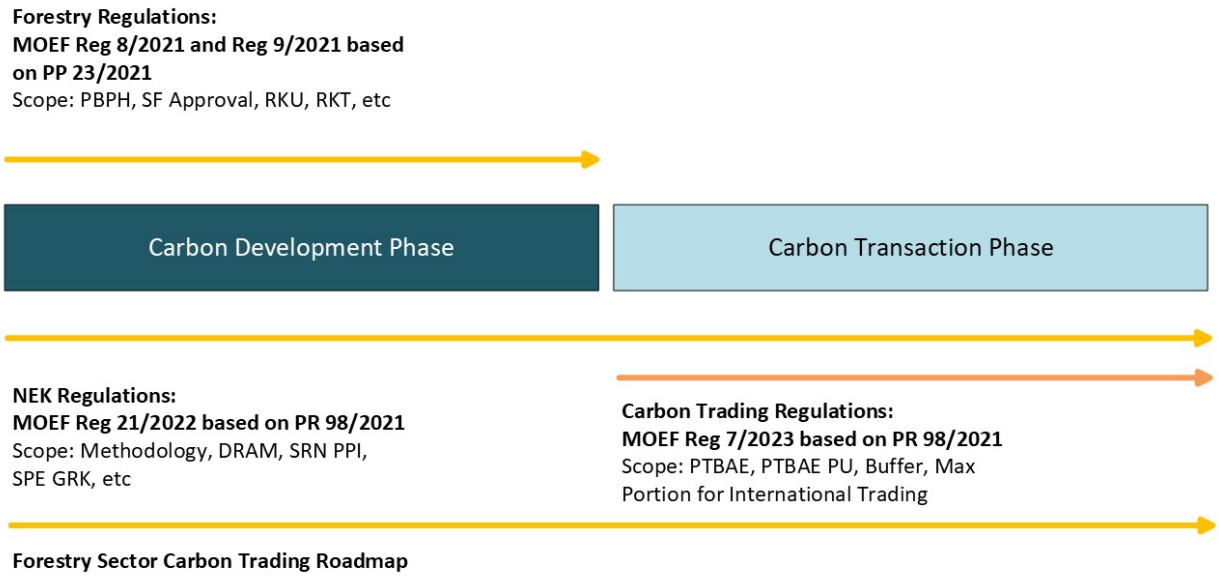

Figure 12 NEK regulations in forestry sector

5.3.1 Subsector, Sub Sub Sectors, and Mitigation Actions

Under MOEF Regulation 21/2022, the implementation of carbon pricing, which encompasses activities like carbon trading, is organized by sectors and subsectors (Figure 13). Specifically, within the Forestry sector, carbon trading is to be carried out within the Forestry subsector, and also within the Management of Peatland and Mangrove subsector. These subsectors further encompass various sub-subsectors, which play a crucial role in the carbon trading process, which include the following Sub-subsectors:

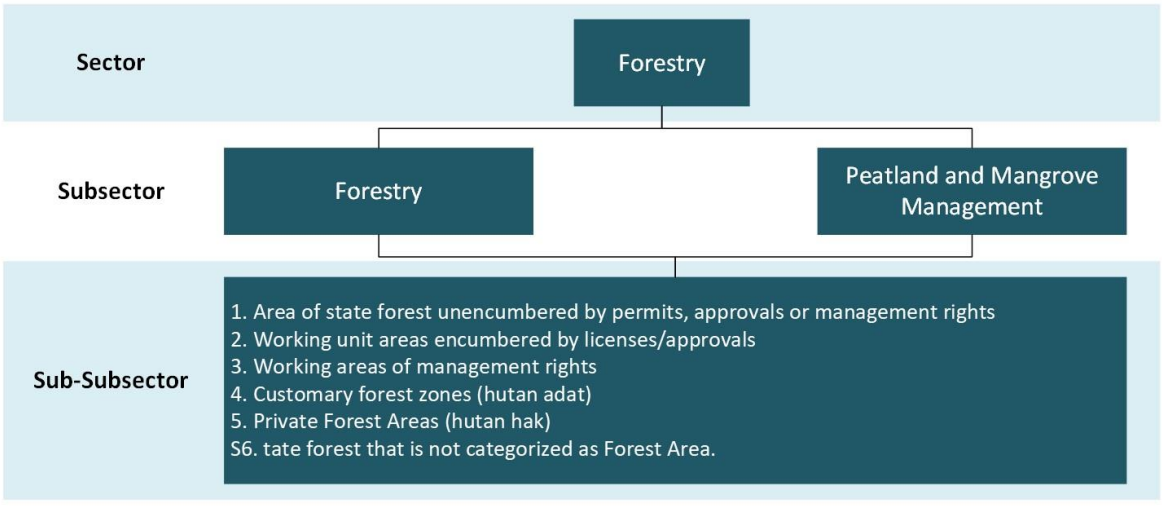

Figure 13 Sub-sector categorization for the carbon trading procedures in the forestry sector

In essence, climate change mitigation actions within the Forestry sector can take two primary forms: (i) reducing emissions, and/or (ii) capturing and storing carbon. Article 3 of MOEF

Regulation 7/2023 outlines a comprehensive list of 22 different types of activities that can be undertaken in this regard, among which are:

1) Reducing emissions from deforestation and forest degradation on mineral, peat, and mangrove land;
2) Sustainable forest management;
3) Rotation and non-rotation rehabilitation;
4) Social forestry;
5) Assistance on customary forest; and
6) Afforestation in ex-mining areas

As stipulated in MOEF Regulation 21/2022, climate change mitigation actions must adhere to methodologies recognized by the UNFCCC, MOEF, and/or the Indonesian National Standardization Agency. Currently, the SRN PPI website indicates the acknowledgment of four methodologies for calculating emission reductions and/or carbon sequestration within the FOLU Sector. These methodologies have undergone review by a methodology panel team and have been officially approved through a Directorate General of Climate Change Control, MOEF decree letter for use in calculating: (i) reductions in deforestation, (ii) reductions in forest degradation, (iii) emission reductions resulting from fire prevention on peatlands, and (iv) emissions from peat decomposition prevented through deforestation and forest degradation prevention actions. Consequently, it can be anticipated that additional methodologies will be formally adopted by MOEF in the future to accommodate a broader range of climate change mitigation actions, as mentioned previously.

5.3.2 Carbon Trading Requirements Vary Depending on the Conditions of the Site

In 2023, the Minister of Environment and Forestry introduced Regulation No. 7, detailing the Procedures for Carbon Trading in the Forestry Sector. This regulation extends opportunities for both business entities and local communities, including indigenous groups (adat communities), within the forestry sector to actively engage in the emission trading system or offset initiatives. This initiative aims to establish an all-encompassing carbon trading ecosystem within the forestry sector, promoting inclusivity.

Furthermore, this new regulation will play a pivotal role in advancing the recent development of a carbon exchange, scheduled for implementation later this year. The execution of carbon trading activities within the Forestry sector, be it emission trading or emissions offset, is contingent upon the specific location and status of each site or area. The particulars of the Carbon Trading

requirements for each site are meticulously outlined in Carbon Trading Requirements in the Forestry SectorTable 8, ensuring a site-specific approach to carbon trading within the sector.

Table 8 Carbon Trading Requirements in the Forestry Sector

No	Location	Actors	Carbon Trading Eligibility	
			Emission Trading	Emission Offset
1	(i) Permanent Production Forest Area; (ii) Convertible Production Forest Area; (iii) Utilization block of protected Forest Area already burdened with permits	Holders of PBPH (Forest Utilization Business Permit), Social Forestry Management Approval, or Management Rights	×	√
2	(i) Permanent Production Forest Area; (ii) Convertible Production Forest Area; (iii) Utilization block of protected Forest Area not yet burdened with permits	Acquiring PBPH (Forest Utilization Business Permit), Social Forestry Management Approval, or Management Rights	×	√
3	Peatland and mangrove areas located within the Forest Zone (*Kawasan Hutan*)	Obtaining PBPH (Forest Utilization Business Permit), Social Forestry Management Approval, or Management Rights.	√	√
4	Peatland and mangrove areas located outside the Forest Area (*Kawasan Hutan*)	Receiving approval from the governor, regent/mayor, or minister/head of the relevant institution according to their respective authorities.	√	√
5	Blocks of other Protected Forest Areas	After obtaining the approval of the Minister.	×	√
6	Conservation Forest Area	Approval must be obtained from: 1.The regent/mayor, for nature reserves located within the District/city. 2. The governor, for nature reserves located across regencies. 3. The Minister, for conservation areas other than nature reserves as referred to in points 1 and 2, and this is carried out by the Business Entity.	×	√
7	Customary Forest (*Hutan Adat*)	Carried out by customary law communities engaged in Offset GHG Emission business and/or activities.	×	√
8	Private forest	Implemented by the community of forest rights owners engaged in Offset GHG Emission business and/or activities.	×	√
9	State forest outside the Forest Area (*Kawasan Hutan*)	Carried out after receiving the location designation and approval from the governor or minister, as appropriate according to their respective authorities.	×	√

Some additional requirements may also apply depending on the subject of a climate change mitigation action as stipulated in Article 8 MOEF Regulation 7/2023 (See Table 9).

Table 9 Additional Requirements for Carbon Trading in the Forestry Sector

Business Actors	Requirements
Individuals or entities holding forest utilization business permits (PBPH), management rights or private forests	Required to possess a sustainable forest management certificate, forest product legality certificate, or forest product declaration. These certifications must align with the stipulations laid out in the pertinent laws and regulations. Compliance with these specific prerequisites is crucial for those engaged in climate change mitigation actions within the forestry sector.
Social Forestry	The Social Forestry is for Social Forestry Business Groups *(Kelompok Usaha Perhutanan Sosial* - KUPS)[3] to at least obtain the Silver classification. The classification of KUPS in Social Forestry is further regulated under Minister of Environment and Forestry Regulation No. 9 of 2021 on Social Forestry Management (MOEF Regulation 9/2021). In order to be classified as Silver KUPS, it must: (i) have established a KUPS[23]; (ii) have identified the potential business; (iii) have prepared a Social Forestry Management Plan; and (iv)have a business unit.
Customary law (*adat*) communities, Social Forestry Management Approval holders, and private forest holders involved in business activities, or GHG emission offset projects	Must work alongside partners who have relevant experience/expertise regarding carbon measurement, project planning and execution, and navigating carbon markets. This partnership is fundamental to guarantee the successful implementation of climate change mitigation endeavors within these communities and forest management entities.

5.3.3 Emission Trading and GHG Emissions Offset in the Forestry Sector

As previously outlined, the emission trading mechanism is specifically applicable to the management of peatland[24]. Under these regulations, MOEF will establish emission caps and/or emission quotas for peatland management within the Peat and Mangrove Management subsector (known as *Petunjuk Teknis Batas Atas Emisi* - PTBAE), as well as for each individual business operating within this subsector (referred to as PTBAE *Pelaku Usaha* - PTBAE-PU). Companies covered by PTBAE may engage in emission trading and sell any remaining GHG emission cap or unused emission quotas that have been verified by a third-party verifier, both within the domestic market and internationally. However, it's important to note that companies can retain these unused quotas for a maximum of 2 (two) years; otherwise, they will lose the ability to trade them[25].

[23] KUPS is a business group formed by Social Forestry Group (KPS)* that will and/or has conducted business established in accordance with the provisions of laws and regulations (Article 1 (42) MOEF Regulation 9/2021)
* KPS: a group of forest farmers and/or community groups and/or cooperatives holding Social Forestry
[24] Article 10 MOEF Regulation 7/2023
[25] Article 12 MOEF Regulation 21/2022

If a company is unable to reduce its emissions below its PTBAE-PU level, it may opt to purchase carbon credits from another company with surplus PTBAE-PU or sell verified SPE-GRK.

For businesses in the Forestry sector other than those engaged in peatland and mangrove management, they have the opportunity to participate in carbon trading through GHG Emissions Offset. The MOEF will establish a GHG emission baseline and emission reduction target for this sector. The GHG offset mechanism applies to businesses and activities that fall into one of the following categories: (i) those without a GHG emission cap, (ii) those with an emission surplus (meaning their emissions reduction falls short of the target and GHG emission baseline), or (iii) those with an emission deficit (indicating their emissions reduction surpasses the target and GHG emission baseline). To engage in Emission Offset, business entities must prepare a Mitigation Action Plan Document (Dokumen Rencana Aksi Mitigasi - DRAM) in compliance with the provisions outlined in MOEF Regulation 21/2022. Both the plan and its implementation must undergo validation and verification by third-party entities to obtain verified SPE-GRK for their emissions reduction achievements.

In addition, business actors engaging in carbon offset activities are obligated to incorporate their climate change mitigation action plans within their forest utilization business planning documents. Failure to comply with this requirement may result in administrative sanctions being imposed.

Regarding the concept of emission reduction reserves, commonly referred to as "buffers," within the context of carbon trading as defined in MOEF Regulation 21/22, it exclusively pertains to carbon offset activities. However, MOEF Regulation 7/2023 extends the scope of buffer provisions, not only for carbon offset but also for emission trading activities involving SPE-GRK. The specific allocation of buffer provisions will be specified in the Forestry sector carbon trading roadmap.

5.3.4 The mechanism of carbon trading by Multi-Sector Forestry Business Permit Holders (PBPH)

The carbon trading business process within the multi-sector forestry mechanism, overseen by the Sustainable Forest Management Directorate of the Ministry of Environment and Forestry, is outlined in the diagram below (Figure 14). Permit holders under this mechanism are encouraged to engage in FOLU net sink mitigation actions and incorporate these mitigation activities into their DRAM. Furthermore, the types of business activities conducted should align with and be predominantly in line with the initial permits for existing forestry permit holders transitioning into carbon trading ventures.

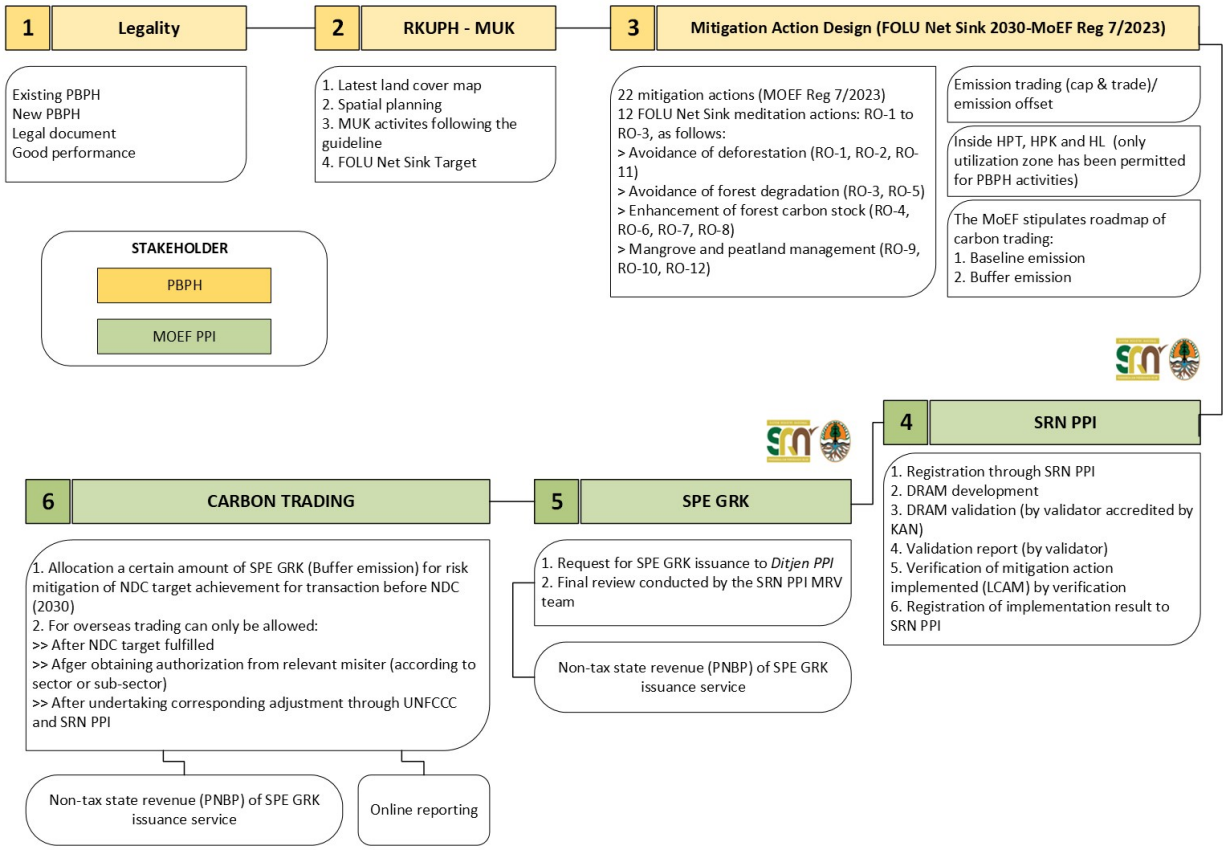

Figure 14 The mechanism of carbon trading by multi-sector forestry (MUK) within PBPH

5.3.5 Ownership of Carbon Credits

MOEF Regulation 7/2023 breaks from standard ownership conceptions connected to cost-bearing business entities and recognizes concessions license holders as owners in compliant carbon markets. However, this transition demands additional regulatory clarification for parties involved in NbS projects and sharing associated costs and risks. The project's carbon credit ownership is determined by criteria such as concessions licensing terms, applicable regulations, and project-specific conditions. Initially, the easiest strategy is to allocate ownership to the business bearing project expenditures and risks and in charge of credit management. Nonetheless, the environment gets more complicated as a result of MOEF Regulation 7/2023, which emphasizes that the concessions license holder shall be both the entity owning and conducting carbon trading, basically the project developer inside Indonesia's compliance carbon market for NbS projects.

MOEF Regulation 7/2023 emphasizes the concessions license holder's critical role, establishing them as the lawful owner and executor of carbon trading activities. In essence, the firm holding the concessions license is anticipated to also operate as the designated project developer inside Indonesia's compliance carbon market, particularly in the case of NbS projects. This instruction is

especially important in areas governed by forest business licenses, where the entity holding the PBPH serves as the certified project developer for NbS programs.

Box 1: The agreement or contract with the concession owner
If the project proponent (that is not the concession owner) shall enter into an agreement with the concession owner, such an agreement should distinctly outline the rights and responsibilities of each party involved. This agreement must encompass critical aspects such as the delineation of ownership rights concerning carbon credits, the distribution of benefits arising from the project, and the mechanism for resolving disputes that may arise. In essence, this contractual agreement serves as the foundation for regulating the relationship between the project developer and the concession owner. Further, MOEF issued Decree No. 716/2023 regarding the integration of carbon pricing in the approval, partnership, or business licensing in the Forestry and Environment Sector; it imposes certain requirements on concession holders who engage in strategic agreements with project proponents or carbon buyers shall be made into an agreement in form of a notarial deed and such agreements must not be construed as licenses being transferred and must be formalized through a notarial deed. In addition, the MOEF Decree 716 stipulates a limitation on the duration of sale and purchase agreements for carbon credits. Such **contracts are restricted to a maximum duration of 5 years**.

Significantly, MOEF Regulation 7/2023 introduces a novel aspect for social forestry or community forest regions where the PBPH label does not apply. It is necessary for these social forestry or community forest owners to work with experienced carbon project partners who have knowledge in carbon project development and market access. However, it is unclear whether these partners, despite playing a critical role in project management and bearing related expenses and risks, have a legitimate claim to carbon credits for their contributions to NbS initiatives in social or community forests. Considering the intricacies outlined above, a few considerations emerge:

1) Transparency and Accountability: Ensuring the transparency and accountability of carbon credit ownership is of utmost importance. It is imperative to establish unambiguous ownership structures to mitigate any potential ambiguity or disputes.
2) Equitable Benefit Distribution: Fair and equitable distribution of benefits generated from carbon credits is essential for all stakeholders engaged in NbS projects. This includes not only project developers but also partners who contribute knowledge, expertise, and resources.
3) Inclusive Participation: The arrangement of carbon credit ownership should be designed in a manner that does not discourage other entities from engaging in NbS projects. The framework should promote collaboration and the engagement of diverse stakeholders, thereby expanding the reach and influence of NbS initiatives.

In essence, while the fundamental concept of simple carbon credit ownership is fair, the addition of regulatory intricacies adds layers of complexity. Achieving a harmonic balance between clear ownership, equitable distribution, and encouraging participation is critical to the success and sustainability of NbS projects within Indonesia's expanding compliance carbon market system.

5.3.6 The Inquiries Concerning About Voluntary Carbon Mechanism in Indonesia

The nature-based solutions (NbS) Project in Indonesia raises various crucial questions and considerations, notably in terms of its incorporation into both compliance and voluntary carbon processes. Key uncertainties include whether these systems will be governed by separate legislation and Indonesia's position on the carbon credits generated by the NbS Project. Indications point to a preference for the compliant carbon market, as evidenced by PR 98/2021 and related regulations. These steps significantly support the establishment of a domestic carbon trading scheme, demonstrating Indonesia's strong commitment to regulating and nurturing carbon trading activities within the national boundaries, as well as its commitment to global climate initiatives.

Box 2: President key speech on the *Peluncuran Bursa Karbon Indonesia* 26 September 2023[26]
1. Utilize international standards as a reference and leverage technology for more effective and efficient transactions. 2. Clear targets and timelines are necessary for both domestic and international markets. Swiftly enter the international market. 3. Regulate and facilitate the voluntary carbon market in accordance with international market practices. Ensure that international standards do not disrupt NDC targets. Referring to MOEF Regulation 21/2022, the use of other certification schemes that can be deemed equivalent to SPE-GRK can be pursued after the establishment of a mutual recognition agreement by the Minister[27].

These regulations also invite various sectors, including forestry, to actively participate in Indonesia's domestic carbon market, underscoring the country's commitment to engaging a diverse range of industries in its efforts to address carbon emissions and combat climate change through regulated carbon trading practices. Moreover, the implementation of PR 98/2021 is detailed in MOEF Regulation 21/2022. This comprehensive regulation provides precise guidelines for the carbon pricing process conducted through the SRN PPI.

MOEF Regulation 21/2022 goes further by specifying the allocation of carbon credits, reserving 0-5% for domestic carbon offsets, 10-20% for international carbon offsets, and at least 20% for

[26] Full speech available at https://www.youtube.com/watch?v=1BrS85i7CZI
[27] Article 68, 69, 70, 71, 72 of MOEF Regulation 21/2022

international carbon offsets not covered by the Nationally Determined Contribution. These allocations demonstrate Indonesia's strong commitment to both domestic and international climate action, promoting a comprehensive approach to carbon reduction and environmental sustainability. These specifics illuminate Indonesia's strategic approach to carbon credit allocation. By reserving a significant portion of carbon credits for both domestic and international use, Indonesia demonstrates its commitment to actively engage in the global fight against climate change. This approach not only supports domestic climate mitigation actions but also highlights Indonesia's role in contributing to international climate goals and cooperation.

The Government of Indonesia's position on the VCM standard appears to be somewhat ambiguous, as outlined in MOEF Regulation 21/2022. For international carbon trading mechanisms that do not impact Indonesia's NDC targets, specific requirements have been established. These requirements include the need for registration in the SRN PPI, the exclusion of carbon unit transfers related to the NDC of other countries, refraining from making claims about emission reductions resulting from climate change mitigation actions, and avoiding involvement in the emission reduction targets of foreign cooperation partners.

This approach, as defined in MOEF Regulation 21/2022, has introduced a degree of uncertainty regarding the future of the VCM in Indonesia. The SRN PPI plays a central role in registering carbon projects in the country, and as explained in the Methodology Submission to SRN PPI section, mutual recognition agreements are essential for project developers seeking to apply voluntary carbon market standards for their carbon projects in Indonesia. VCM certificates such PVCs issued by Plan Vivo and VCUs issued by Verra could be recognized to be traded domestically. In order to do this, a mutual recognition between the MOEF and Verra, Plan Vivo, or any other certification scheme must be carried out by disclosing their standards to each other to reach conformity.

The regulatory landscape suggests that Indonesia is carefully considering how international carbon trading mechanisms align with its climate goals and commitments, which has implications for the adoption of VCM standards within the country. This ambiguity may necessitate further dialogue and clarification on the role of VCM in Indonesia's overall carbon trading framework.

The utilization of methodologies derived from voluntary certification mechanisms is not allowed in Indonesia unless the government engages in mutual recognition agreements for certification. Certificates of emission reduction issued by other certification bodies can be regarded as equivalent to SPE-GRK once mutual recognition agreements have been formalized with the

Minister of Environment and Forestry. The Minister is responsible for overseeing this mutual recognition process through the following actions:

1) Mutually sharing information regarding the use of MRV standards:
    a. Information regarding principles and requirements,
    b. Standards and/or approaches used;
    c. In calculating the GHG Emission Baseline;
    d. Information about monitoring GHG Emissions, Validation, and Verification;
    e. Competency standards for Validators or Verifiers; and
    f. Recording and tracking systems or registries.
2) Assessing the compatibility of the use of international standards and/or Indonesian national standards:
    a. Methodologies recognized by the intergovernmental panel on climate change or Intergovernmental Panel on Climate Change; and
    b. Results of Validation and Verification conducted by internationally accredited Validators and Verifiers.
3) Issuing statements regarding the results of the assessment of compliance with international standards and/or Indonesian national standards;
4) Establishing and implementing mutual recognition agreements; and
5) Publishing certifications recognized by both parties on SRN PPI.

In order to use a newly submitted methodology, it should first be accepted by the panel of methodology and published on the website. Referring to the guidelines28, the overall process of new methodology evaluation may take 1-year timeframe or more. Once the methodology is accepted, project developers can use it for project design documents or DRAM29 submission to SRN PPI.

To facilitate these requirements, the Directorate General of Climate Change Control, MOEF issued Decision No. 22/PPI/IGAS/PPI.2/6/2017, which established the Methodology Panel Team. The Methodology Panel Team determines methodologies that can be proposed and used by project

[28] "Pedoman Penyusunan Metodelogi Penghitungan Reduksi Emisi dan/atau Peningkatan Serapan GRK dalam Kerangka Validasi dan Verifikasi Pernyataan Capaian Aksi Mitigasi" can be translated to proper English as follows:
"Guidelines for the Preparation of Methodology for Calculating Emission Reductions and/or Increased GHG Uptake within the Framework of Validation and Verification of Mitigation Action Achievements," prepared by the Directorate of GHG Inventory and MRV, Ministry of Environment and Forestry, in 2018."

[29] "DRAM" stands for "Dokumen Rencana Aksi Mitigasi" in Indonesian, which translates to "Mitigation Action Plan Document" in English.

developers. The methodology determination procedure aims to provide guidelines for proposing methodologies by proponents, when calculating GHG emission reductions and removal.

5.3.7 Indonesia Carbon Exchange - IDXCarbon

According to previous carbon trading regulations like PR 98/2021, which outlines the trade ability of PTBAE PU and SPE-GRK, these carbon assets can be traded either directly or through carbon exchanges. In the realm of the capital market, there are essentially two market types: the primary market (or initial market) and the secondary market. The primary market represents the space where investors acquire securities for the first time directly from the issuer (typically a company) through processes like Initial Public Offerings (IPOs). On the other hand, the secondary market is where investors engage in trading previously issued securities from these companies. This secondary market is often referred to as an exchange, providing investors with various mechanisms to buy and sell these securities.

In terms of carbon trading, before carbon units are traded on the carbon exchange or enter the secondary market, they must first be registered with the SRN PPI and the Carbon Exchange Organizer, as carbon units that are not registered in the SRN PPI cannot be traded. The explanation for this is provided in Figure 15.

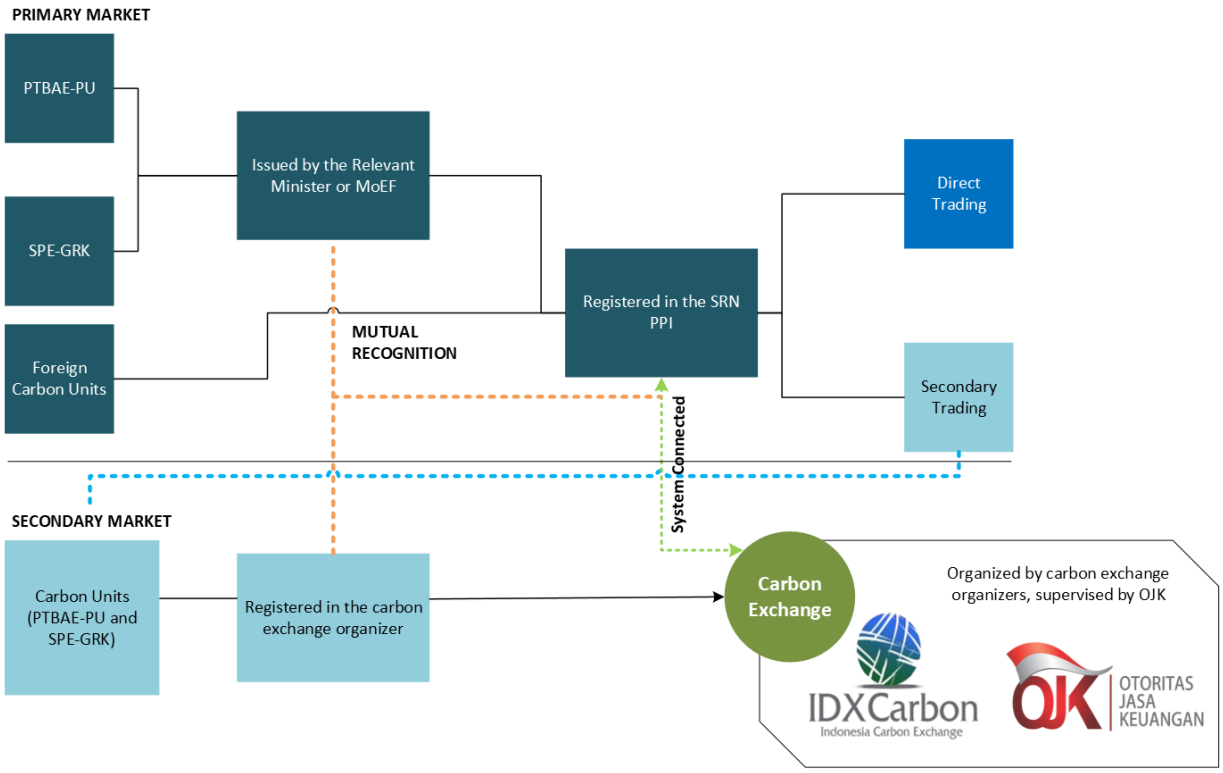

Figure 15 Indonesia Carbon Exchange framework

Based on the previous Figure 15, it becomes evident that the issuance of PTBAE-PU and SPE-GRK, which encompasses both SPE-GRK resulting from the performance of PTBAE-PU and SPE-GRK derived from emission offset, initiates with registration on the SRN PPI. This initial stage aligns with what is commonly referred to as the primary market, where authorized parties are empowered to define and generate PTBAE-PU and SPE-GRK. Subsequently, these assets can proceed to be traded on the carbon exchange or the secondary market. In essence, it underscores that any trading activity in the secondary market must undergo verification within the primary market first.

The determination of PTBAE-PU is made by the Relevant Minister based on PTBAE-PU Subsequently, once business actors have carried out calculations to verify their emission results (whether they are above or below PTBAE-PU), carbon trading can commence. If the actual emissions fall below PTBAE-PU, businesses can apply for the issuance of SPE-GRK, with SPE-GRK 's performance being derived from PTBAE-PU. The issuance of SPE-GRK is conducted by MOEF. After PTBAE-PU and SPE-GRK are established, listed in SRN PPI, and recorded with the Carbon Exchange Organizer, carbon units become eligible for trading on the carbon exchange, which constitutes the secondary market. Within the carbon exchange, the trading mechanisms are governed by internal policies established by the Carbon Exchange Organizer.

Referring to the carbon trading plan and the initial trading pilot project organized by IDX, it's apparent that there are four potential mechanisms in play: (a) auction, (b) regular trading, (c) negotiated trading, and (d) marketplace30. These mechanisms have the potential to be applied to carbon units and their derivatives. This suggests that in the future, carbon trading within carbon exchanges may encompass a variety of mechanisms, each aligning with the internal policies set by the exchange. This diversity in trading mechanisms reflects the evolving landscape of carbon trading, providing flexibility and adaptability to meet the needs of various stakeholders and market dynamics. The IDXCarbon exchange is expected to run its first trading on 26 September 2023, where the focus will be on the power plant sub-sector.

[30] Indonesia Stock Exchange, “Rencana Perdagangan Karbon dan Pilot Project Perdagangan Perdana”, 19 September 2023.

6 CASE STUDY

6.1 GENERAL DESCRIPTION OF PT WIJAYA SENTOSA

PT Wijaya Sentosa is one of the companies holding a PBPH-HA logging concessions permit for selective logging in the Papua Barat Province. Its operational area covers 130,755 hectares with a concessions period of 55 years until 2056, situated in Teluk Wondama within the districts of Teluk Wondama and Teluk Bintuni. PT Wijaya Sentosa is a member of the Sinar Wijaya Group, along with PBPH PT Kaltim Hutama and PT Wukirasari.

PT Wijaya Sentosa has been in operation for 9 years, with an average production of round wood at 112,000 m3 per year and an average logging area of 3,500 hectares per year. The primary types of wood produced include merbau, resak, matoa, and other mixed jungle species. All wood production is utilized to meet the needs of the woodworking industry, including plywood, owned by the Sinar Wijaya Group.

Based on its legality, PT Wijaya Sentosa is authorized to conduct selective logging in natural forests for all types of wood, with a tree diameter limit of 40 cm and above, across effective forested areas, excluding specific protected and conservation zones as determined by government regulations. Through the regulations of the MOEF that allow multi-business forestry activities within the PBPH permit area, PT Wijaya Sentosa will also revise its 10-year RKU and incorporate environmental services - carbon in addition to timber products.

Several options being considered to generate carbon credits through improved forest management practices include limiting the logging limit for merbau trees from 40 cm to 60 cm and above in diameter, reducing the annual logging area by converting primary forests and highly valuable conservation areas into conservation zones, and mitigating forest damage through RIL practices or a combination of these options. PT Wijaya Sentosa is used as a case study example to analyze the potential carbon credits from the implementation scenario of IFM.

6.2 APPLICABILITY AND ASSESSMENT OF METHODOLOGIES

PBPH's major business in Papua Barat Province is selective logging of natural forests. We did field surveys in PBPH areas predominantly with primary business in selective logging of natural forests during our focus group discussion with stakeholders in Papua Barat Province. We collected detailed information on RKU, RKT, and actual logging realizations. As a result, we selected to study

a carbon project that is related to PBPH's core business activity of selective logging from natural forests.

A wide range of carbon offsetting methodologies were considered for the project31. A systematic approach was used for identifying the most suitable methodologies. The following steps were undertaken:

1) All methodologies from the carbon standard SRN PPI and VERRA VCS were considered;
2) Methodologies that were not applicable to the project were excluded and the most;
3) Suitable methodologies summarized, using the most recent versions available in the SRN PPI and VERRA VCS registry, all the registered forestry and REDD+ and IFM projects and programs were accessed;
4) The projects were filtered according to project type to include only REDD+ and IFM projects;
5) Thereafter, the methodologies used in each of the relevant projects were identified;
6) Researched and considered for the project; and an extensive search was then conducted to identify any additional or new;
7) Methodologies not yet registered on the sites.

The methodologies employed in this feasibility study were limited to VERRA VCS-VM0010. It is recommended as the most suitable methodology for the development of BP Tangguh's carbon project in PBPH with the initial permit logging concessions in Papua Barat Province. This recommendation is based on its alignment with the applicability criteria and its prominent highlighting in bold in the provided list. However, this method has important limitations as explained in the box, regardless of carbon project implementation in Indonesia see Box 3.

Box 3. Limitations of Methodology
It's important to emphasize that methodologies other than those specified by the SRN PPI, such as the Verra VCS-VM00010 method, cannot presently be used for registering and operating carbon projects in Indonesia's forestry sector. This method can only be applied if mutual recognition is established between Verra and SRN PPI, or if government policies and regulations allow its usage. For a more detailed explanation on this topic, please refer the relevant section 5.3.6.

[31] Methodology screening as of July 2023

Available SRN PPI methodologies for forestry projects are listed below[32]:

1) MSAH-001 *Pengurangan Deforestasi*;
2) MSAH-002 *Pengurangan Degradasi Hutan*;
3) MSAH-003 *Perhitungan emisi dekomposisi gambut dari pencegahan deforestasi dan degradasi hutan*;
4) MSAH-004 *Penghitungan penurunan emisi dari pencegahan kebakaran di lahan gambut*.

Available VERRA VCS methodologies for forestry projects are listed below:

1) VM0003 Methodology for Improved Forest Management through Extension of Rotation Age, v1.2;
2) VM0004 Methodology for Conservation Projects that Avoid Planned Land Use Conversion Peat Swamp Forests, v1.0;
3) VM0005 Methodology for Conversion of Low-productive Forest to High-productive Forest, v1.2;
4) VM0006 Methodology for Carbon Accounting for Mosaic and Landscape-scale REDD Projects, v2.2;
5) VM0007 REDD+ Methodology Framework (REDD+MF), v1.6;
6) VM0009 Methodology for Avoided Ecosystem Conversion, v3.0;
7) **VM0010 Methodology for Improved Forest Management: Conversion from Logged to Protected Forest, v1.3;**
8) VM0011 Methodology for Calculating GHG Benefits from Preventing Planned Degradation, v1.0;
9) VM0012 Improved Forest Management in Temperate and Boreal Forests (LtPF), v1.2;
10) VM0015 Methodology for Avoided Unplanned Deforestation, v1.1;
11) VM0029 Methodology for Avoided Forest Degradation through Fire Management, v1.0;
12) VM0034 Canadian Forest Carbon Offset Methodology, v2.0;
13) VM0035 Methodology for Improved Forest Management through Reduced Impact Logging v1.0;
14) VM0037 Methodology for Implementation of REDD+ Activities in Landscapes Affected by Mosaic Deforestation and Degradation, v1.0.
15) VM0045 Methodology for Improved Forest Management using Dynamic Matched Baselines from National Forest Inventories, v1.0.

[32] The FOLU sector methodology currently available in SRN PPI is the methodology employed by the Indonesian Government for reporting the 1st FREL in the REDD+ program at UNFCCC. The strengthening process of SRN PPI is currently underway, and new methodologies are being prepared by the Government to accommodate carbon projects at the jurisdictional to project management unit levels.

6.3 Most Suitable Methodologies

6.3.1 Title and Reference of Methodology

- VM0010 Methodology for Improved Forest Management: Conversion from Logged to Protected Forest Version 1.3.
- VT0001 Tool for the Demonstration and Assessment of Additionality in VCS Agriculture, Forestry and Other Land Use (AFOLU) Project Activities, v3.0
- VCS AFOLU Non-Permanence Risk Tool v4.0

Overview:

- This methodology quantifies the GHG benefits generated from preventing logging of forests that would have been logged in the absence of carbon finance. This methodology is applicable where the baseline scenario includes planned timber harvest, and under the project scenario, forest use is limited to activities that do not result in commercial timber harvest or forest degradation.
- This Logged to Protected Forest (LtPF) methodology provides a detailed procedure to estimate the net GHG emission reductions/removals resulting from the implementation of IFM projects aimed at the protection of forests that would be logged in the absence of the project.
- This methodology is applicable to tropical, temperate, or boreal forests.
- The latest revision of VM0010 includes mechanisms to quantify the emissions resulting from establishing forestry infrastructure (e.g., clearing roads, skid trains and log landings), as well as the fossil fuels from forestry machinery including mechanized felling, skidding, forwarding, haling, loading, and transporting the wood products inside the project area.

The VM0010 approach is used in the case study's calculations of the IFM LtPF, which is presented in Scenario 1: 100 % IFM LtPF and Scenario 2: 50% IFM LtPF and 50% Continuation of Selective Logging under MUK. Documents including RKU, RKT, and field survey data from PT Wijaya Sentosa are used to gather the calculation data.

6.3.2 Applicability of Methodology

The following Table 10 demonstrate and justify how the project activities meet each of the applicability and eligibility conditions of the methodology and tools applied.

Table 10 Applicability Conditions from VM0010 Methodology for Improved Forest Management: Conversion from Logged to Protected Forest, v1.3

No	Applicability Condition	Demonstration and justification how the project activities meet this applicability condition
1	Forest management in the baseline scenario must be planned timber harvest	The condition has been met. Under the baseline scenario, the project area would have been managed as a production forest, and certain portions of the area would have been subject to ongoing selective logging in accordance with the RKT and RKU guidelines, with a documented history of actual harvesting activities occurring.
2	Under the project scenario, forest use is limited to activities that do not result in commercial timber harvest or forest degradation	Condition met. If in the project scenario, the area is transformed into a multi-business utilization of environmental services that is fully protected and there are no further activities. subject to commercial timber harvesting.
3	Planned timber harvest must be estimated using forest inventory methods that determine allowable offtake as volume of timber (m^3 ha^{-1})	The merchantable volume of timber per unit area is available in the RKU, RKT, and harvesting realization data, which is based on IHMB and ITSP data.
4	The boundaries of the forest land must be clearly defined and documented	Condition met. The project boundaries are clearly defined and well-documented because PBPH is an active and legally recognized selective logging company.
5	Baseline condition cannot include conversion to managed plantations	Condition met. Under the baseline scenario, the assumption is that under multi-business utilization, PBPH would manage environmental services activities that are fully protected.
6	Baseline scenario, project scenario and project case cannot include wetland or peatland	Condition met. There are no peatlands or wetlands in the project area.

6.3.3 Eligibility Conditions

In addition to the applicability conditions, VM0010 also outlines a number of eligibility conditions that must be considered by BP Tangguh if they intend to undertake a carbon project in PBPH, Papua Barat Province.

Legal Right to Harvest

The legal right to harvest must pre-exist the implementation of the project. The legal right to harvest must be issued by a relevant government body, define a legal allocation of rights to a forest timber resource, and include a plan for forest management that includes a definition of the spatial extent of the forest, the volume of the timber resource to be extracted and a description of harvesting practices.

Rights to forest management must be demonstrated by documentary proof of legal permissibility for timber harvest, intent to harvest and a description of the timber resource. This proof must be issued by the relevant (governmental) regulatory body that has designated, sanctioned, or approved the project area (or areas) for forest management.

Intent to Harvest

The project proponent must demonstrate intent to harvest through the following forms of evidence.

originating prior to the date of all evidence in pursuit of carbon finance/consideration of IFM.

Projects must provide either:

1) Documented evidence demonstrating that:
   - The project site is representative of other forestlands harvested in the country within the past two years; and,
   - The project site is within commercially viable distance to existing transport networks and a port for timber export or a mill for timber processing; or
2) A valid and verifiable government-approved timber management plan for harvesting the project area.

6.4 RISK AND OPPORTUNITY

6.4.1 Risk: Multi Usaha Kehutanan

The Indonesian Government, through Government Regulation 23/2021 and MOEF Regulation 8/2021, regulates the implementation of multiple forest businesses for Community Forestry. The main principle of multiple forest businesses is to optimize the value of forest areas to enhance the economic development of forest regions and contribute to emission reduction efforts in the forestry sector. The objectives of multiple forest businesses are:

1) Optimizing area utilization
2) Optimal forest management
3) Increasing Gross Regional Domestic Product
4) Supporting food security programs

Multi Usaha Kehutanan represents a transformation of forestry through landscape-based area management. This step is an optimization strategy for forest area utilization and simultaneously improves investment climate by simplifying business licenses. It is achieved by integrating various

forest products into one Forest Business Licensing for all business activities within the forest area. Multi Usaha Kehutanan also plays a crucial role in supporting the achievement of NDC targets and Indonesia's FOLU Net Sink 2030, as part of climate change mitigation actions.

Presidential Regulation No. 23 of 2021 defines Multi Usaha Kehutanan as the implementation of several forestry business activities, including area utilization, utilization of timber and non-timber forest products, and/or utilization of environmental services to optimize forest areas in Protected Forests and Production Forests. Multi Usaha Kehutanan, through PBPH, can be granted to individuals, cooperatives, state-owned enterprises (BUMN), regional-owned enterprises (BUMD), and private enterprises (BUMS) for business activity Figure 16:

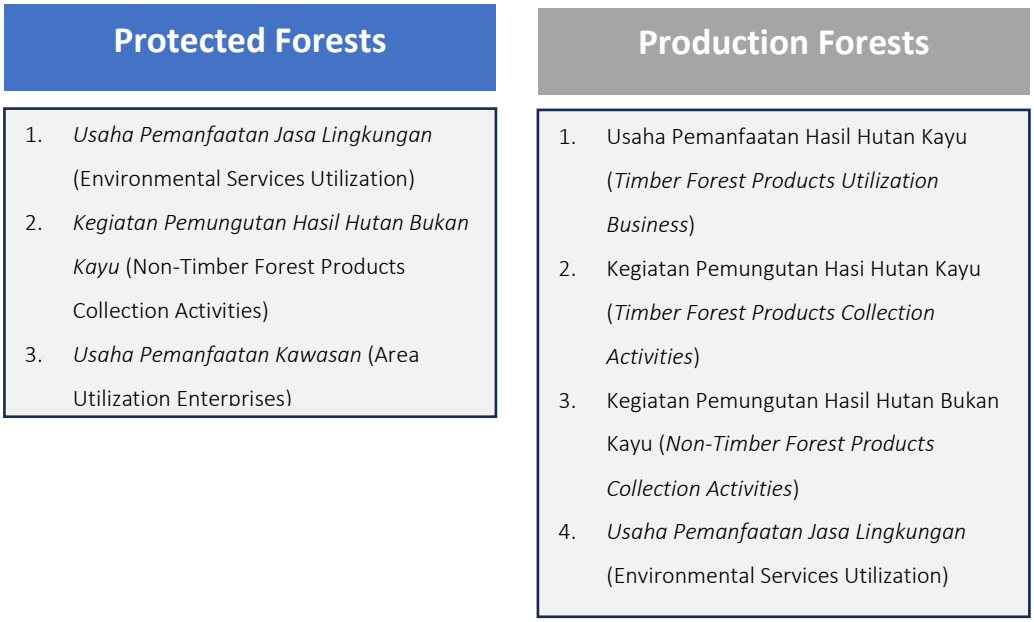

Figure 16 Business activity in PBPH based on forest and non-forest cover – protected forests and production forests

6.4.1.1 Risks of Implementing 100% IFM LtPF within the Multi Usaha Kehutanan Scheme

In accordance with the regulations outlined above and Section 5.3.4, activities within PBPH must involve more than one type of activity. Moreover, the types of business activities undertaken should be in alignment with and primarily correspond to the initial permits issued for existing forestry permit holders transitioning into carbon trading ventures. For instance, in the case of PT Wijaya Sentosa, which is involved in timber harvesting/logging, it cannot be completely transformed into environmental services such as a carbon project.

To implement a carbon project using the VM0010 IFM logged to protected method, the project managers must reduce emissions generated from logging activities and then carry out protection

measures. Therefore, based on the current regulations, a 100% IFM LtPF project cannot be executed for PBPH with initial permits or core logging business activities.

6.4.1.2 Production and Wood Demand in Indonesian Logging Concessions (PBPH-HA)

The discussion with APHI states that the current demand for natural wood is relatively met if production can be maintained at 5 million cubic meters. Production data can be observed in Figure 17 from a source provided by the Directorate General of Sustainable Forest Management, MOEF. Considering that wood production has remained within the range of 5-6 million cubic meters, it indicates that the demand for natural wood has been fulfilled as there have been no significant additions in the last five years. A decrease occurred in 2020 due to the force majeure event of Covid-19.

If the existing concessions meet the demand for natural wood, there is no substantial risk or threat of increased emissions resulting from logging natural wood, and the situation stays within the current baseline. However, if IFM LtPF activities are introduced in active concessions, there is a potential risk of displacement. Displacement risks occur because logging activities in active PBPH-HA concessions are stopped due to the implementation of IFM LtPF, leading to a reduction in national wood production. Nevertheless, if the demand for wood remains at approximately 5 million cubic meters, it is likely to drive logging activities to take place elsewhere, both through legal and illegal means.

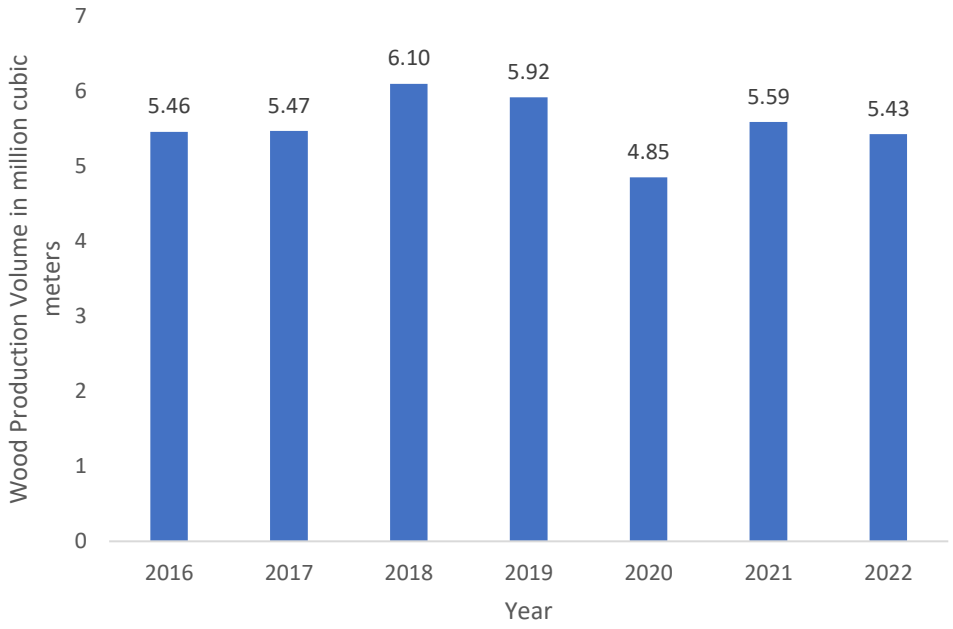

Figure 17 Log Production from PBPH-HA (logging concessions)

6.4.2 Risk: PBPH-HA Production and Additionality

The 2022 MOEF forestry statistics report33 stated that log production from PBPH-HA from 2013 to May 2020 was below the annual targets. The gap between the targeted and actual log production occurred due to several issues in the field. Low log production coupled with high production costs has significantly reduced the profits of numerous natural forest concessions. This decreasing profitability is one of the reasons why 28.8 percent of natural forest concession holders have no activities in the field. Besides from production costs, several proposed RKT logging activities have poor realization rates due to decreasing commercial timber stock, causing harvesting uneconomical. This is also a result of failing to conduct a pre-harvest inventory (ITSP) 1-2 years before logging. The government is evaluating the performance of natural forest timber concessions and encouraging their commitment in managing the Production Forest sustainably.

Box 4. Additionality
The term "no activities" refers to the absence of administrative reporting responsibilities such as PHPL, RKU, and RKT. However, **over 50 percent of PBPH-HA are unproductive**. "Unproductive" denotes that the company, despite having an RKU, doesn't create an RKT or conduct logging activities (harvesting). Furthermore, some companies hold an RKT but do not conduct logging (harvesting). Therefore, conducting an initial analysis to check the production activities of PBPH-HA becomes crucial before initiating the IFM project development.

In the context of carbon offset projects, additionality refers to the concept that the emissions reductions or removals claimed in a project are additional to what would have occurred in a business-as-usual scenario. Therefore, if a project developer intends to establish a carbon project using the IFM method, they must choose active PBPH-HA areas with a history of logging production to fulfill the principle of additionality. However, if the project developer invests in PBPH-HA areas that are not productive, no additionality can be claimed. This is crucial because even though Indonesia has a total PBPH-HA concessions area of 20 million hectares34, not all of them are actively producing.

6.4.3 Risk: Mutual Recognition

MOEF Regulation 21/2022 outlines the procedure for mutual recognition as a mechanism for acknowledging emission reduction certificates issued by other certification bodies such as Verra, Gold Standard, Plan Vivo, etc. This mutual recognition process is conducted by the Minister as

[33] Available at: https://backpanel.kemlu.go.id/Shared%20Documents/The%20State%20of%20Indonesias%20Forest%202022.pdf
[34] Data sources: https://phl.menlhk.go.id/infografis

stipulated in articles 68, 69, 70, 71, and 72. The use of voluntary methods like VCS-VM0010 cannot be applied until this mutual recognition occurs; for further details, please refer to the relevant section 5.3.6.

6.4.4 Opportunity

At the moment, the Indonesian government is focusing on strengthening regulations and tools for implementing the economic value of carbon. This creates the opportunity to initiate carbon projects within the forestry sector. SRN PPI will serve as the registry platform, issuing SPE-GRK that can be traded directly or through carbon exchanges regulated under POJK 14/ 2023 on Carbon Trading Through Carbon Exchanges.

6.5 Potential VCUs

6.5.1 Scenario 1: 100 % IFM LtPF

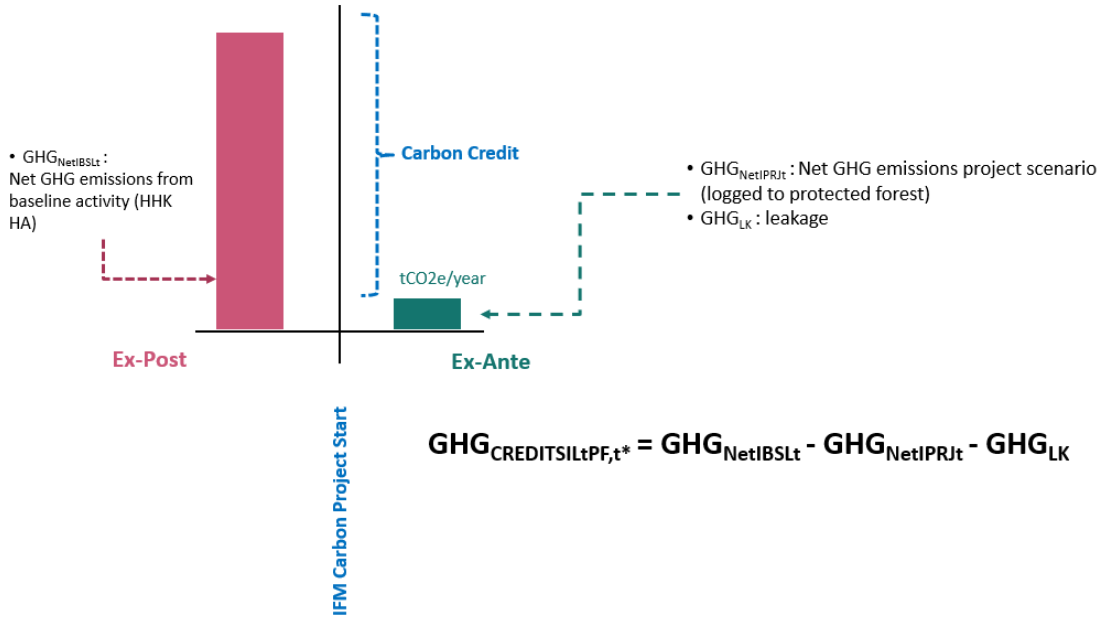

Figure 18 Scenario 1: 100 % IFM LtPF

The emission reductions calculation for the IFM LtPF project in a PBPH-HA logging concessions area in Papua Barat Province, covering a total area of 130,000 hectares, indicates a mitigation potential of 17. MtCO2e over the 30-year project duration. This translates to an annual average of 0.597 MtCO2e per year (See Figure 18).

The total volume of VCUs available for trading will depend on the project's risk rating. A 10% risk rating is the minimum that can be applied to a project. However, based on the identified risks through the non-permanence risk tool relevant to the Papua Barat Province project, it is expected that the risk rating would be approximately 15%35. The total and annual volumes of potential VCUs are shown in the summary Figure 19.

Size	**130k ha**	Total Investment	
Start Date 2023		**Avg Annual Operation Cost**	**$5.70 million**
Duration	30 years	**Avg Operating Cost per Credit**	**$9.54/Verified Carbon Credit in tCO2e**

Core Impact Duration	Climate - Carbon - Forest Cover	Biodiversity - Ecosystems - Species	Community - Livelihoods- Improved Capacity - Wellbeing - Inclusivity and Diversity

Credits	IFM				
Avg Est. Annual (Buff 15%)	**0.597 mtCO2e**	Avg Annual Credits per Ha	165.24 tCO2e/Ha	Project Type(s)	IFM (VM0010 – Adaptation to SRN PPI)
Avg Est. Total	**17.93 mtCO2e**	Avg Annual Harvested Area	3,618 Ha	Standard(s)	SRN, CCB

Annual Gross Income from Carbon Credit ($15/tCO2e)	$8,96 million/year	Annual Net Income from Carbon Credit	$3,26 million/year

Description

- The project is owned by a forestry company with active logging permits and a **75% harvesting realization**. Financial reports, audited by public accountants, show over **80% fund allocation** for required forest management as per Guidelines for Financial Reporting of Production Forest Utilization.
- The company has secured a long-term contract for wood supply and strategically positioned itself near transport networks, a port, or a timber processing mill.
- The project's main goal is to shift focus from logging to forest protection and restoration (IFM LtPF).
- Furthermore, the project aims to actively participate in CCB certifications. These certifications provide recognition for the project's efforts in promoting climate change mitigation, community benefits, and biodiversity conservation, aligning with the Climate, Community, and Biodiversity Standards (CCB Standards). By pursuing CCB certifications, the project seeks to demonstrate its commitment to sustainable practices and adherence to recognized international standards.

Limitations

- There is currently no mutual recognition process between Verra and SRN PPI, thus the VM0010 – IFM (LtPF) methodology cannot be used. Will SRN PPI adapt the IFM methodology, and what is the process and requirements if businesses want to propose IFM as a new methodology to SRN PPI?
- If a business entity with a logging license wishes to undertake an IFM project, is an additional business license required to match this new activity? What is the process and procedure for requesting a change in this license?
- What types of multi-business activities are allowed, and is it possible to change the type of business from one initially related to logging to a new type unrelated to logging?
- Is it possible to obtain CCB certification separately from SRN PPI?

Figure 19 Potential VCUs Scenario 1: 100 % IFM LtPF

[35] A 15% risk rating is the average AFOLU non-permanence risk of existing VCS carbon projects in Indonesia. The non-permanence risk rating is calculated using AFOLU non-permanence risk tools to measure internal risk, external risk, and natural risk to determine the final buffer discount of VCUs.

6.5.2 Scenario 2: 50% IFM LtPF and 50% Continuation of Selective Logging under MUK

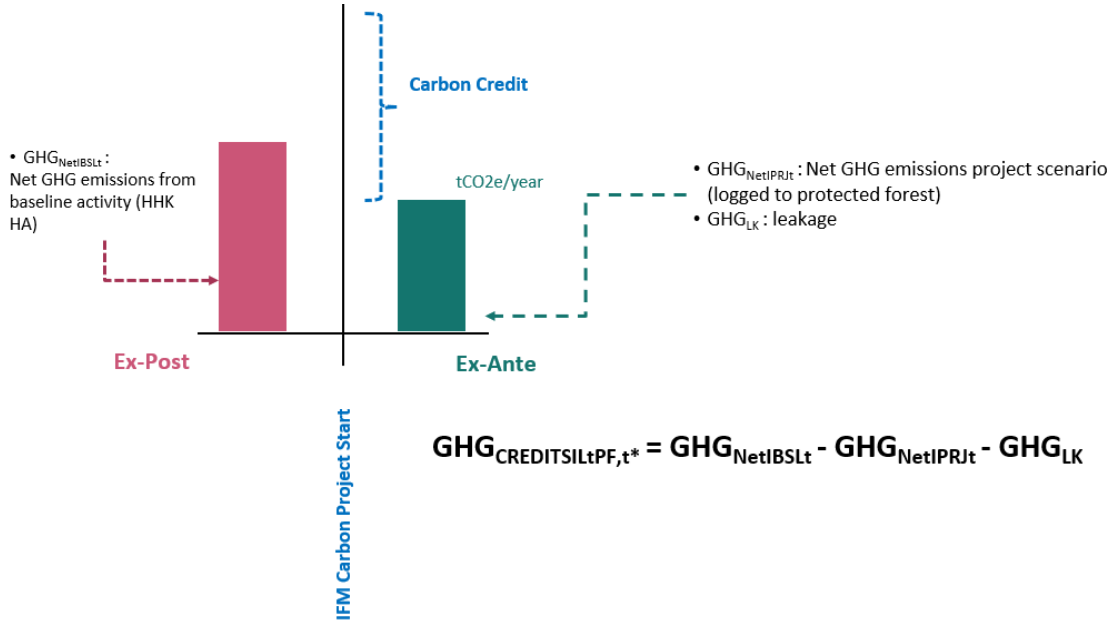

Figure 20 Scenario 2: 50% IFM LtPF and 50% continuation of selective logging under MUK

The emission reductions calculation for the IFM LtPF project in a PBPH-HA logging concessions area in Papua Barat Province, covering a total area of 130,000 hectares, indicates a mitigation potential of 8.99 million MtCO2e over the 30-year project duration. This translates to an annual average of 0.229 MtCO2e per year (See Figure 20).

The total volume of VCUs available for trading will depend on the project's risk rating. A 10% risk rating is the minimum that can be applied to a project. However, based on the identified risks through the non-permanence risk tool relevant to the Papua Barat Province project, it is expected that the risk rating would be approximately 15%. The total and annual volumes of potential VCUs are shown in the summary Figure 21.

Size	**130k ha**	Total Investment	
Start Date 2023		**Avg Annual Operation Cost**	**$3.32 million**
Duration	30 years	**Avg Operating Cost per Credit**	**$11.09/Verified Carbon Credit in tCO2e**

Core Impact Duration	Climate - Carbon - Forest Cover	Biodiversity - Ecosystems - Species	Community - Livelihoods- Improved Capacity - Wellbeing - Inclusivity and Diversity

Credits	IFM				
Avg Est. Annual (Buff 15%)	**0.229 mtCO2e**	Avg Annual Credits per Ha	165.24 tCO2e/Ha	Project Type(s)	IFM (VM0010 – Adaptation to SRN PPI)
Avg Est. Total	**8.99 mtCO2e**	Avg Annual Harvested Area	1,809 Ha	Standard(s)	SRN, CCB

Annual Gross Income from Carbon Credit ($15/tCO2e) $4,49 million/year Annual Net Income from Carbon Credit $1,17 million/year

Description

- The project is owned by a forestry company with active logging permits and a **75% harvesting realization**. Financial reports, audited by public accountants, show over **80% fund allocation** for required forest management as per Guidelines for Financial Reporting of Production Forest Utilization.
- The company has secured a long-term contract for wood supply and strategically positioned itself near transport networks, a port, or a timber processing mill.
- The project's main goal is to shift focus from logging to forest protection and restoration (IFM LtPF).
- Furthermore, the project aims to actively participate in CCB certifications. These certifications provide recognition for the project's efforts in promoting climate change mitigation, community benefits, and biodiversity conservation, aligning with the Climate, Community, and Biodiversity Standards (CCB Standards). By pursuing CCB certifications, the project seeks to demonstrate its commitment to sustainable practices and adherence to recognized international standards.

Limitations

- There is currently no mutual recognition process between Verra and SRN PPI, thus the VM0010 – IFM (LtPF) methodology cannot be used. Will SRN PPI adapt the IFM methodology, and what is the process and requirements if businesses want to propose IFM as a new methodology to SRN PPI?
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- What types of multi-business activities are allowed, and is it possible to change the type of business from one initially related to logging to a new type unrelated to logging?
- Is it possible to obtain CCB certification separately from SRN PPI?

Figure 21 Potential VCUs Scenario 2: 50% IFM LtPF and 50% continuation of selective logging under MUK

6.5.3 Scenario 3: Implementation of a Wide Range of IFM Practices

Additional options apart from IFM Logged to Protected include the implementation of methodologies that calculate emission reductions resulting from IFM practices designed to prevent emissions (from harvest or natural disturbance) or enhance sequestration. Projects may apply a combination of practices implemented together in the same area. Examples of potential activities include enrichment planting, release of natural regeneration through management of competing vegetation, stand irrigation and/or fertilization, reducing timber harvest levels, deferring harvest/extending rotations or cutting cycles, designating reserves, and altering fire severity through fuel load treatments. The practice of reducing timber harvest levels has already been applied in the PT Wijaya Sentosa through limiting the logging of merbau trees from 40 cm to 60 cm and above in diameter, protecting highly valuable conservation areas by converting them into conservation zones, and practicing selective logging.

The method currently available at Verra is VCS-VM0045 Methodology for Improved Forest Management using Dynamic Matched Baselines from National Forest Inventories, v1.0. This method can also be an option for methodology submission at SRN PPI through the submission mechanism, which will be reviewed by SRN PPI. This approach can ensure the long-term sustainability of natural timber harvesting operations while also reducing emissions and obtaining carbon credits. The MOEF is promoting this concept to ensure the continuity of wood-based initiatives within PBPH in Multi Usaha Kehutanan scheme.

6.5.4 Scenario 4: IFM RIL and SILIN

The RIL and SILIN activities are mitigation strategies within Indonesia's FOLU Net Sink 2030 context for Sustainable Forest Management. The objective is to reduce emissions and enhance forest carbon stocks. RIL involves measured logging practices and can reduce emissions through stages SILIN. Enrichment involves activities to increase forest stand density by planting different tree species than those that already exist. Both ENR and SILIN are targeted in concessions areas with natural forest cover and fall under conservation and rehabilitation directives, including secondary forests within production areas. The aim is to enhance the natural regeneration rate of natural forests. The target for Net Sink FOLU activities requiring implementation by 2030 is 1.77 million hectares. According to the data from the Indonesian Forest Entrepreneurs Association (APHI), the cumulative total of SILIN implementation and RIL application in 2019 was approximately 167,000 hectares and 269,000 hectares, respectively.

Box 5. RIL and SILIN

Reduced Impact Logging is a harvesting method carried out through careful planning and control to minimize environmental impacts on forest stands and soil. PBPH-HA has lower carbon emissions if harvesting activities successfully improve the following parameters: the number of trees left standing, damage and waste from logging, damage due to skidding, and the width of timber transport roads. Specific actions to enhance performance based on these parameters include, for example, using plunge tests, employing cable yarding to reduce damage from skidding, and narrowing road corridors to decrease emissions from hauling activities.

PT Wijaya Sentosa, with an average Annual Allowable Cut (AAC) of 3,500 hectares per year and 69% of affected blocks, would achieve a reduction in emissions of 180,806 tCO_2e/year by implementing RIL. It's important to note that this emission reduction estimate has a coarse resolution due to the detailed data required for RIL calculations, which cannot be obtained from documents like RKU or RKT. An appropriate methodology for calculating emission reductions from RIL can be the VM0035 Methodology for Improved Forest Management through Reduced Impact Logging v1.0.

PBPH-HA currently covers 20 million hectares in Indonesia. If all PBPH-HA actively engage in logging and apply RIL, their combined potential might result in emission reductions of 24 $MtCO_2e$/year[36].
The method for calculating emissions from the implementation of SILIN depends on the calculation of emission reductions resulting from various techniques used to optimize forest growth and yield. The emission reduction values cannot be calculated yet due to insufficient data obtained.

[36] Griscom, B.W., Ellis, P.W., Burivalova, Z., Halperin, J., Marthinus, D., Runting, R.K., Ruslandi, Shoch, D., Putz, F.E., 2019. Reduced-impact logging in Borneo to minimize carbon emissions and impacts on sensitive habitats while maintaining timber yields. For. Ecol. Manag. 438, 176–185. https://doi.org/10.1016/j.foreco.2019.02.025.

The MOEF specifically promotes the practice of RIL and SILIN for PBPH-HA. As a result of this, carbon projects incorporating these methodologies will be prospectively approved into the SRN PPI.

6.6 COST ANALYSIS

This case study involves considering the costs incurred in implementing the IFM LtPF carbon project for scenario 1, assuming registration with Verra. In scenario 2, the cost analysis takes into account the expenses required for both the carbon project and selective logging. We have utilized proxy cost data obtained through stakeholder data collection in Papua Barat Province to inform our analysis.

The capex and opex required to operate PBPH-HA were collected during FGDs. This data was used as the foundation for cost analysis using a model. The proportions and components of costs involved in carrying out selective logging operations in Papua Barat Province are illustrated in the following Figure 22.

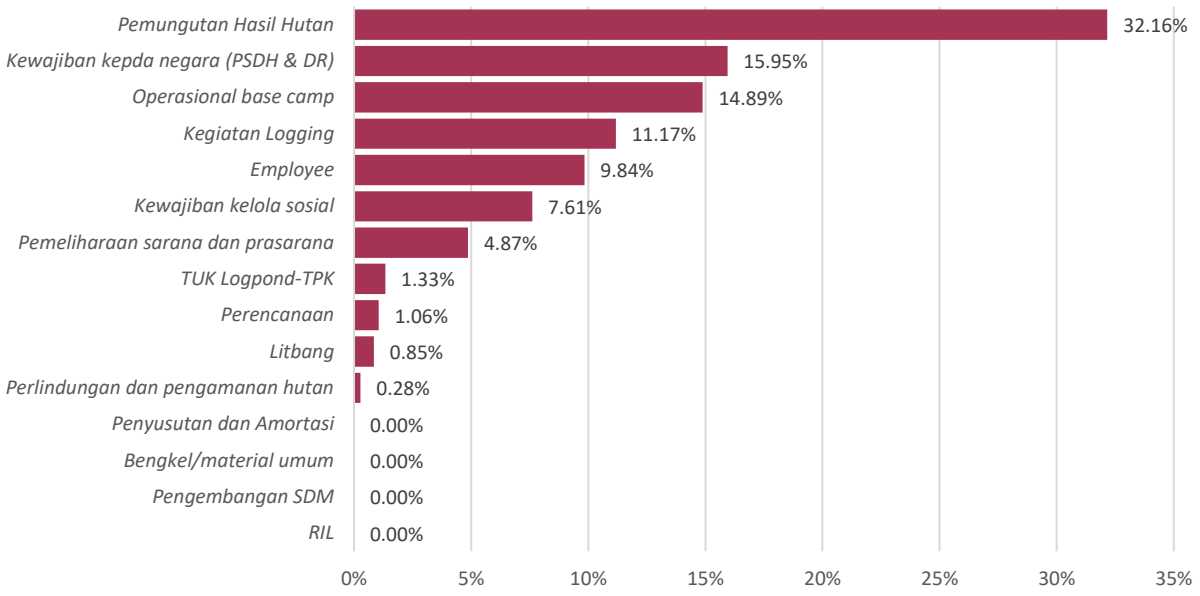


Figure 22 Cost proportion for selective logging business in Papua Barat Province

The cost proportions required for opearting the IFM LtPF carbon project are depicted in the following Figure 23.

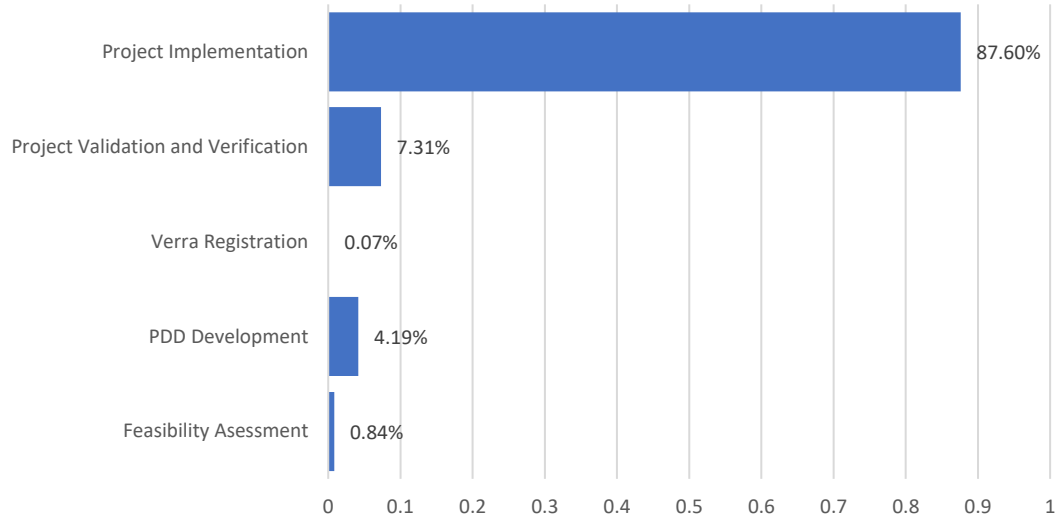


Figure 23 Cost proportion for IFM LtPF carbon project in Papua Barat Province

The results of the cost analysis have already been summarized in **Scenario 1: 100 % IFM LtPF and Scenario 2: 50% IFM LtPF and 50% Continuation of Selective Logging under MUK** regarding the cost required to produce 1 tCO_2e unit of carbon credit.

7 CONCLUSION AND NEXT STEPS

7.1 NBS PATHWAYS SELECTION

Project developers undertaking nature-based solutions mitigation pathways must conduct assessments of both the baseline and additionality of these initiatives. In order to identify suitable land areas, creating maps can be a valuable tool to guide implementation to appropriate locations and facilitate engagement with policymakers and local stakeholders. However, it's essential to acknowledge that the development of detailed maps can be resource-intensive, time-consuming, and data-dependent.

Furthermore, project developers may encounter challenges in determining the potential scope of certain ecosystems, particularly when historical changes, such as peatland drainage, have occurred centuries ago. These historical alterations can make it challenging to accurately assess

the original state of ecosystems and the extent to which they have been affected by human activities.

Whether or not maps are created, it's crucial to avoid double-counting greenhouse gas fluxes for multiple pathways in the same area. Typically, when assessing a specific area, it's recommended to count wetlands separately because they can exhibit additional GHG fluxes and unique soil conditions compared to other ecosystems. Project developers might also factor in cost considerations. For example, reforestation might be more expensive to implement, project developers might choose to allocate the area to natural regeneration.

Broadly, the objective in this stage is to pinpoint the biophysical maximum opportunity, which refers to the largest available area or extent for NbS intervention. To improve its practical relevance, project developers may choose to further narrow down this maximum potential by taking into account additional factors such as costs or feasibility. The forest transition model serves as a tool to determine the suitability of the chosen pathway, whether it involves protection, improved management, or restoration. Project developers will employ various approaches to assess the extent of this opportunity, as depicted in Figure 6.

7.1.1 Manage

Manage pathways aim to enhance the management of working lands in a manner that contributes to climate change mitigation while sustaining commodity production. Similar to protect and restore pathways, the extent of many manage pathways is typically described in terms of the land area suitable for implementing specific practices. However, alternative metrics may also be employed. For instance, PBPH intends to continue logging natural mangrove forests, as recommended by the FOLU Net Sink. To mitigate this action, SFM practices like RIL and SILIN can be implemented. While it might not always be feasible to create highly detailed spatial maps for these opportunities, it is important to estimate their extent using a metric relevant to the specific pathway.

7.1.2 Protect

Protect pathways are designed to prevent the loss or degradation of ecosystems. To accurately assess their extent, two crucial pieces of information are necessary: 1) The geographical distribution of these ecosystems, and 2) The proportion of these ecosystems that face threats such as disturbance or conversion to other land uses. The second question is particularly significant. A common mistake in mitigation planning is to prioritize areas based solely on their carbon storage

capacity, without considering whether these areas are susceptible to human-induced changes. While protecting such areas may be essential for biodiversity and other reasons, failing to account for additionality in this context undermines the credibility of climate change mitigation actions. Identifying areas at risk can be challenging. If it's unclear where protection is warranted, it's advisable to analyze historical trends. In Indonesia, historical emissions serve as a baseline, and areas with higher historical disturbance rates may offer greater mitigation potential.

7.1.3 Restore

Restore pathways involve expanding the land area or improving the functionality of ecosystems that have experienced degradation or transformation from their original state. Nature-based solutions specifically encompass activities that restore land cover to its historical condition. For instance, tree planting in native grasslands would not be considered as part of these pathways. Planting trees in grassland systems often yields poor results, can diminish biodiversity, and negatively impact soil carbon. To assess the potential extent of opportunities for these pathways, project developers must determine the natural distribution of each land cover type in the absence of human interference.

Furthermore, project developers must determine the current extent of the relevant ecosystem. By subtracting the current extent from the historical natural extent of these areas, project developers can calculate the portion that has been converted for human activities. Project developers might have the capacity to map these locations, or they may rely on non-spatial estimates. The remaining extent represents the maximum area suitable for restoration. As previously mentioned, project developers may choose to refine this area further, considering factors like cost-effectiveness, accessibility, or potential co-benefits, in order to identify more feasible locations.

Restore pathways are applicable to potential scenarios of land restoration in the future, and their extent is generally quantified in terms of the total potential restored area, typically measured in hectares. Here are some key tips for successful reforestation:

1) Ensure Eligibility: Double-check that the land meets the criteria for restoration.
2) Avoid Infeasible Areas: Steer clear of areas that are not suitable or undesirable for new forests, such as productive agricultural lands.
3) Prioritize Native Species: Give preference to a diverse range of native tree species over non-native species or monocultures.

4) Consider Growth Rate: Keep in mind that forests grow slowly, and the suitability of areas for forests may shift due to climate change. Prioritize areas likely to remain stable for forests in the long term.

7.1.4 Note Taking

There are key considerations of carbon offset project in Papua Barat Province, Here's a breakdown of each aspect:

1) Additionality: This is a crucial concept in carbon offset projects. It assesses whether the project results in emissions reductions or removals that wouldn't have occurred under business-as-usual circumstances. The project should go beyond what would typically happen, and the incentive offered by the project developer should be the driving force behind these additional emissions reductions or removals.
2) Baseline: Determining the historical emissions related to the NbS activity is essential. It helps gauge the likelihood of these emissions continuing under business-as-usual scenarios. An NbS project should represent an improvement from what would have occurred naturally, and this is central to defining additionality.
3) Permanence: Ensuring that emissions avoided or removed from the atmosphere remain out of the atmosphere in the long term is a critical aspect of carbon offset projects. Most carbon offset standards require addressing permanence over various timeframes to minimize the risk of carbon being re-released.
4) Leakage: Leakage refers to the potential shifting of avoided emissions to other areas or activities due to the offset project. It's essential to assess and address this risk to prevent unintended consequences. Leakage is often challenging to quantify, leading to the application of standard discounts to offset volumes generated.
5) Measurement and Monitoring: Accurate measurement and monitoring of emissions reductions or carbon sequestration over time are fundamental to the credibility and effectiveness of carbon offset projects. This involves determining measurement methods, monitoring frequency, and the acceptable level of accuracy, often incorporating advanced technologies like satellite imagery and LiDAR, along with field measurements when necessary.
6) Sustainable development benefits and safeguards: Evaluate the project's potential to deliver positive sustainable development impacts, including socioeconomic benefits and environmental safeguards. Ensure that the project complies with relevant national and international laws and regulations related to environmental protection, human rights, and

indigenous rights. Examine the project's adherence to principles of equity, fairness, and inclusivity in its engagement with stakeholders, particularly vulnerable or marginalized groups. Incorporate mechanisms for the transparent and accountable management of project benefits, including revenue-sharing and community development funds.

Box 6. Important point to consider
• Building confidence in additionality requires thorough field research spanning months. This includes understanding the project context, assessing risks, and involving all stakeholders in a well-documented process. Comprehensive analysis of baseline and carbon activities for feasibility and financial viability is vital. Moreover, budgeting for transparent MRV activities is underway, ensuring credibility.
• Forest concession owners have a long history of managing their projects for the benefit of communities, biodiversity, and environmental protection. The key challenge in carbon project management lies in comprehending carbon methodologies and elevating these skills to a level that aligns with the production of high-quality VCUs.
• Protect forest that aren't at risk in addition to addressing deforestation and implementing IFM, it's crucial to consider less apparent situations where forest protection remains a common concern.
• Baselines are often constructed without concrete evidence: While most projects rely on data to establish their baselines, certain avoided planned deforestation projects might justify a very aggressive baseline with minimal documentation, such as a single piece of paper indicating the risk to the trees. However, the MOEF takes a conservative approach in this regard by relying on historical baselines.
• Not keeping track of where trees have been planted: Large-scale reforestation activities frequently struggle to monitor the planted trees, affecting accurate carbon sequestration measurement.
• Indeed, many project developers aspire to achieve CCB recognition, but there's often a gap in practical understanding. While carbon reductions begin right away, community and biodiversity benefits require time to manifest. Establishing clear baselines is important. Determine which values to measure, the methodologies for measurement, and the programs for value creation. Additionally, ensure legal safeguards and security measures are in place from the project's inception.

7.2 LEGAL AND OWNERSHIP

The project developer must evaluate how NbS projects in Indonesia align with the country's legal framework. This involves examining the legal structure of the project and considering the use of the compliance carbon market. Additionally, the project developer needs to assess the legal requirements for their NbS projects, which may include:

1) **Concessions License Legality**

It is imperative for the project developer to validate the legality of the concessions license. This entails confirming the license's authenticity and verifying that the project aligns with the stipulated conditions within the license. These licenses can encompass various

categories, such as forestry business licenses, social forestry licenses, or community forestry licenses.

2) **Carbon ownership**

The project developer should ascertain the ownership of the carbon credits resulting from the project, which could be influenced by factors such as the concessions license terms, relevant legal provisions, and project-specific details. The Indonesian government places significant emphasis on the concessions license holder being the entity responsible for both owning and executing carbon trading activities, specifically in the context of NbS projects within Indonesia's compliance carbon market. According to MOEF Regulation 7/2023, the government highlights the pivotal role of the concessions license holder as the party entitled to manage carbon trading activities. In simpler terms, within the scope of NbS projects in Indonesia's compliance carbon market, the entity that holds the concessions license should also serve as the designated project developer. This directive is particularly relevant to areas governed by forest business licenses, where the entity holding PBPH is considered the qualified project developer for NbS initiatives.

When the project proponent is not the concession owner, it is crucial to establish a clear agreement or contract with the concession owner that outlines the rights and responsibilities of all parties involved. This agreement should cover key aspects, including defining ownership rights concerning carbon credits, distributing the benefits generated by the project, and providing a framework for resolving potential disputes. Essentially, this contractual arrangement serves as the foundation for managing the relationship between the project developer and the concession owner.

Additionally, the Ministry of Environment and Forestry has MOEF Decree 716/2023, which focuses on incorporating carbon pricing into the approval, collaboration, or business licensing processes in the Forestry and Environment Sector. This decree introduces specific requirements for concession holders who enter into strategic agreements with project proponents or carbon buyers. These agreements must be formalized through a notarial deed and should not be construed as the transfer of licenses. Additionally, MOEF Decree 716/2023 sets a limitation on the duration of sale and purchase agreements for carbon credits, capping them at a maximum of **5 years**.

3) **Authorization for international carbon trading and corresponding adjustments**

The project developer must secure authorization from the Indonesian Government to engage in international carbon credit trading. Additionally, the Government may request that the project developer make corresponding adjustments to the project's design or implementation to ensure it aligns with Indonesia's NDC target and does not have adverse effects.

4) **Transparency and Accountability**

Ensuring the transparent and accountable ownership structure of carbon credits is important. Clearly defined ownership lines should be established to prevent ambiguity and potential disputes.

5) **Equitable Benefit Distribution**

It is essential to ensure that the distribution of benefits arising from carbon credits is fair and equitable among all stakeholders involved in the NbS projects. This includes not only the project developers but also partners contributing knowledge, expertise, and resources.

6) **Inclusive Participation**

The structure of carbon credit ownership should be designed to encourage and facilitate the participation of various entities in NbS projects. It should not discourage others from engaging in these initiatives, fostering collaboration and involvement of diverse stakeholders to expand the scope and impact of NbS projects.

7.3 BUILDING A FUTURE-POOF NBS PORTFOLIO

The paradox of climate action lies in its dual nature: it demands both urgency and a long-term commitment. Companies that have made climate commitments must develop investment strategies that embrace this duality, requiring immediate deployment while spanning decades.

Nature emerges as a viable solution that offers both immediate and lasting impacts, akin to any other investment. However, these solutions come with inherent risks and rewards. Managing a NbS portfolio parallel managing a financial one. Companies need to comprehend these risks and establish their risk tolerance thresholds.

7.3.1 Risk Factors to Consider

When constructing a NbS portfolio, your project developer needs to consider four crucial factors: project and credit quality, claims and regulations, volume and price security, and resource commitment (See Figure 24).

1) Project and credit quality

Ensuring meaningful climate impacts is strongly dependent on project quality, requiring credible claims, and risk mitigation actions. Although NbS projects are essential for climate solutions, they face documented quality challenges. When evaluating project and credit quality, factors such as the accuracy of data and assumptions used for core crediting aspects (additionality and baseline setting), ensuring the project's enduring impacts, its effects on biodiversity, contributions to local low-carbon economies, and the commitment to do no net harm to the environment are critical considerations.

2) Claims and regulation

The carbon market is continually influenced by changing regulations and guidelines, potentially impacting the investment claims made by corporations. Considerations in this context involve assessing how the project's characteristics adhere to current regulations and align with the committed guidance, based on the available information. It's crucial to evaluate whether the jurisdiction where the project is situated supports market-based approaches to climate mitigation.

3) Volume and price security

The carbon market is still evolving, and this can lead to challenges in long-term planning and budget allocation. Project developers must assess how accurately they can predict market pricing, determine required volumes, and incorporate project quality into budget considerations. Internally, key considerations should include budget planning factors, various procurement scenarios based on budget and timeframes, ensuring the corporate finance team understands credit purchases and investments accounting, evaluating project costs and internal rate of return, and effectively managing volume and delivery risks associated with long-term commitments.

4) Resource commitment

Conducting project due diligence, staying informed about claims and regulations, and monitoring market dynamics demand substantial internal resources. Project developer must recognize the continuous resource requirements and allocate budgets, expertise, and gain stakeholder buy-in to effectively assess and acquire credits. It's crucial to identify the team’s needing visibility, the decision-makers involved, assess the technical expertise, procurement setup, and legal infrastructure to evaluate project quality and negotiate terms. Additionally, establishing a decision-making framework is essential to provide visibility and engage stakeholders effectively.

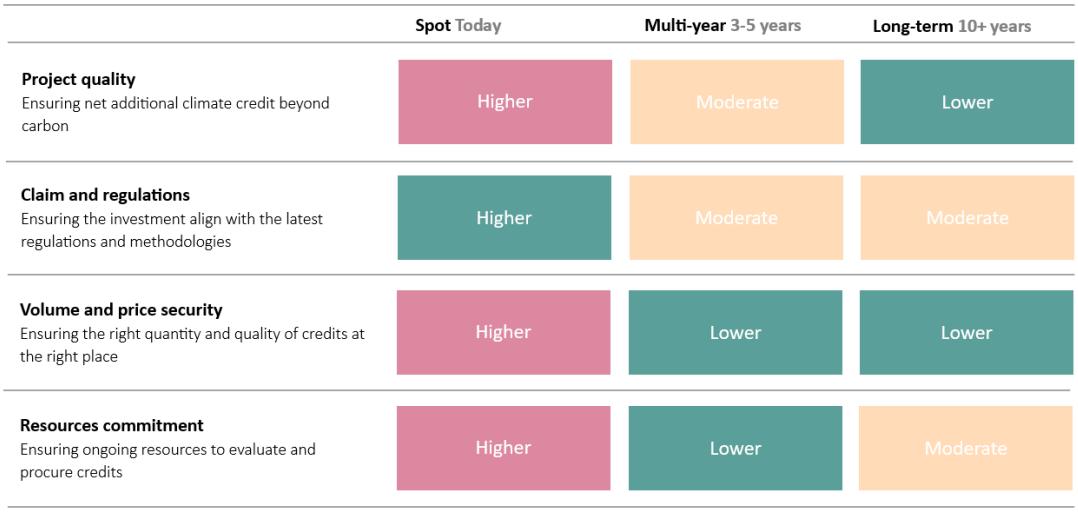


Figure 24 Risk considerations for nature investment vary over time

7.3.2 Accounting for risk across time horizons

1) Spot purchases

Spot purchases involve buying credits today to meet near-term (typically annual) or ad hoc needs (for example, to offset emissions of a specific event) based on today's market rates. This requires performing net new due diligence for each procurement. A key risk factor for spot purchases is project quality. Buyers can mitigate quality risk by evaluating projects and stakeholders against key principles for high-integrity carbon credits, such as Core Carbon Principles developed by The Integrity Council for The Voluntary Carbon Market. Work with trusted partners and ask for data to back up project claims. Another risk in a spot market is price transparency. Different service providers often sell the same project.

Box 7. Considerations and Questions for Spot Purchases
• How do you know what price is fair? • Ask how the price is set and push them to justify it? • Does it include additional services and value-adds? How much goes back to the project?

2) Multi-year investments

Contracting for credit delivery for the next 3-5 years based on a fixed price and/or volume can be accomplished through collaboration with PBPH holders, with the company actively involved in investing in project development. This method typically demands substantial upfront effort, including comprehensive project diligence, market assessment, and aligning contract requirements. However, this process occurs only once every three to five years, offering both budget and volume security.

A key risk factor for multi-year investments relates to claims and regulation. How might new guidance (for example, around vintages) or regulation (such as the NEK regulations; ETS, carbon offset, results-based payment, carbon tax) significantly influence the investments companies select and the claims they make.

Be specific and transparent about the diligence criteria, the partners involved, and the sources of data. Portfolios that can justify decision-making processes based on the most reliable information available are the most credible. Utilizing technology can assist companies in storing and reporting their diligence and impact data. If regulations undergo changes, it's crucial to maintain transparency with stakeholders.

4) Long-term investments

Investing capital in projects to generate new supply for a company's needs provides several benefits. It ensures a stronger influence over project design and implementation, fosters closer ties to the projects, and delivers budget and volume security in line with long-term net-zero targets.

The main risk associated with long-term investments is the availability of resources and stakeholder support for sustaining such investments over an extended period. To mitigate this risk, it's crucial to identify similarities with past infrastructure and renewable energy procurements. Additionally, involving legal, finance, and procurement teams early and consistently in the process can help in managing and reducing potential risks effectively. Another consideration is timing. For most companies, making equity-style or 10-year-plus investments in carbon projects is a new venture. The process of finalizing your first long-term contract might take between 12 to 18 months.

Nature moves at its own pace, especially in the case of reforestation and removal projects. The timing of credit delivery is intricately linked to the planting of seedlings, which must coincide with the appropriate planting season and environmental conditions. Companies aiming for removal credits to meet their 2030 or 2035 net zero targets should initiate financing immediately. This urgency is not merely being proactive; in this context, companies have only two planting seasons (2023 and 2024) to ensure trees are planted to achieve reasonable volume outputs for credit delivery timelines aligned with net zero target years.

7.3.3 Build a NbS portfolio that balances risk and upside

Nature is one of the highest-impact investments a company can make to reverse the trajectory of climate change. We recommend companies to begin with discrete spot purchases. This approach allows them to practice navigating stakeholder inquiries, approval procedures, and communications effectively. Subsequently, the focus should shift towards securing multi-year contracts with projects that have undergone thorough vetting. This process aids in developing the necessary internal capabilities to formulate a long-term strategy spanning the next decade and beyond.

When building nature strategy, companies should identify the most critical risk factors and collaborate with high integrity, capable partners to mitigate risks effectively. By gaining a comprehensive understanding of these risks and developing a tailored framework for nature investments, companies can align with their targets and create an immediate, enduring impact on climate change.

7.4 Business and Partnership Model

To develop an NbS carbon project, various business and partnership models are available for consideration, including the Figure 25. BP Berau Ltd, operating within the Papua Barat Province, can assume the role of a capital investor through multi-years or long-term investments. Establishing contracts for credit delivery over the next 3-5 years, based on fixed prices and/or volumes, is possible through collaboration with PBPH holders. In this setup, the company actively participates in project development and ensures the certainty of carbon credit volumes. This involvement is crucial, mitigating potential carbon credit shortages in the Indonesian market. BP Berau Ltd's early engagement in project development enables contributions to the project's design, supporting strategies and achieving the Net Zero by 2050 target.

This approach usually requires significant upfront effort, including comprehensive project diligence to assess NbS projects with strong additionality, permanency, and have non-carbon benefits. A major risk factor for multi-year or long-term investments pertains to claims and regulations. New guidance, such as that related to vintages, or regulations like the NEK regulations, can significantly impact the investments companies choose and the claims they assert. It's essential for companies to closely monitor and adapt to these evolving guidelines and regulations to make informed investment decisions and maintain compliance with the changing landscape of carbon markets.

The carbon project development process for Nature-Based Solutions, particularly in the forestry sector based on PBPH, is considerable; it generally requires at least 2-5 years for the development phase before generating a functional carbon project. The project development timetable is a significant concern. Roles of Each Party (Table 11) is also a key component of setting up Heads of Agreement. If BP Berau Ltd decides not to be involved with over project operations, the role of operations could be handled by PBPH license holders. This is aligned with the NEK implementation in Indonesia.

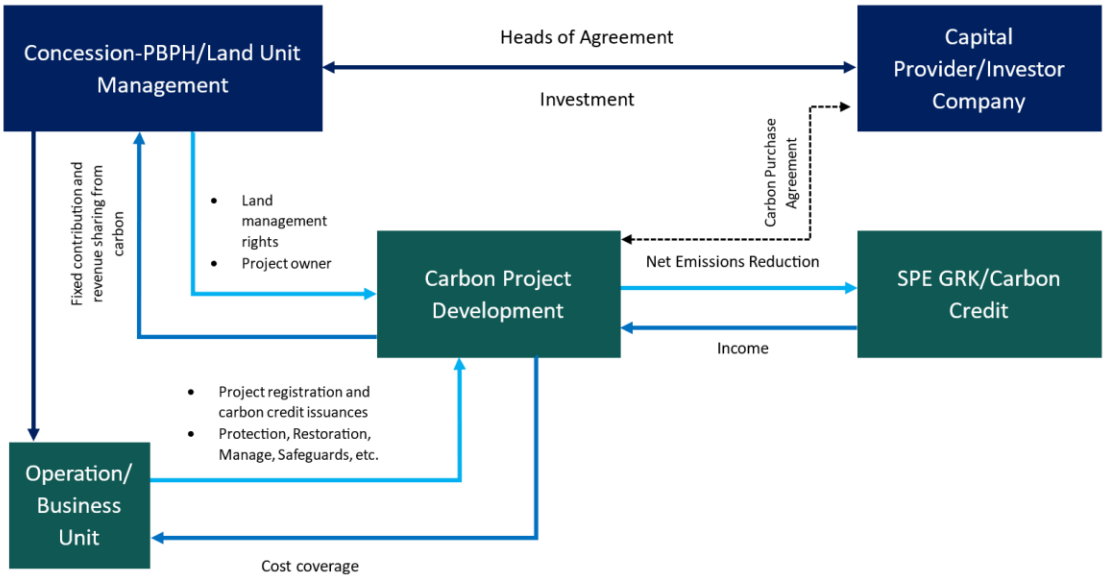


Figure 25 Business model for NbS carbon project in Papua Barat Province

Table 11 of Each Party in Business Scheme for NbS Carbon Project in Papua Barat Province

Roles of Each Party	
Capital Provider/Investor Company (BP)	Providing initial capital for the project
	Providing working capital for the project
	Lending corporate personnel if needed
Concession-PBPH/Land Unit Management	Ensure no land conflicts with any party
	Ensure land status with the MOEF and other relevant authorities
	Maintain facilities and infrastructure in the area
	Developing management systems and organizational structure
	Providing management expertise and supervision
	Developing and managing financial control systems, including tax reporting
	Developing and managing relationships and reporting to government agencies
	Developing and managing logistics for project development and implementation
	Ensuring successful annual verification for the national registry
	Managing relationships with the national registry

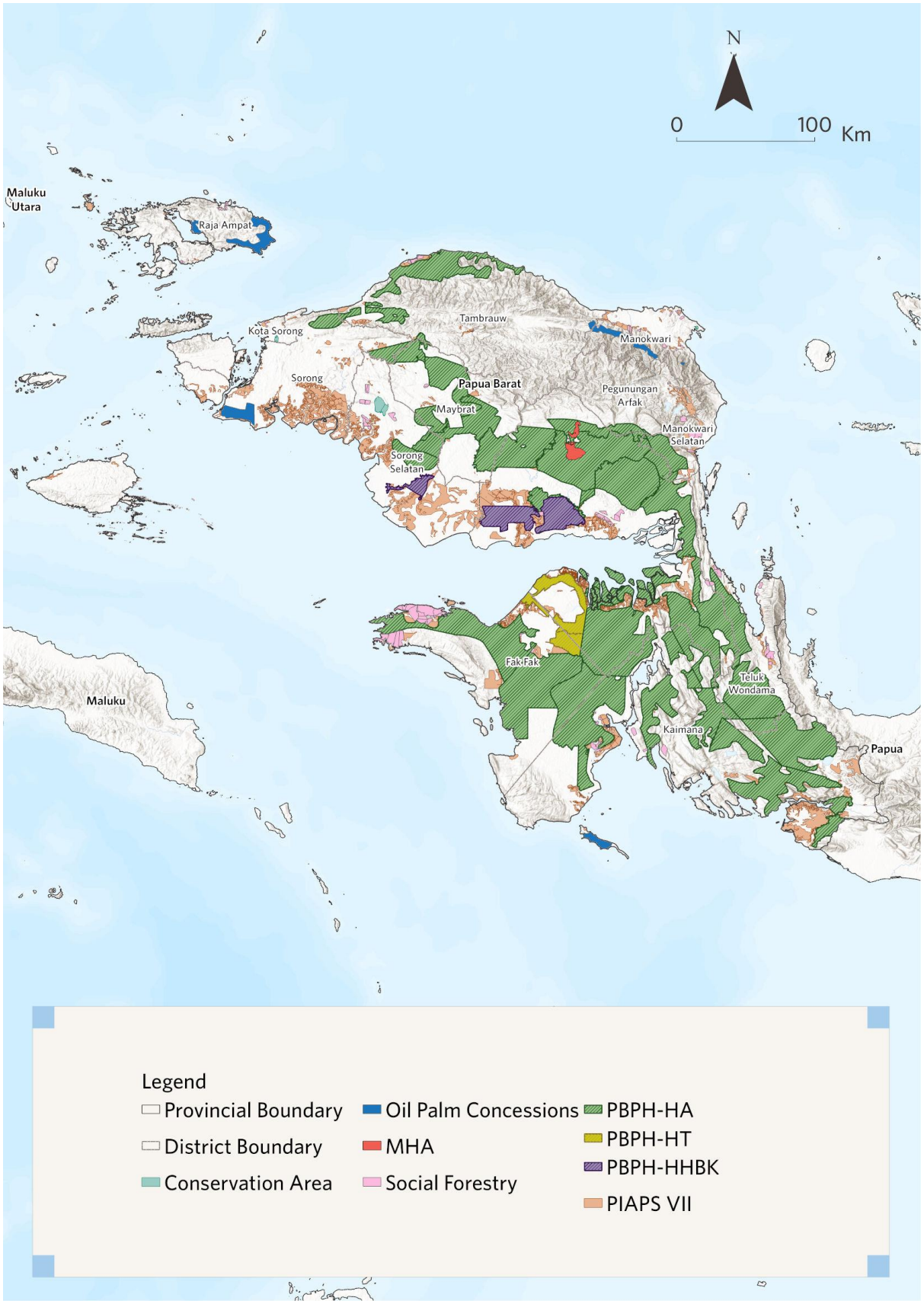
Roles of Each Party	
	Managing sales and marketing aspects
	Ensuring compliance with Indonesia's carbon regulation schemes
	Managing consultants
	Expanding the company's business scope
	Managing day-to-day implementation aspects of NbS projects, including:
	• Monitoring areas
	• Incident response
	• Community development
	• Restoration
	• Etc
	Supporting the validation and verification processes
	Managing relationships with local government authorities

8 REFERENCES

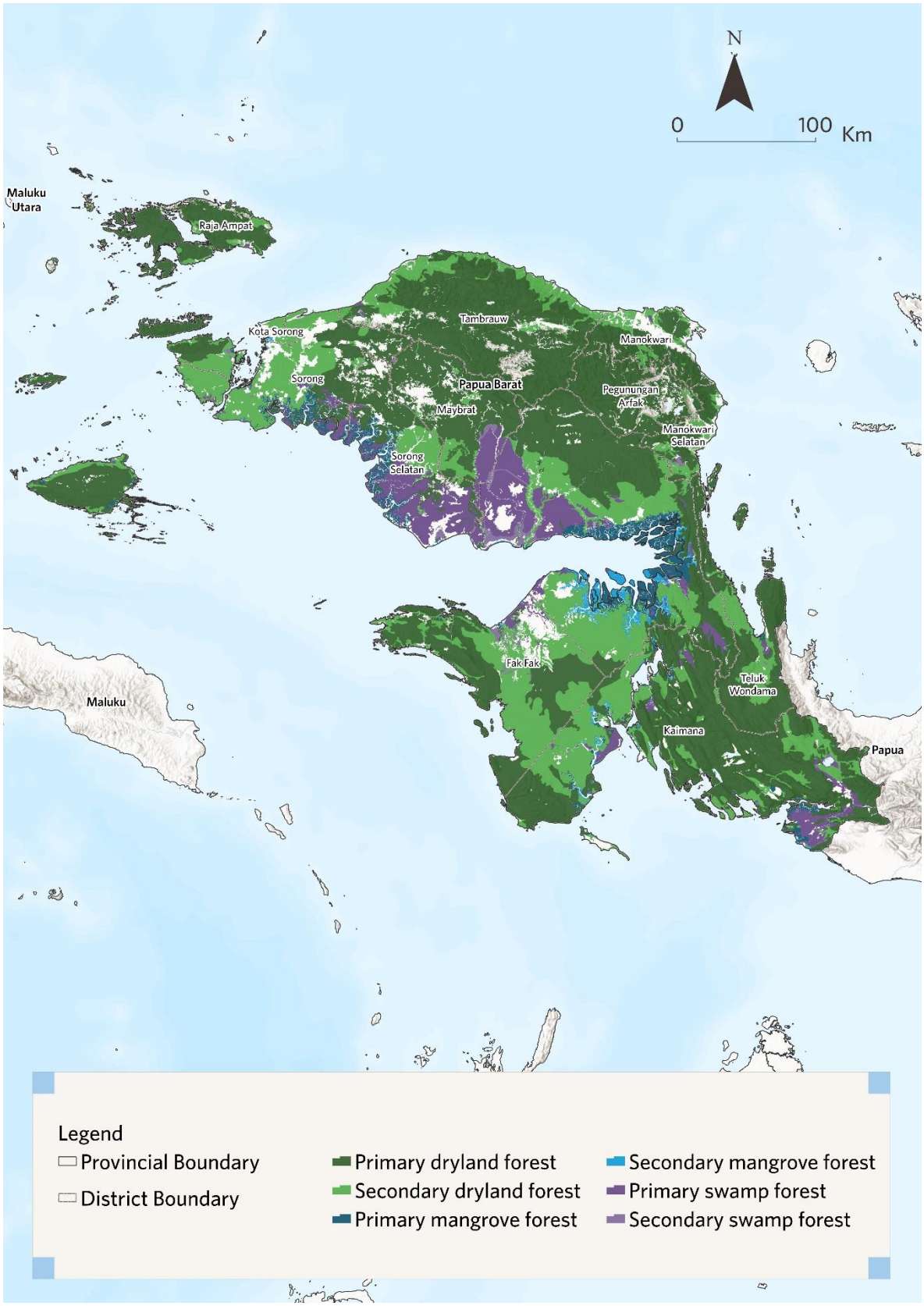
Mather, A.S. and Needle, C.L. (1998) The Forest Transition: A Theoretical Basis. Area, 30, 117 124. http://dx.doi.org/10.1111/j.1475-4762.1998.tb00055.

APPENDICES

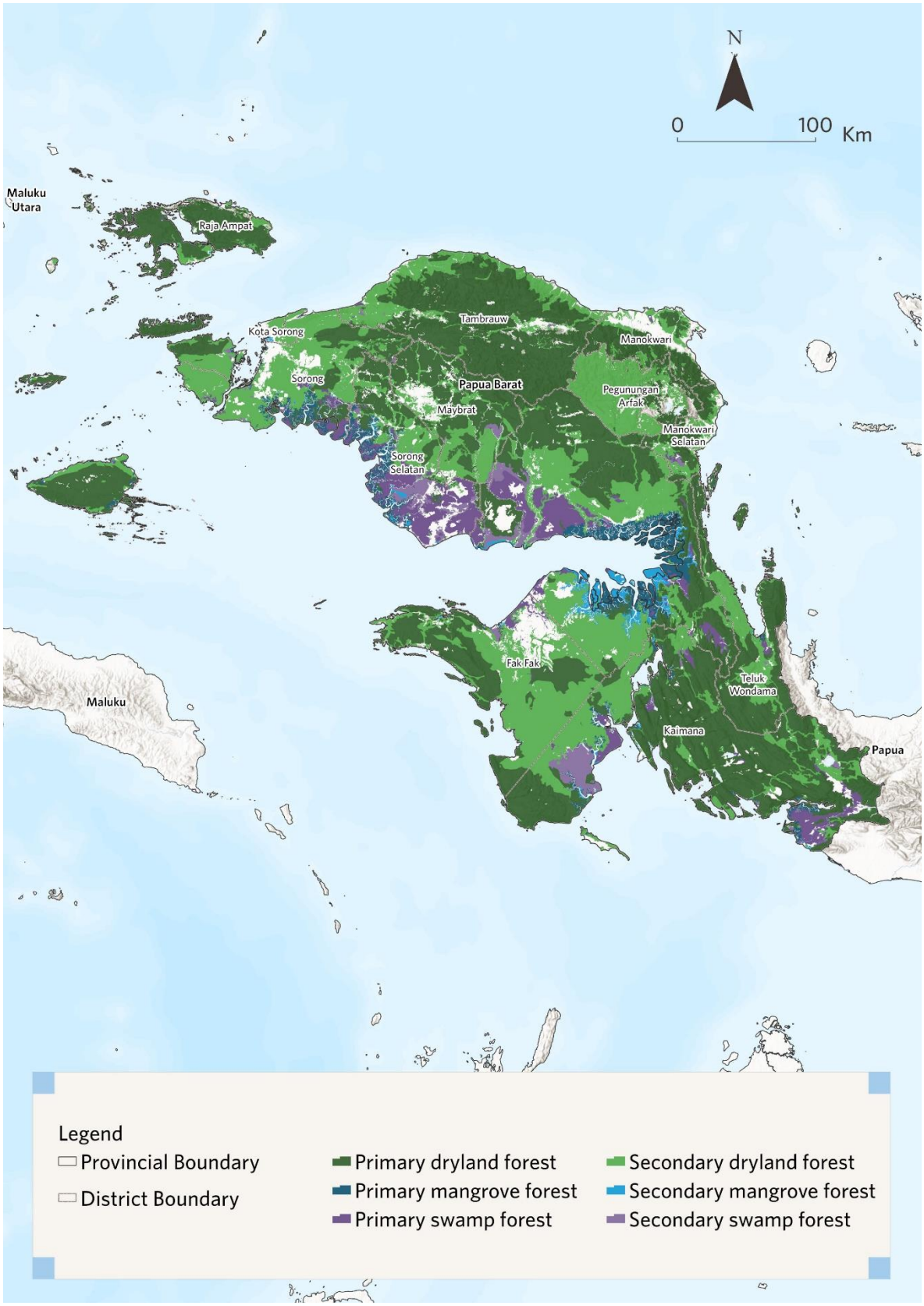
Appendix 1 Forest Management Permit in Papua Barat **Province**



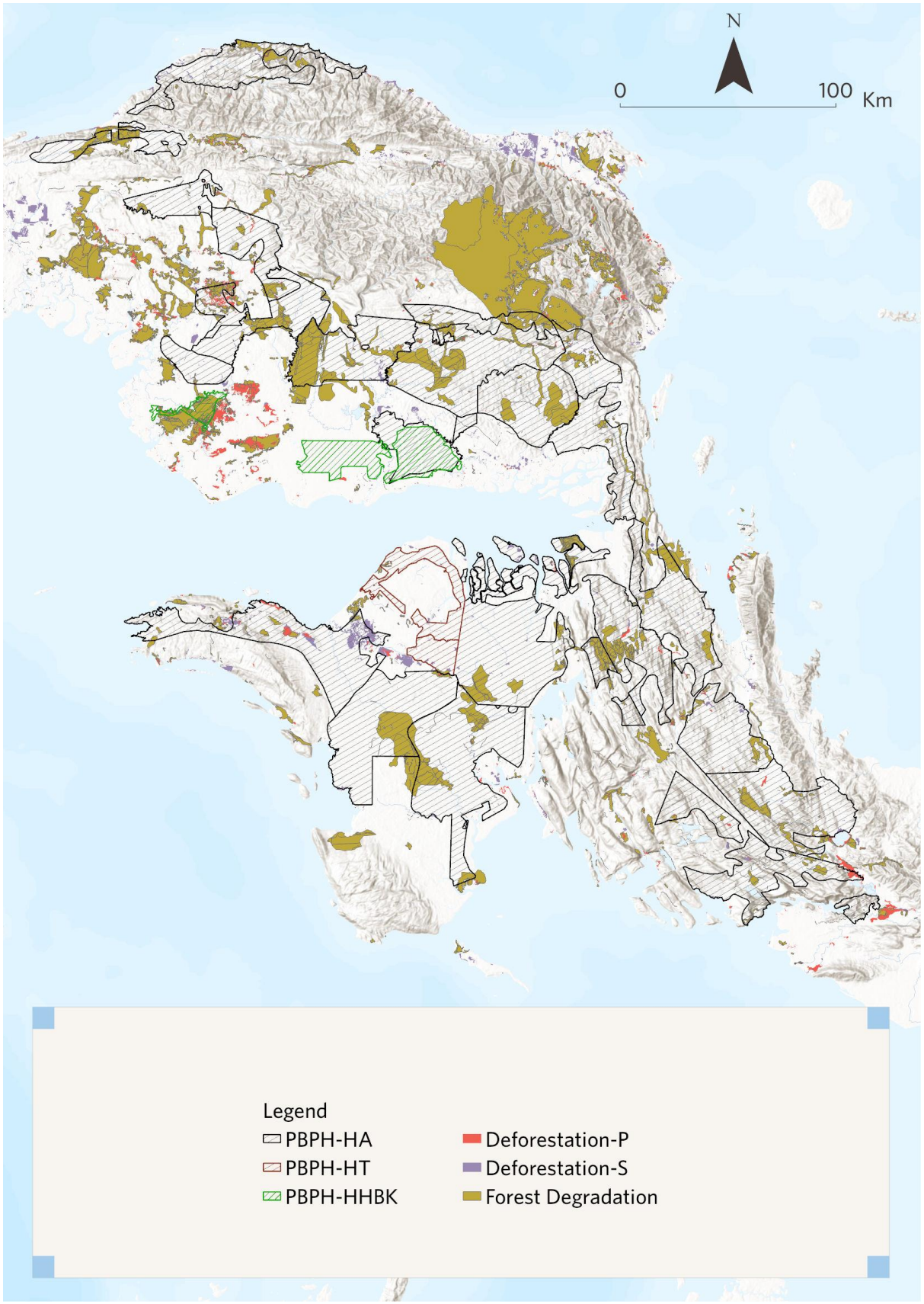
Appendix 2 Forest Cover Map 2011-Papua Barat **Province**



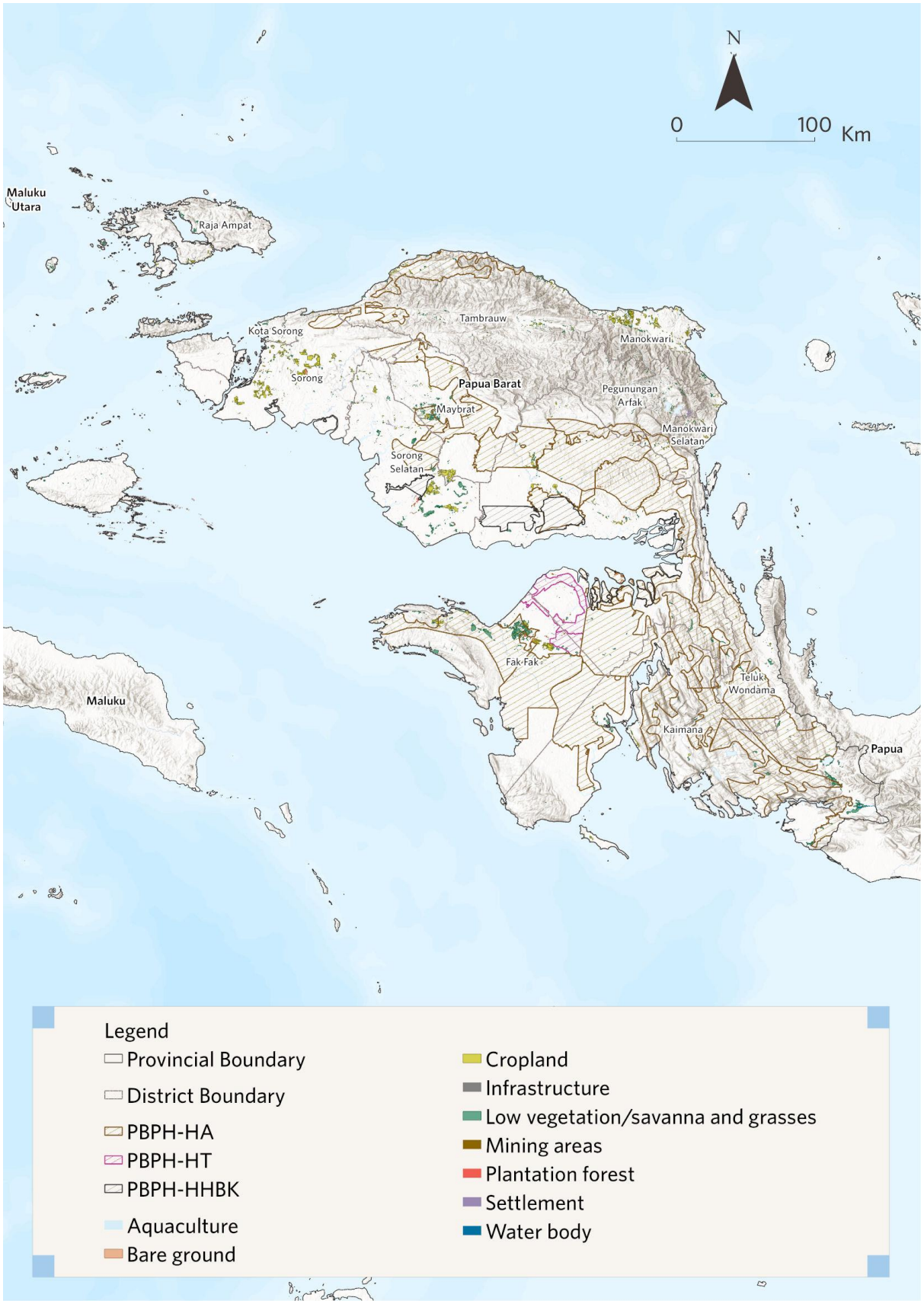
Appendix 3 Forest Cover Map 2021-Papua Barat **Province**



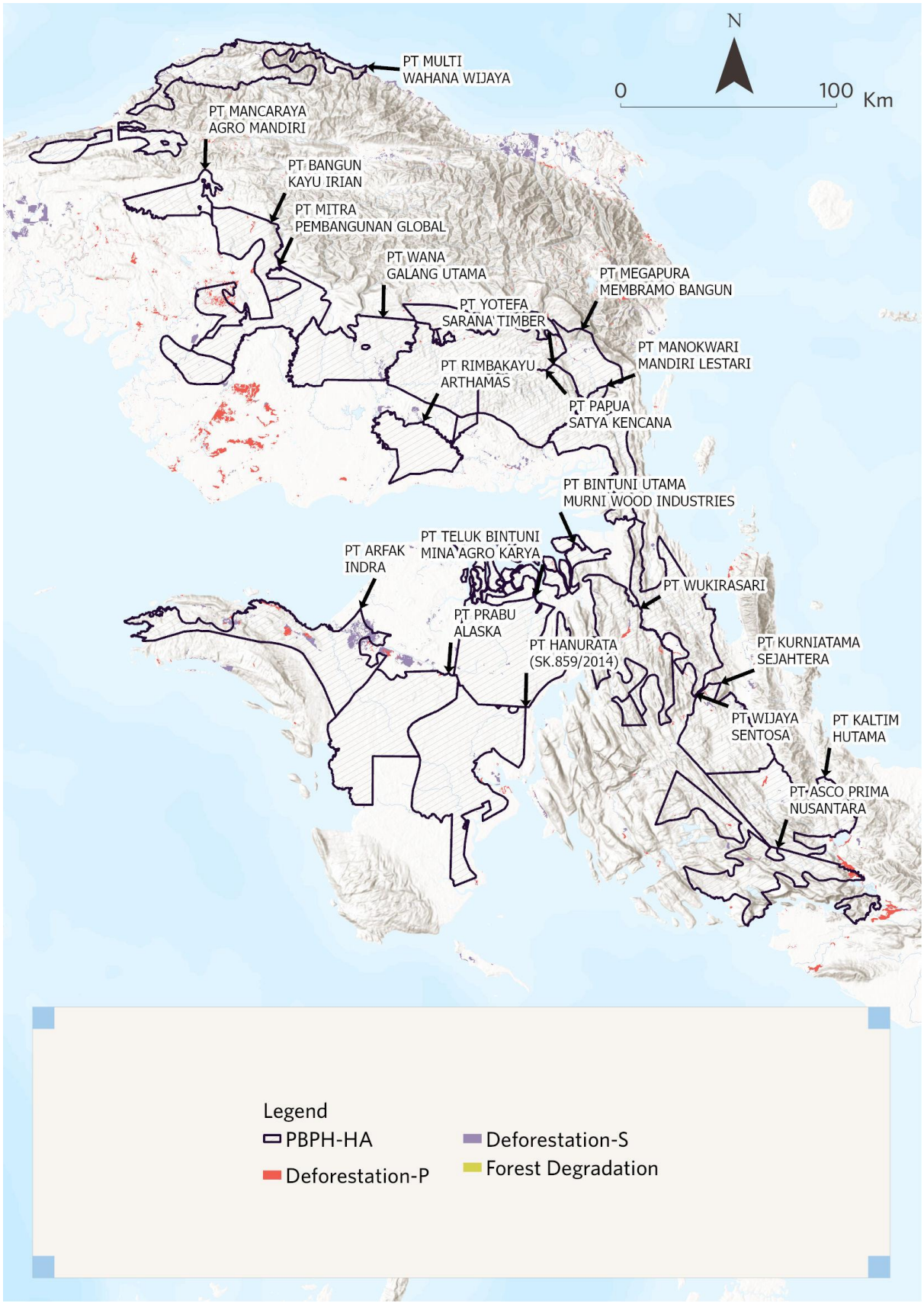
Appendix 4 Deforestation and Degradation (2011 – 2021) in Papua Barat **Province**



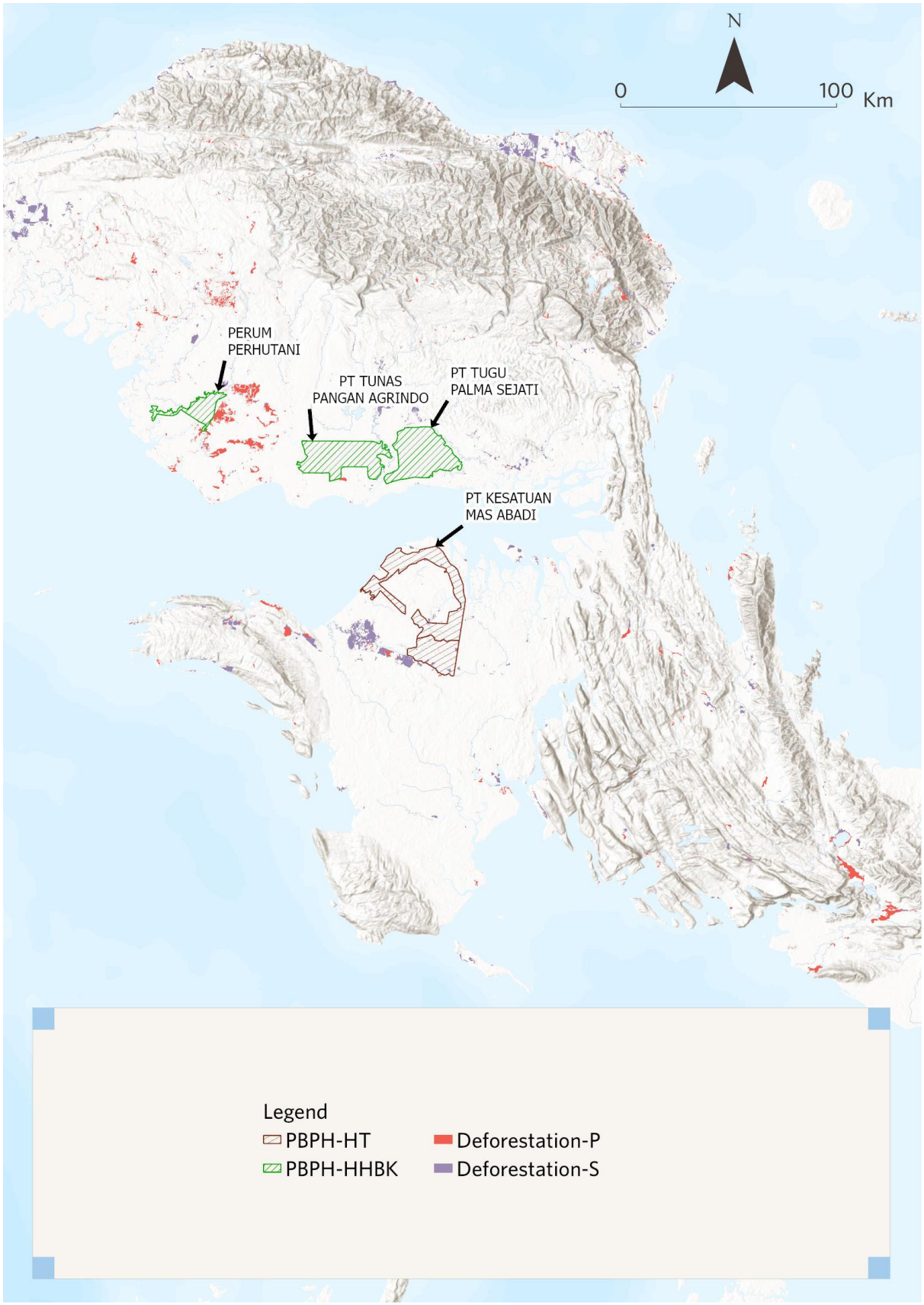
Appendix 5 Land Cover After Deforestation



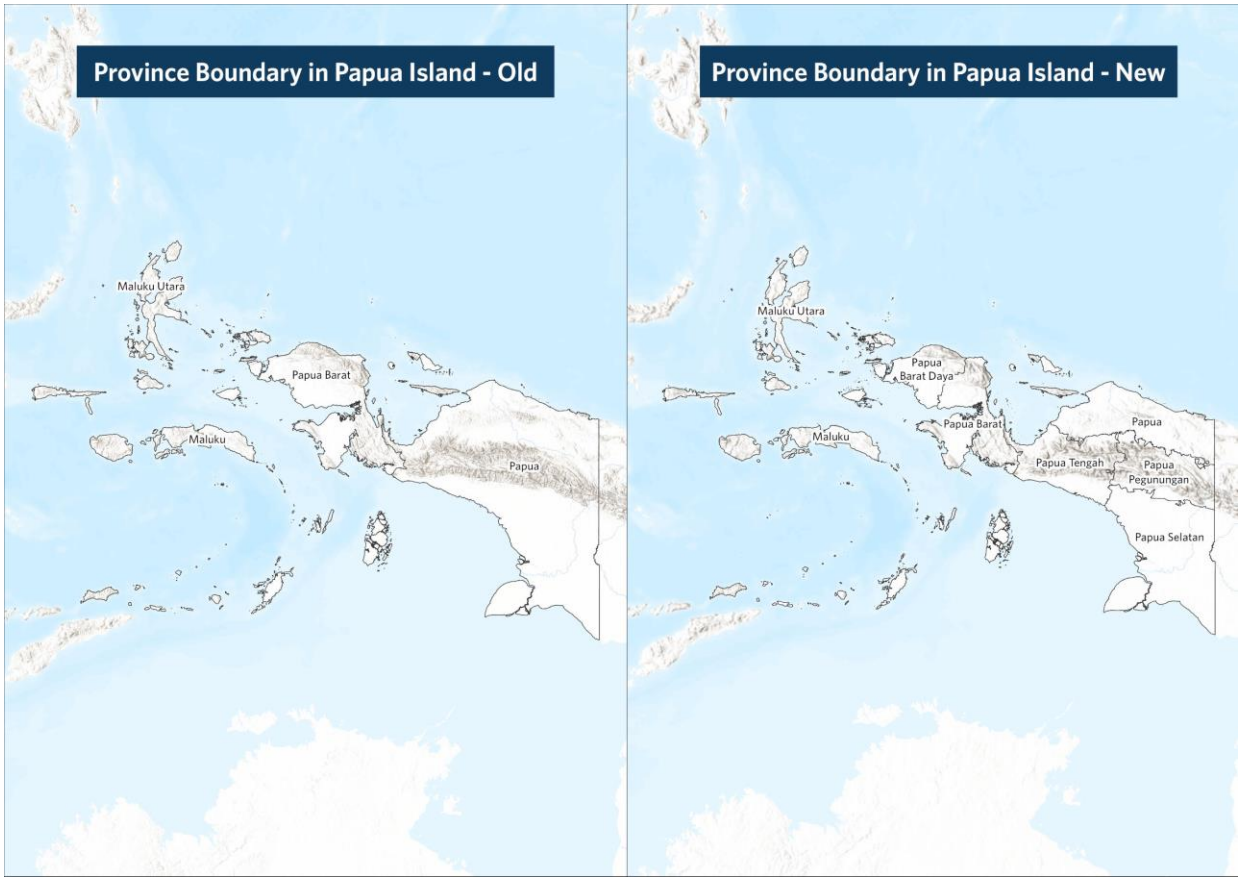
Appendix 6 Deforestation in PBPH-HA Concessions-Papua Barat **Province**



Appendix 7 Deforestation in PBPH-HT and *PBPH-HHBK* Concessions-Papua Barat **Province**



Appendix 8 Comparison of Old and New Province Boundaries in Papua Island Province



Note

1. During the project proposal development, it was agreed that the provincial borders used for analysis will follow the old Papua Barat Province boundaries and have not yet migrated to the new Papua Island boundaries. Because the data was not available at the time, this decision was made.
2. In October 2023, we obtained the new Province boundary data for Papua Island, and Appendix 8 is intended solely to illustrate the differences in provincial boundaries on the old and new maps of Papua Island.
3. The Provinces on Papua Island, originally just two Provinces named Papua and Papua Barat, were expanded by the Indonesian Government in 2022 to comprise six Province.