New Planting Procedure - Summary of Assessments

RSPO Roundtable on Sustainable Palm Oil	Bumitama Agri Ltd.	TÜVRheinland® Precisely Right.

NPP Reference Number:	RSPO New Planting Procedure (NPP) 2021
Country of the NPP submission:	Indonesia
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Section 1: General Information

PT Karya Makmur Langgeng (KML) which is in Sub-district of Simpang Dua and Simpang Hulu, District of Ketapang, West Kalimantan Province, is a palm oil company that is a member of the RSPO under its parent company, Bumitama Agri Ltd. In its plantation operations, PT KML has a plantation business permit (Izin Usaha Perkebunan, IUP) and has carried out the Environmental Impact Assessment (EIA/ AMDAL) which has been approved by the government.

PT KML has plans to develop land for oil palm, with the focus areas for new plantings based on Plantation Business Permit No. 510/DISBUN-D/2013 dated 16 October 2013 for an area of ± 16,700 ha. PT KML carried out the NPP mechanism for the first time in 2013. For now, PT KML will be resubmitting the NPP for the areas that had not been developed at that time, adopt the RSPO NPP guideline 2021. As a part of the process, PT KML has carried out the integrated HCV-HCS Assessment which also has been stated satisfactory by HCVRN Quality Panel Review, Soil and Topography Study, Land Use Changes Analysis (LUCA) as required in the NPP guideline, Social Environment Impact Assessment (SEIA/ SIA), Green House Gas (GHG) calculator through the alternatives of land clearance and carry out socialization to the surrounding community by applying the principle of FPIC.

The results of each assessment will be displayed in this NPP summary of assessments report.

During this NPP period, many land use changes occurred in the PT KML concession area, especially in the last 6 months. Due to a lot of land that has not been acquired/controlled by PT KML, most of the land clearing is carried out by local communities.

Since KML decided to continue developing land and carry out the re-assessment of integrated HCV-HCS, participatory mapping as part of the new planting procedure process, community interest in converting their land into oil palm plantations, whether cultivating their own plantations or collaborating with companies, has increased. This is also supported by the price of palm oil which tends to be stable compared to rubber commodities. Since the West Kalimantan governor's regulations still allow the community to clearance their land for cultivation by burning as a form of preserving local wisdom (Reff: i. Peraturan Gubernur Kalimantan Barat No. 103 tahun 2020_Pembukaan Areal Lahan Pertanian Berbasis Kearifan Lokal; ii. Peraturan DaerahProvinsi Kalimantan Barat No. 1 tahun 2022_Pembukaan Lahan Perladangan Berbasis Kearifan Lokal), most of communities around PT KML cleared their land by burning.

In response to this matter, PT KML has made efforts to prevent it by conducting socialization on the dangers of burning and the Fire Free Village Community cooperation program, as well as increasing the frequency of patrols during this dry season. PT KML also taking part in ensuring that land clearing by burning does not exceed the applicable regulations (2 ha/household), preventing the spread of fire and aiding in firefighting.

Aligned with the Bumitama Sustainability Policy, PT KML is committed not to takeover/ acquisition land that has been intentionally burnt after 2015.

Company Information and Contact Person

Company Name	:	PT Karya Makmur Langgeng
Company Address	:	Jalan Melawai Raya No. 10, South Jakarta Jakarta- Indonesia, 12160
Type of business	:	Oil Palm Plantation & Mill
Capital Status	:	Foreign Investment (*Penanaman Modal Asing, PMA*)
Geographical Location		0° 40' 17.85" - 0° 50' 20.21" S
		110° 09' 12.20" - 110° 25' 50.59" E
		See Map 1 and Map 2

Surrounding Entities	North	:	IUPHHK-HT PT Mayawana Persada, IUPHHK-HT PT Prima Bumi Sentosa, Village of Paoh Concong
	South	:	Oil Palm Plantation (PT Mitra Karya Sentosa), IUPHHK-HT PT Mahkota Rimba Utama, Village of Kampar Sebomban, Semandang Kanan & Mekar Raya
	West	:	IUPHHK-HT PT Mayawana Persada
	East	:	IUPHHK-HT PT Mahkota Rimba Utama, Village of Paoh Concong & Semandang Kanan

Contact person		Martin Mach
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Table 1. Types of permits and recommendations PT KML

No.	Licenses and Recommendations	Issued by	Number & Date	Note
1	Deed of Establishment	- Eliwaty Citra, SH. - Ida Waty Salim, SH., M.Kn	- No: 71 dated 19-11-2003 - No: 7 dated on 02-01-2023	
2	Approval of the deed of Establishment	Ministry of Justice & Human Rights	C-04344 HT.01.01.TH.2004 dated 24-02-2004	
3	Approval of the deed of Establishment Changes	Ministry of Justice & Human Rights	AHU-AH.01.09-0006832 dated 05-01-2023	
4	Permitted Area (Izin Lokasi)	District of Ketapang	239 Year 2006 Dated 13-10-2006	± 19,000 Ha
	Permitted Area (an extension)	District of Ketapang	24 Year 2010 Dated: 13-01-2010	± 19,000 Ha
5	Document of Environmental Management & Monitoring	Governor of West Kalimantan	201/BLHD/2013 Dated: 14-02-2013	± 18,483.2 Ha

|			262/BLHD/2013 Dated: 29-04-2013	± 18,483.2 Ha
6	Permitted Area Revised	District of Ketapang	525/1513/Ekbang-A/2013 Dated: 22-05-2013 (for one year)	± 19,000 Ha
7	Plantation Permit (IUP)	District of Ketapang	510/DISBUN-D/2013 Dated: 16-10-2013	16,700 Ha
9	Land Right Tittle	National Land Agency	30/HGU/KEM-ATR/BPN/IV/2016 Dated 20-04-2020	4,000.09 ha

Area and time-plan for new plantings

The proposed new planting area by PT KML is in the Plantation Permit (Izin Usaha Perkebunan, IUP), which has been agreed by the owners of the land that it will be made available to the company through the FPIC (free, prior, and informed consent). Land development and planting of oil palm will begin by following the procedures of the RSPO New Planting Procedures (NPP), using NPP Guidelines 2021.

Table 2. New Planting Projection Plan PT KML

Description of Landuse		Area	
		(ha)	%
A **Develop Area**		**4,847.34**	**29%**
Planted Area	3,279.92		
Community Oil Palm	1,422.27		
Infrastructure	145.14		
B **Conservation**		**2,771.36**	**17%**
HCV - HCS Integrated	2,771.36		
C **Plan for Development**		**9,090.26**	
Proposed for New Planting	**2,071.54**		**12%**
2024	984.24		
2025	937.07		
2026	150.22		
Proposed New Planting for Community	**7,018.73**		**42%**
2024	3,123.75		
2025	2,270.05		
2026	1,624.92		
Total Area (A+B+C)		**16,708.96**	

Section 2: Maps
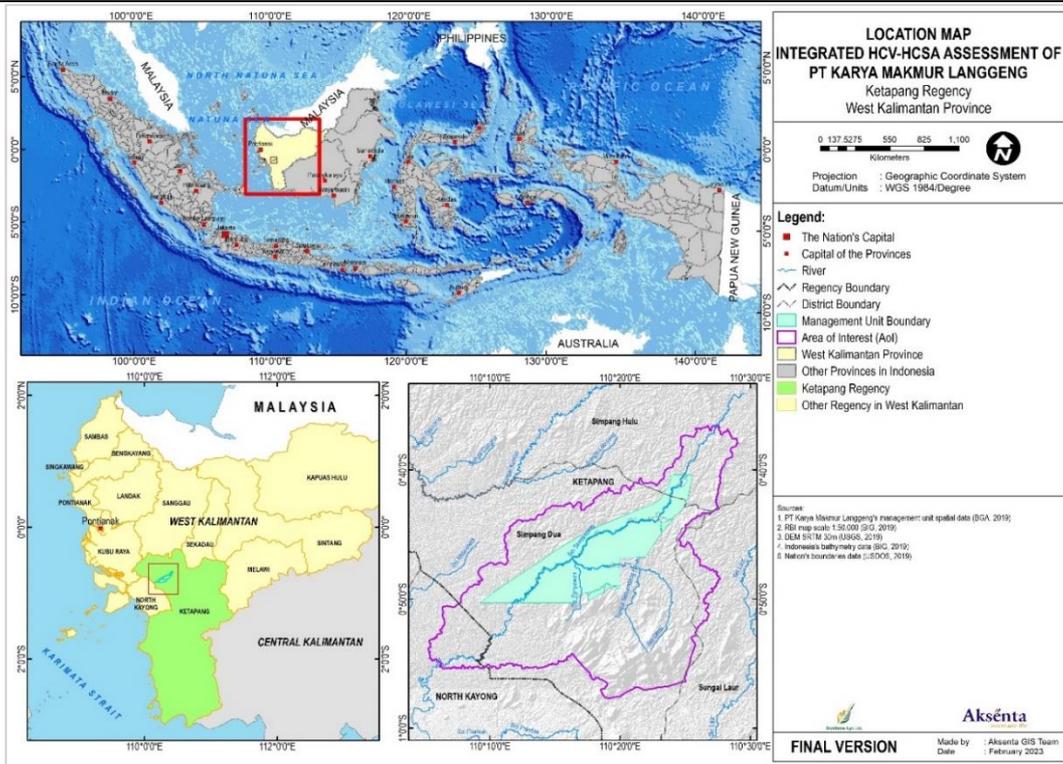
Map 1. The Location of PT KML in Sub-district of Simpang Dua & Simpang Hulu, District of Ketapang, West Kalimantan Province
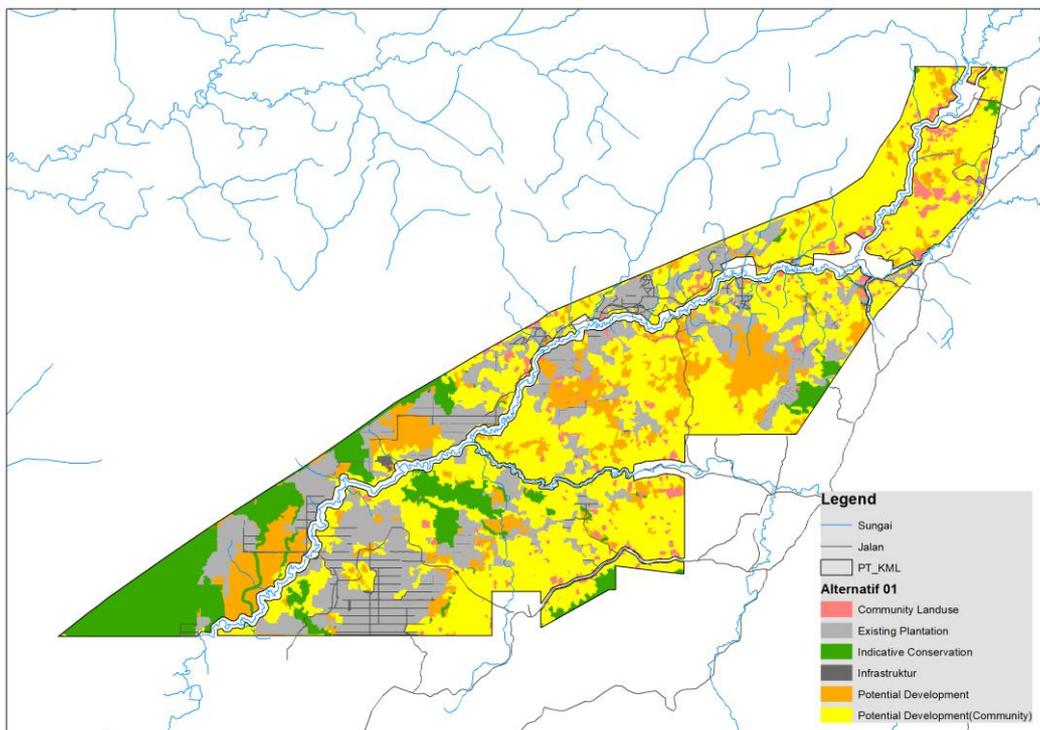
Map 2. Indicative Conservation Land Use Plan of PT KML and Area Proposed for New Planting

Section 3: SEIA

Environmental Impact Assessment (EIA)

The Social Environmental Impact Assessment of PT Karya Makmur Langgeng was carried out by CV. INTERGRAHA CITRA PERSADA, which located at Komplek Tanjung Pura University Jl. M.H. Thamrin No. P-42 Pontianak, West Kalimantan (Telephone No: 0561 – 745286). The assessment was carried out on December 2012 – March 2013.

The key consultants conducting these assessments are accredited with the competency certificate which was approved by The National Association of Professional Consultants of Indonesia.

Table 3. Person and Expertise SEIA Team Assessor in PT Karya Makmur Langgeng

Team composition	Name	Specification	Competence certificate
Team Leader	Yudi Andrian, ST.	AMDAL A dan B	Team Leader
Sub Team Physics – Chemistry	Sulistiani, ST	AMDAL B	Member
	Dhipa Raditya, ST		
Sub Team Biology	Zulkifli, SP.M.Si.		Member
	Naveri, S. Hut		Member
Sub Team Leader of social culture-community health	Endang Mulyadi A.K, MSi		Member
	Sutriswanto S.K.M. M.Kes (Epid)		

Assessment Methods (data sources, collection, dates, program and visited places)

The Environmental Management and Environmental Monitoring Effort Document has been prepared in accordance with the prevailing laws and regulations of the Indonesian government. The data collection process was strongly associated with the type of data that were collected. Generally, studies will be conducted based on primary data and secondary data. Primary data were obtained through observation, measurements and field interviews, while secondary data were obtained from the literature collected, either from the company, or directly from related institutions in the study of this area. The methods that were used to collect the data were adjusted with the components that can be studied. The data must be accurate and reliable so that it could be used to analyse, measure, and observe the environmental components which were predicted to be affected and components of action plan which were predicted to give significant impacts to the surrounding environment. The collected data were as follow:

- Physical – Chemical Components (Climate, Air Quality and Hydrology, and Soil).
- Biological Components (Vegetation, Animals, and Water Biota).
- Socio-Economic Cultural Components (Demography/ Population, Social, Economic, Social and Cultural).
- Environmental Health and Public Health Components (Environmental sanitation, public health level, level of public health services).

a. Methods of Significant Impact Estimation

Determination of the significant impact to the environment caused by the development activities of the plantation and the palm oil mill is only intended as an attempt to estimate the large and important environmental quality changes that are caused by the plantation development activities and the palm oil mill of PT KML in Sub-district of Simpang Dua and Simpang Hulu,

District of Ketapang. The method of significant impact estimation is by differentiating the magnitude of impact and significance of impact.

b. Estimation of the Magnitude of Impact

Magnitude of impact are measured from the environmental quality changes. The estimation of changes in environmental quality is done by formal and nonformal methods.

   i)   Formal Methods

Formal methods are used to estimate the impact of parameters whose system characteristics can be identified or estimated by environmental threshold approach at national and regional levels.

   ii)   NonfFormal Methods

Nonformal method is based on the professional judgment of expert(s), logical frame analysis and analogy. This method is used to estimate the environmental parameters whose system characteristics are difficult to identify or estimate by modelling approach such as models and socio-cultural systems.

To simplify the estimation of the magnitude of impact, the approach of environmental quality assessment scale is used in matrix filling. This scale is ranged from 1-5. Based on this assessment, environmental quality is differentiated as: excellent (5), good (4), fairly good (3), bad (2), and very poor (1).

c. Determination of Significant Impact Characteristics

The assessment of the significant impact characteristics was in accordance with BAPEDAL decision Number: KEP-056 of 1994 on Guidelines Regarding Significant Impacts size. Meanwhile regarding the impact evaluation, significant impacts are classified into two categories: important and less important. Characteristics of impact are divided into two groups, negative impacts and positive impacts. It will be regarded as negative if the changes/impact estimated gets adverse towards the environment, and it is positive if the changes/ impact estimated gives benefit to the environment.

d. Methods of Significant Impact Evaluation

The significant impact evaluation explores "holistic causative" against expected environmental components that are affected. Thus, interaction matrix is used as a supporting tool. Interaction matrix between activity components and environmental components contains magnitude of impact and significance of impact. This significant impact evaluation will conduct careful and thorough study of the primary impacts (positive / negative) and secondary impacts (positive / negative), and other derivative impacts on the environmental and activity components.

The study of the important source of impact and hypothetical impact can identify the key issue that needs to be managed. The results of the important impact evaluation are also expected to assist the decision-making process in the selection of a viable alternative plan that considers environmental aspects of the proposed area.

Summary of Assessment Findings

The development of oil palm plantation and palm oil mill of PT KML in Sub-district of Simpang Dua and Simpang Hulu, District of Ketapang raises the awareness of the environmental impact on the physical-chemical, biological, and social, economic, cultural, and local public health, both positive and negative impacts. In the implementation of plantation development and palm oil mill of PT KML, one of the main considerations is the preservation of the environment, to ensure sustainable development.

The EIA study of the plantation's activity and palm oil mill is a single EIA activity/ project. The scoping study of the area boundary for Environmental Impact Assessment (EIA) of Oil Palm Plantation activities considers four (4) factors, namely: limited project/ activity, ecological boundaries, social boundaries, and administrative boundaries.

Plantation activities and palm oil mill were predicted to impact the environment; thus it needs to be explored in depth including the four phases of activities: Pre-Construction Phase, Construction Phase, Operational Phase and Post-Operational Phase.

a. Pre-construction Phase

At this phase, there may be a change in attitudes and perceptions and containing social unrest, due to the socialization and boundary demarcation, also land acquisition.

b. Construction Phase

The identified activities that will be carried on this phase could be the mobilization of heavy equipment, manpower recruitment, land clearing, construction of facilities and infrastructure, seeding and planting, maintenance of immature plants, mill construction and wastewater treatment plant, construction of water channels and roads. Those activities will have impacts as follows; decrease in air and water surface quality, increase in noise level, land & forest fire potential, decrease in the diversity of flora and fauna species, and change in attitudes and perceptions as well as the decrease in public health. The positive impacts include increase in job and business opportunities and increase in people's income.

c. Operational Phase

At this phase the identified activities could be nursery, FFB harvesting and transport, mobilization of heavy equipment and maintenance of oil palm trees. The magnitude and significance of impact that need attention at the operational phase are the decrease of air quality and increase in noise level, increase in job and business opportunities, increase incomes, change in attitudes and perceptions, decrease in public health in the study area.

d. Post-Operational Phase

There will be labor dismissals, demobilization of heavy equipment, reforestation, and revegetation, and land handover to government and community which will have significant impacts; decrease in air quality, increase in noise level, decrease in local income, change in attitudes and perceptions, and community unrest.

Changes in some aspects of the environment (abiotic, biotic, social, economic, cultural, and public health) due to these activities in Sub-district of Simpang Dua and Simpang Hulu, District of Ketapang, require a further efficiency in the utilization of available natural resources, optimizing the management, and monitoring efforts which needed to be integrated into all components of the integrated business.

The magnitude and significance of impacts that will be managed and monitored in the Environmental Management Plan and Environmental Monitoring Plan based on the results of the impact evaluation are: 1) Physical-chemical environment components including air quality, surface water quality, and forest fires potential; 2) Social culture and public health components including social unrest, job and business opportunities, perceptions, local income, and public health level.

Environmental management of the environmental components that are experiencing fundamental changes, both positive and negative as an effect of the oil palm development plan of PT KML will be carried out in three approaches: technological, socio-economic-cultural and institutional.

The implementation of environmental monitoring is carried out by PT KML. The environmental monitoring reports will be submitted annually to the technical adviser of the government agencies.

Social Impact Assessment (SIA)

The latest Social Impact Assessment of PT Karya Makmur Langgeng was carried by Ecotrop in January - March 2022. The team is as follows:

Table 4. SIA Team Member and Expertise in PT Karya Makmur Langgeng

No.	Name	Position	Expertise
1	T. Ade Pahlevi	Team Leader	Social economic & stakeholders' engagement, and FPIC expert
2	Bias Berlio P	Team Member	Social mapping & community development expert

| 3 | Reza Abdillah | Team Member | GIS & land use specialist | |

Methodology

This assessment uses a qualitative and quantitative approach. A qualitative approach will produce the descriptive data regarding oral and written information also the behaviour of the observed object. Thus it can describe the reality of an event and show the quality of the object of assessment. The quantitative approach is used to measure the observed object through the indicators or criteria that have been determined in the assessment so that it can provide a measure of the object of the assessment.

1. Data Collection(s)

    Primary and secondary data will be used in this assessment. The primary data was obtained through survey and consulting activities using the Rapid Appraisal Method, as follows:
    - Focus Group Discussion (FGD). This method is a qualitative data collection technique designed to obtain information on people's wants, needs, perspectives, beliefs, and experiences regarding social problems, social conditions, and social impacts of company activities. The purpose of conducting FGDs is to explore specific issues and collect data regarding public perceptions and views regarding a particular topic so that in the process several discussion-starting questions are used.
    - Direct Observation. This method is in the form of direct observation to see and directly observe the social conditions of the local community. The data that can be collected through this method consists of information on geographical conditions, socio-economic conditions, natural resources, infrastructure, ongoing programs, social interactions, potential conflicts, the role of women, and so on.

    The secondary data was obtained from tracing statistical data, and social and environmental assessment documents that had been carried out in the assessment area.

Table 5. Source of secondary data and information for the Social Impact Assessment

No	Source
1	*Village Boundary Data and Population of Simpang Dua District and Simpang Hulu District, 2021 (https://gis.dukcapil.kemendagri.go.id/peta/)*
2	Population Data for Simpang Dua and Simpang Hulu District, 2021 (http://prodesel.binapemdes.kemendagri.go.id/mpublik/)
3	Developing Village Index, 2022 (https://idm.kemendesa.go.id/status)
4	Topographical Map of Indonesia, 2021
5	Sub-district of Simpang Dua in Number (BPS, 2021)
6	Sub-district of Simpang Hulu in Number (BPS, 2021)
7	Permitted Location of PT KML (2006)
8	Extension of Permitted Location of PT KML (2010)
9	Plantation Business Permit of PT KML (2013)
10	Land Tenure Study of PT KML (2012)
11	Social Environment Impact Analysis of PT KML (2012)
12	Report of CSR Program & Realization Area 8B (2018 – 2019

2. Sampling Technique

    The local communities that were sampled for the assessment were the people in the village who had direct interaction with

the company's concession area, which is village inside the concession or directly adjacent village at the time this assessment was carried out.

This assessment was carried out in a participatory manner by involving community representatives and representatives of the company's internal community as informants. They are individuals or group representatives who have knowledge on the social conditions of the people in the assessment location.

Table 6. Scope of the social impact assessment

No	Sub-district	Village
1	Simpang Dua	Semandan Kanan
2	Simpang Dua	Kampar Sebomban
3	Simpang Hulu	Paoh Concong

3. Data Analysis

Descriptive Analysis

Descriptive analysis is used to find out the pattern of data and information that has been collected, as well as being the basis for further analysis. The qualitative data that has been collected is then grouped based on the theme of the assessment, while the quantitative data that is collected is then analysed using a central tendency measurement approach in order to provide an overview of a measure that represents a set of data such as the mean (average) and median.

In this assessment, descriptive analysis is used to describe project descriptions, community profiles, social impacts and risks, stakeholder analysis, and develop recommendations for social management and monitoring.

Spatial Analysis

There are several spatial analysis functions, namely: classification, network, overlay, buffering, 3D analysis, and digital image processing. In this assessment, a spatial analysis was conducted to assess geographical boundaries, spatial planning, and land use. Spatial analysis is carried out using tools that allow the assessor to review the assessment area in a comprehensive manner.

Livelihood Analysis

The livelihood analysis in this assessment systematically describes the accessibility of livelihood assets and community livelihood strategies in the assessment location. The accessibility of livelihood assets is analysed using the pentagonal asset model which consists of five assets, namely: human capital, social capital, physical capital, natural capital, and financial capital. Meanwhile, the livelihood strategy is analysed using the approach of household socio-economic status and the approach of activities carried out by a community.

Livelihood strategy analysis was carried out descriptively which refers to the definition of livelihood strategy used in this assessment. Livelihood strategies based on household socio-economic status are divided into three, namely: (1) survival strategy is a strategy to meet life needs at a minimum level in order to survive; (2) consolidation strategy is a strategy to meet the needs of life which is reflected in the fulfillment of basic and social needs; and (3) the strategy of accumulation is a strategy of meeting the necessities of life to achieve basic needs, social and capital accumulation. Meanwhile, livelihood strategies based on the activity approach undertaken by the community are divided into two, namely: (1) natural resource-based livelihood strategies (such as agriculture, animal husbandry, fisheries, and so on), and (2) non-natural resource activities (such as livelihood diversification and migration).

Ranking Matrix

The ranking matrix is a way to identify the problems faced and determine the priority of problems that will be sought for solutions. In this assessment, ranking matrix analysis is used to determine the priority of problems according to public perception.

Impact and Risk Analysis

Impact analysis was carried out descriptively by identifying and classifying impacts by considering the relationship between environmental, health, safety and socio-economic conditions.

The next stage after impact grouping is done, it is important to determine the significance of the impact by conducting a risk assessment of the impact.

Risks are identified based on the level of consequence of the impact and the level of likelihood of the impact based on the perceptions of community representatives.

Stakeholder Analysis

Stakeholder analysis is a process that systematically develops an objective understanding of which key stakeholders are important to involve and to recognise how much influence and interest they have in a program, as well as setting criteria-based priorities that lead to the development of appropriate engagement strategies.

Stakeholders in this assessment are defined as parties who have an interest, contribute positively and/or negatively, and have direct or indirect influence in the company's operational activities.

Characteristics of the Surrounding Communities

PT KML is administratively in 3 villages within 2 sub-districts: Village of Semandang Kanan and Kamar Sebomban, Sub-district of Simpang Dua and Village of Paoh Concong, Sub-district of Simpang Hulu. The demographic description of the three villages is as follows:

Table 7. Village demographics around PT KML

No	Sub-district	Village	Number of Hamlet	Population		Area (km2)	Density (ppl/km2)	Number of Household (s)
				Male	Female			
1	Simpang Dua	Semandan Kanan	5	2,020	1,814	258.21	14.8	1,095
2	Simpang Dua	Kampar sebomban	5	958	861	162.02	11.2	548
3	Simpang Hulu	Paoh Concong	5	836	760	71.24	22.4	461

Source: Department of Population and Civil Registration, June 30, 2021

Socio-Economic

Based on data from the Department of Population and Civil Registration, 2021, there are 62.8% of the people in the assessment locations who are registered as people who have livelihoods and income. These livelihoods are divided into six groups sequentially as follows: agriculture and animal husbandry (27.2%), other occupations (24.1%), self-employed (8.2%), state officials (1.7%), teaching staff (1.3%), and health workers (0.4%). While the other 37% are people who have not/do not work. Of the 37%, there are around 19.5% of people who are still pursuing their education level (students and university students), while the other 17.5% are people who have not/do not work.

Agriculture and animal husbandry are the first largest group of livelihoods carried out by the community in the assessment location. In general, people who fall into this group carry out cultivation activities for various agricultural commodities, such as: oil palm, rubber, rice, and vegetables.

The other livelihood groups are the second largest group of livelihoods carried out by the community in the assessment location. This group consists of several sub-groups, namely: retirees, religious leaders, fishermen, and private employees. Of all these sub-groups, private employees are the largest sub-group. People who work as private employees generally work in forestry and oil palm plantation companies.

Based on the results of consultations with community representatives in the three villages at the assessment location, most people in all villages have more than one source of income.

Community accessibility to markets is relatively affordable and adequate. Generally, people make purchases at the district capital and kiosks/shops in the village neighborhood. The nearest market location is in Semandang Kanan, this is because Semandang Kanan Village is an economic centre so there are more shops and traders selling basic needs for the community. Unlike Semandang Kanan Village, the fulfilment of basic needs of the people in the other two villages is relatively limited because the location of the villages are far from the economic centre so there is no market yet. Fulfilling the needs of the people in the two villages is obtained from kiosks/shops and itinerant traders in the village neighborhood. The supply of people's living needs is guaranteed throughout the year.

Socio-Culture

Indigenous people who occupy the three villages in the assessment location consist of the Dayak Simpang and Malay ethnic groups. Meanwhile, the Javanese, Flores, Banjar, Madurese, and Chinese people are a group of migrants who currently live in three villages at the assessment location. They become the village community due to work and marriage factors.

Most people in those three villages adhere to Protestant Christianity (45.6%), while some others embrace Islam (36.4%), Catholic (17.1%), Hindu (0.2%), Buddhist (0.7%), and religious beliefs (0.1%). Protestant and Catholic adherents are dominated by the Dayak Simpang and Flores people, but there are also Dayak Simpang people who adhere to Hinduism and their Beliefs. Islam is generally embraced by people from the Javanese, Banjar, and Madurese tribes, while Buddhism is embraced by some Chinese communities.

Educational facilities

Educational facilities available at the assessment location were relatively limited, only Semandang Kanan Village had complete educational facilities for all levels of education. Limited educational facilities in Kampar Sebomban Village and Paoh Concong Village require that people who wish to continue their education to the next level should travel a longer distance. The following is the number of school facilities in each village at the assessment location:

Table 8. Educational Facilities in Villages around PT KML

No.	Village/ Sub-district	Elementary School	Junior High School	Senior High School
	Simpang Dua			
1	Semandang Kanan	4	1	1
2	Kampar Sebomban	4	0	0
	Simpang Hulu			
3	Paoh Concong	2	0	0

Source: Department of Population and Civil Registration, June 30, 2021

Infrastructure

Accessibility within the area of each village has been provided. Asphalt road surfaces are only found in the sub-district centre and are a means of connecting between Simpang Dua and Simpang Hulu sub-districts, while roads within the village area are dominated by dirt-level roads. The dirt road is a road that is often used by local communities for main accessibility in order to reach public facilities in sub-districts and districts. The condition of the connecting road is not maintained, during the dry season it produces dust and during the rainy season it is stagnant and difficult to pass. This is due to the high intensity of rain, the frequent passing of

FFB transport trucks and inadequate maintenance. Maintenance of roads within village areas is supported by the Village Revenue and Expenditure Budget (APBDES).

In general, local people use motorbikes as a means of transportation, and only a small portion of the community uses cars. The travel time needed by local people to get to the sub-district centre is 20-40 minutes.

<u>Health Care Facilities</u>

Health facilities in the form of Community Health Centres (Puskesmas), Supporting Health Centres (Pustu), and pharmacies are only available in Semandang Kanan Village, while the other villages in the assessment location do not yet have health facilities. However, people in the two villages can access the health facilities available in Semandang Kanan Village. In addition, the community can also access health facilities in the Regency Capital (Ketapang) with a travel time of about 7 hours.

<u>Internal Issues, Impacts, and Potential Impacts and Social Risks</u>

Identification of Social Issue(s)

Table 9. Social Issue(s) and its rank

Social Issue	Issue Area	Impact	Frequency	Score	Priority
Overlapping company areas with community lands, this problem became the concern of community representatives in all villages at the assessment location. This causes the community to be unable to upgrade the legality status of the land from a Land Certificate (SKT) to a Certificate of Ownership (SHM).	5	5	5	15	1
The high rate of FFB theft is carried out by unscrupulous members of the community, this problem is of concern to community representatives in all villages at the assessment location. This problem is triggered by the mindset of some people who tend to think instantly to earn cash. In addition, the high price of FFB is also a driving factor.	5	5	4	14	2
Inadequate village/hamlet roads, this problem became the concern of community representatives from Semandang Kanan Village, especially Sungai Tontang Hamlet and Sekucing Baru Hamlet. The roads in the two hamlets are in the same condition as dirt road and there is a lot of damage on various roads. The road is very difficult to pass during the rainy season, and during the dry season it produces dust which is hazardous to public health. Road damage in the two hamlets was caused by the absence of road maintenance carried out by the village government and the company. The reason the company did not carry out road maintenance was because the company no longer used the road as an access for FFB transportation and other operational activities. In addition, community representatives also stated that the inter-sub-district crossroads in the Semadang Kanan Village area are often traversed by the company's FFB transport trucks, this will make these roads more easily damaged.	4	4	2	10	6
River pollution: This problem is a major concern of community representatives from all villages. Mining activities in the upstream section, as well as oil palm plantation activities carried out by unscrupulous members of the public are the causes of river pollution. River pollution causes a reduction in fish populations, the water is cloudy, it cannot be used as a source of water for drinking/cooking and has the potential to cause disease for people who use river water as a source of water for sanitation.	3	3	3	9	7
The form of land compensation is 80% of the land value released by the community, this problem is of concern to the community, the community does not agree if the company carries out social and environmental protection commitments, especially the determination of conservation areas on land with a compensation value of 80%. They feel disadvantaged because the released land with a value of 80% will not get partnership/plasma oil palm plantations.	3	3	2	8	8
High unemployment rate: This problem is of concern to community representatives from all villages at the assessment location. The high unemployment rate is caused by several factors, namely: the low level of education and skills in the community, people aged between 20-30 years are reluctant to work as laborers for reasons of prestige, and limited information on job vacancies from companies in the village environment.	1	2	2	5	11

A small number of people who are members of cooperatives have not received SHK. This is related to cooperative management who do not have adequate knowledge and experience.	2	1	1	4	12

Analysis of Social Impact

Impact: Tangible, Positive & Direct

- Job opportunities for the community. The company's operational activities created jobs for the people in the villages at the assessment area so that they absorbed most of the community members who were in the productive age group as workers. Absorption of labor at the local level contributes to reducing the unemployment rate, and provides financial benefits in the form of a fixed monthly income. This also contributed significantly to reducing the crime rate and reducing other social problems caused by unemployment. Meanwhile, financial benefits in the form of monthly income contribute to improving community welfare.
- Increasing the productivity and economic value of land, especially community lands that have been developed by companies for oil palm plantations through the partnership/plasma program. Otherwise, with the addition of a road network that can facilitate access to a land, the economic value of the land has increased significantly.

Impact: Tangible, Positive & Indirect

- Increased types of community livelihoods. New types of livelihoods that have emerged are economic activities that support company operations and company employees such as hosting contractors and goods and services trading businesses.

Social Impact: Perceived, Positive & Direct

- The positive public perception of the company has increased as a result of the social assistance programs initiated by the company. Communities in all villages around the company assess that the existence of a social assistance program from the company can help fund social activities and other community development programs.

Social Impact: Perceived, Positive & Indirect

- Multiplier effect at the local level. This could only be assessed from the company's indirect expenditure, namely: expenditure by local people who work at the company (company employees). Employee expenditure to fulfill living needs within the villages at the assessment location contributes to increasing the flow of money so that the wheels of the economy at the local level continue to turn and provide benefits for every economic actor.

Social Impact: Tangible, Negative & Direct

- Communities who do not want their land to be compensated by the company will go through a longer process when arranging their land rights/legality status upgrades, hence the company's concession. Nonetheless, the community explained that the company still recognises the rights and ownership of community land which are not transferred to the company and the community can still manage these lands.
- The company's oil palm plantation area which is not located on the same stretch of land makes management and monitoring difficult. This provides opportunities for unscrupulous people who have intention to steal the FFB.
- The company's FFB transportation activities from the PT KML plantation to its sister company's mill have the potential to cause damage to village roads. In addition, the lack of road maintenance activities carried out by the company has worsened the condition of village roads, particularly in Semandang Kanan Village.

Social Impact: Perceived, Negative & Direct

- Oil palm plantation and mill activities carried out by the company are large-scale projects. This creates a perception in the community that the company must be responsible for all social problems in the village environment and prioritise the community in all company operational activities.

Social Impact: Perceived, Negative & Cumulative

- River water pollution is an accumulation of various activities carried out by several companies and communities. The river pollution referred to by community representatives is the effect of upstream mining activities and the use of agrochemicals. However, to determine the threshold value of river water, it is necessary to carry out further laboratory tests, especially in the rivers within the company's concession area
- Air pollution is an accumulation of various activities carried out by several companies and communities. The air pollution referred to by community representatives is an increase in the dust content in the air which causes health problems to the community such as acute respiratory infections (ARI) and eye infections. However, further studies are needed to provide more complete data and information related to ARI and eye infections cases in the community at the assessment site.

Section 4: HCV-HCSA Assessment; OR

ALS HCV and Standalone HCSA assessment

4.1. Assessor and Credential

The HCV-HCS integrated assessment conducted in the Plantation Business Permit Area (IUP) of PT KML was carried by Gagas Dinamiga Aksenta (Aksenta), which located at Jln. Gandaria VIII/10 Kebayoran Baru, Jakarta - Indonesia 12130. Webpage www.aksenta.com

This HCV document had been reviewed by the HCVRN and was declared satisfactory on 15 December 2021, please refer to the following link:
https://www.hcvnetwork.org/reports/hcv-hcsa-terpadu-pt-kml-kabupaten-ketapang-kalimantan-barat-indonesia

Table 10. Key consultants of HCV-HCSA Integrated Assessment

Name	Role	Expertise
Fersely Getsemani Feliggi	Lead Assessor (ALS18004FG) HCSA registered practitioner	Hydrology, soil and water conservation, carbon stock, watershed management, land use change analysis
Risa D. Syarif	GIS and Remote Sensing expert; HCSA registered practitioner	Carbon stock, spatial analysis, land use change analysis
Idung Risdiyanto	Assessor team, ecosystem service expert	Hydrology, forest ecology, spatial modelling, carbon stock, land suitability, peat survey, watershed management also soil and water conservation
Iwan Setiawan	Assessor team, ecological and wildlife expert	Wildlife identification, wildlife ecology and conservation, animal conflict management, landscape ecology
Pramitama Bayu Saputro	Assessor team, fauna expert	Wildlife identification, wildlife ecology and conservation, GIS and remote sensing
Ahmad Syrojuddin	Assessor team, flora expert	Flora identification, forest inventory
Andrini Eka Diah	GIS and remote sensing	GIS, remote sensing, land cover analysis
Ali Akbar Hutzi	Assessor team, social expert	Socio-economy, social impact management, socio-culture, participatory mapping
Andri Novi Hendrarto	Assessor team, social expert	Socio-economy, social impact management, socio-culture, participatory mapping
Anwar Muzakkir	Forest inventory team member	Flora identification, forest inventory, carbon stock estimation

Muhammad Richsy Fauzi	Forest inventory team member	Flora identification, forest inventory, carbon stock estimation
Aulia Bahadhori Mukti	Forest inventory team member	Flora identification, forest inventory, carbon stock estimation, land suitability, soil mapping
Muhammad Fakhrul	Forest inventory team member	Flora identification, forest inventory, GIS & remote sensing, carbon stock estimation

Table 11. Structure of the Forest Inventory Team

Name	Position
Anwar Muzakkir	Team Coordinator, species identification technician
Muhammad Richsy Fauzi	Species identification technician
Aulia Bahadhori Mukti, Muhammad Fakhrul	Measuring assistant
Markus Ruju, Andreas	Compass man
Suwan, Teguh Setiono	Plot cleaner
Soni Guruh Sasono, Corintus	Hip chain operator
Sudirman, Yosea Ateng, Jumali, Ardianto	Line cutter

4.2. Assessment Timeline

The assessment activity series are carried out from December 2019 to December 2020. Phases of the activity refers to HCV-HCSA Assessment Manual (HCVRN, 2017).

Table 12. Phases and timeline of the Integrated HCV-HCSA Assessment

Phase	Activity	Location	Timeline
PRE-ASSESSMENT			
Information exchange and desktop study	● Collecting basic information ● Kick off meeting. ● Quick due diligence ● Contract signing	Jakarta	1 – 5 December 2019
SCOPING STUDY			
Scoping Study	● Desktop study (non-field work); collection and analysis of secondary data/information ● Stakeholder identification	Jakarta	6 – 7 December 2019
	Initial consultation with stakeholder (NGOs, governments) *	Pontianak and Ketapang	19 – 20 November 2019 and 10 – 12 December 2019
	Field visit for land cover verification and consultation with local community representatives	Management Unit (MU) and villages in the Assessment area	9 – 15 December 2019
FULL ASSESSMENT			
Field survey	● Collecting field data (Rare, Threatened, and Endangered ("**RTE**") species, hydrology, socio-culture, forest inventory) ● Conducting interview with stakeholders ● Field data compilation and team's internal coordination	MU and 3 surrounding villages	10 – 24 February 2020
Participatory mapping	Workshop with informants and community members who have knowledge over and experience with the Assessment area	3 villages around the MU	10 – 20 February 2020
Closing meeting	Presentation to and discussion with the MU	PT KML Office	25 February 2020
Stakeholder consultation (final)	Final consultation is carried out using two approaches; (i) formal online meeting to present the Assessment results and receive	Online	1 August 2020 to 15 September 2020

		inputs and correction from stakeholders; and (ii) individual online consultation which is conducted to comply with national policies in preventing the spread of Covid-19 during pandemic. Stakeholders involved include local community members, local governments, relevant district and provincial government agencies, as well as NGOs and companies operating around the assessment area.		
Analysis and reporting	• Field and spatial data analysis • Preparing (draft) report • Aksenta's internal QC • Report finalisation • Submitting report to HCVRN	Aksenta Office, Jakarta and Bogor	October – December 2020

*Note: Initial consultation for this Assessment is carried out along with initial consultation for the Assessment of PT LGI, PT AMS, and PT NAS (other BGA members who conducted the Assessment at the same time as the companies' locations are in the same district as PT KML)

4.3. Pre-Assessment

Activities in pre-assessment phase include: (i) collecting initial data and information on the Assessment area and status of development plan area; (ii) collecting information and reviewing the Company policies on implementation of this Assessment; (iii) reviewing Free, Prior and Informed Consent ("FPIC") process that the Company has carried out; and (iv) conducting desktop study and initial review of secondary data (spatial data, statistical data, and literature). See Table 13 for due diligence against four HCV-HCSA Assessment preconditions. This phase concludes that the Company is eligible to proceed to the next phase in the Assessment implementation.

**Table 13.** Due diligence in relation to the four preconditions

No.	Preconditions	Due Diligence
1.	Commitment to environmental and social conservation	The Company has committed to environmental and social protection, as represented by the policies of BGA as parent company of PT KML (https://bumitama-agri.com/wp-content/uploads/2023/03/BAL_SustainabilityPolicy_FA.pdf)
2.	Company commitment to a moratorium on any land clearing or land preparation until the proposed ICLUP has been completed or finalised	• The Company is committed to 'no land clearing' during the assessment until the final decision of ICLUP is made. This is outlined in a moratorium of land clearing statement as of 1 November 2019. This needs to be further verified in the scoping study
3.	Demonstration of legal rights to or permit to explore or discover the Area of Interest (**"AoI"**)	• PT KML obtained Location Permit through Ketapang District Head Decree No. 293/2009 covering 19,000 ha which was subsequently extended through Ketapang District Head Decree No. 24/2010. • PT KML obtained approval for its plantation business through Ketapang District Head Decree No. 551.31/2238/Disbun-D dated 4 September 2006 which later on was incorporated into Ketapang District Head Decree No. 510/Disbun-D/2013 on the Granting of Palm Oil Plantation Business Permit to PT Karya Makmur Langgeng, covering an area of 16,700 ha. • In 2011, PT KML acquired lands through Convertible Production Forest (HPK) relinquishment from Minister of Forestry Decree No. SK.689/Menhut-II/2011 on Relinquishment of Part of HPK Area for PT KML Palm Oil Plantation
4.	FPIC process has been initiated with full dissemination of proposed project to all potentially affected communities and stakeholders, and a process for further negotiation and consent has been agreed, with fairly appointed representatives	• PT KML has initiated FPIC process since the beginning of its palm oil plantation development plan. In this process, the Company informed the following: i) its scope from legal standpoint; ii) land transfer plan; and iii) development plan timeline. This phase has been carried out since 5 March 2012. • PT KML has conducted Participatory Mapping and Land Tenure Study in 2012. • PT KML has signed Memorandum of Understanding (MoU) with Simpang Sekayok Cooperative on 2 May 2019 on Development and Management of Palm Oil Plantation in terms of Partnership, which is a form of local community agreement with the Company. • On 10 December 2019, PT KML requested permission from 3 village government leaders within the Company's area regarding the implementation of the Assessment plan. Furthermore, the three village leaders accepted and approved the Assessment plan, which will be carried out by third party (Aksenta). This will be confirmed during the scoping study

PT KML and BGA MU has expressed its commitment to environmental and social safeguard. In addition, the MU has specifically released an official statement that any activities related to new development would be suspended pending the complete process of the HCV-HCS Assessment and meeting of RSPO NPP.

4.4. Scoping Study

4.4.1. Activity Summary and Scoping Study Conclusion

This phase includes desktop and secondary data review; field visit to collect biophysical information and verify land cover; identification and initial consultation with stakeholders to identify important issues related to the Assessment; and initial consultation with community representatives to identify social condition and status of the FPIC process initiated by PT KML towards communities. See **Table 14** for details of activities in this phase and **Map 3** for field visit locations.
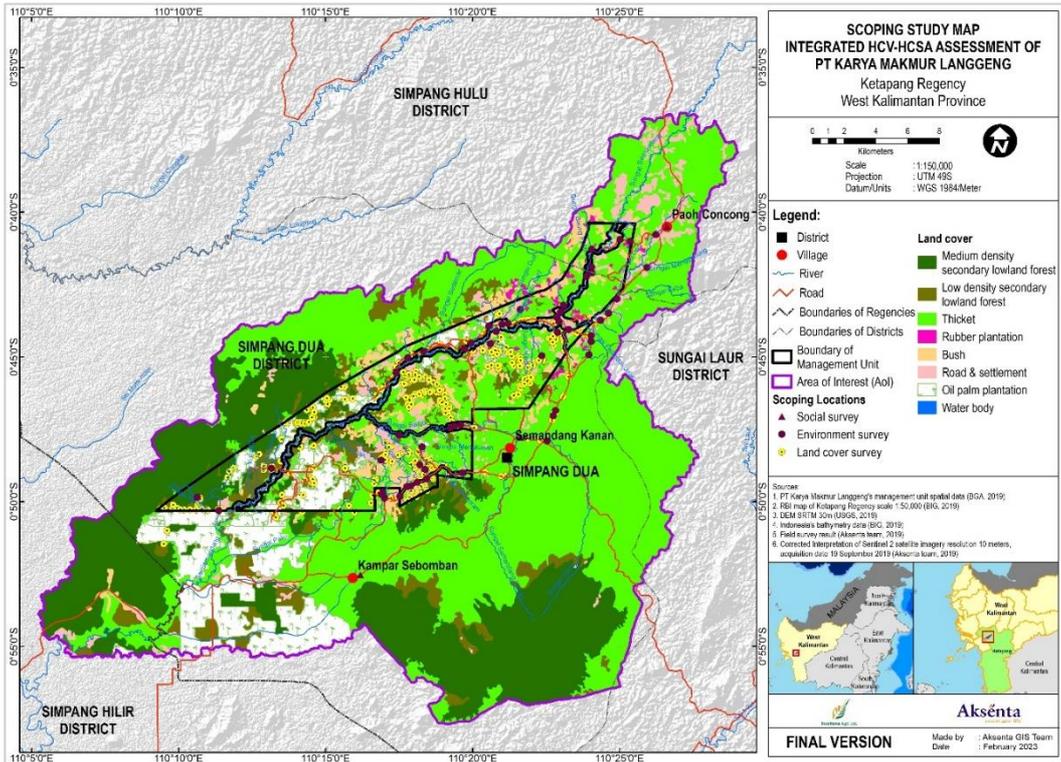
Map 3. Field survey locations (environmental, social, and land cover verification)
in the scoping study of HCV-HCSA Assessment of PT KML

Table 14. Phase and Timeline of Initial Assessment of the Integrated HCV-HCSA Assessment

Activity	Description	Timeline
Collecting information	Discussion with the Company to learn about the accessibility, transportation, and travel distance to stakeholder locations inside the Assessment areas. In this phase, implementation plan, target locations for initial land cover verification, biophysical aspect observation, and samples of villages to visit were also presented	1 – 5 December 2019
Field visit	This activity took five (5) days in the field and included biophysical and ecological surveys to determine AoI boundaries, land cover verification to identify land cover conditions, as well as stakeholder identification and initial consultation	9 – 15 December 2019
Visiting sample community members	Meeting with local community to learn about their social conditions and schedule the participatory mapping as well as focus group discussion (FGD) for full Assessment. See Map 3 for locations visited in this activity and Table 16 for consultation	9 – 15 December 2019
Ground truthing of initial land cover map	Ground truthing of initial land cover map was conducted during field visit. In this phase, the output is the corrected land cover maps that will be used in the full assessment	9 – 15 December 2019

Identifying stakeholder and carrying out initial consultation	Stakeholder identification has been conducted since pre-assessment phase. Initial consultation was carried out for two (2) days, i.e., meeting with stakeholders at provincial level (Pontianak) and district level (Ketapang). This activity was carried out to identify their main concerns and recommendations related to this Assessment. This activity included direct discussion and the assessor team visiting each stakeholder's office or meeting at agreed locations. See **Table 16** for consultation.	19 – 20 November 2019 and 10 – 12 December 2019

Initial land cover groundtruthing suggests that areas with natural vegetation cover can still be found in the assessment area, including forests, shrubs, and thickets. The groundtruthing was conducted at 300 sample locations including forests, old shrubs, young shrubs, rubber plantations, bushes, and open land. Palm oil land cover is verified using the Company's planting year data. Forests and shrubs are found in the southwestern part of its operational area, while the northern part is dominated by farms and rubber plantations (**Map 4** and **Map 5**). Correcting the initial land cover interpretation using the verification points leads to a kappa accuracy of 79.9%.
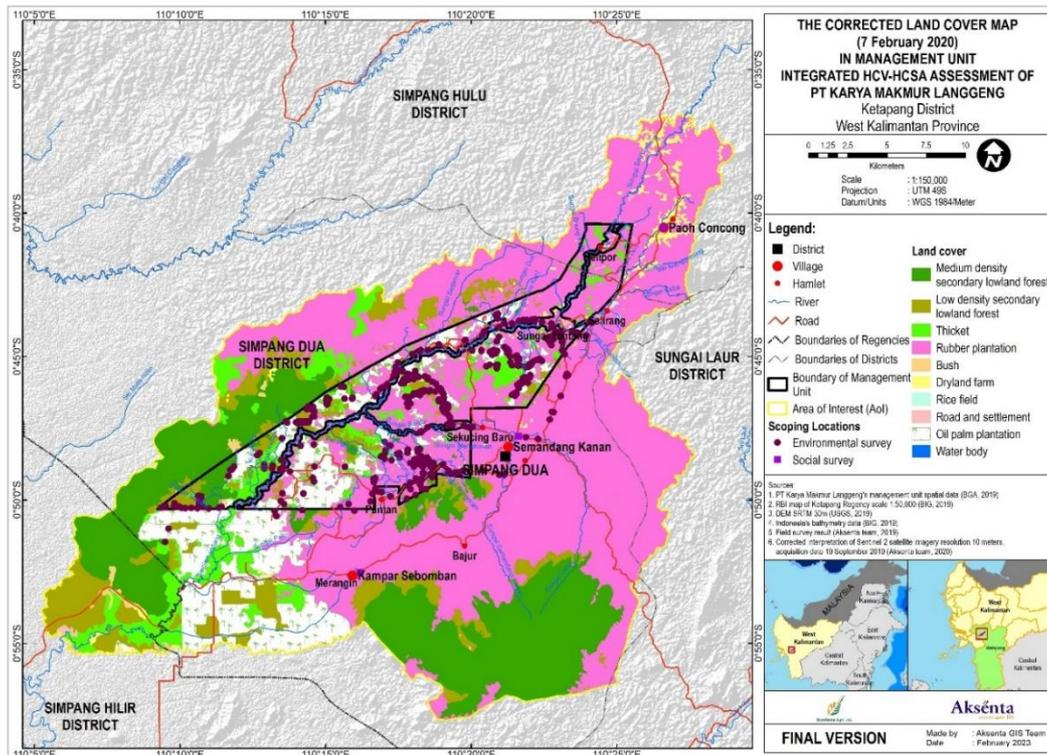
Map 4. Observation points and classification of corrected land covers (79.9% overall accuracy)

Forests found in the Assessment area include peat swamp forest, dipterocarp forest, and riparian forest. Based on field visit, it is known that endangered species (i.e., Bornean white-bearded gibbon (*Hylobates albibarbis*) and rhinoceros hornbill (*Buceros rhinoceros*)) are directly encountered. On the other hand, based on the interview, there are indications of the presence of clouded leopard (*Neofelis nebulosa*), Sunda pangolin (*Manis javanica*), and sun bear (*Helarctos malayanus*). No indication of orangutan presence is found in PT KML's operational area. Through the interview, it is known that this species is commonly found in the southern part of the Company's IUP to the outer part of the AoI, i.e., in the operational areas of PT MKS (partially located in the AoI), PT CUS, and PT JV (southern part of PT MKS), up to Mt. Palung National Park, which is entirely located outside the AoI.

Figure 1. Landscape of Assessment area (farms and rubber plantations)
with the background of Seriung Hill covered by forests

PT KML is located in an area with an elevation of 40-370 m a.s.l. The slope class analysis finds that the southwestern part of the Company's operational area is dominated by area with 0-8% slope class, while in the north it is an undulating area with 0-15% slope class. Areas with steep slopes (>40%) are found in the southeastern part of the Company (Batu Tulur and Seriung Hills). The Company's operational area is located at the upstream Semandang watershed with Semandang as the main river. A total of 12 Semandang tributaries flow through the Company's operational area.

Based on the initial visit and consultation, the following issues should be explored during full assessment.

- HCV 1   : presence of endemic and endangered species
- HCV 2   : forest landscapes in production forests that have connectivity with forests in the Company's operational area
- HCV 3   : rare and threatened ecosystem, including dipterocarp forest, riparian forest, and peat swamp forest
- HCV 4   : presence of river, hill, and peatland
- HCV 5   : use of rivers as fishing ground, and hills as the main source of water in Kampar Sebomban Village
- HCV 6   : presence of sacred sites
- HCS   : sampling of carbon values representing types of land cover based on initial verification of land cover and peat land

Verification of the four preconditions concludes that the due diligence results are already in line (**Table 15**) with FPIC principles, although the principles implementation need to be explored in the assessment phase.

Table 15. Field Verification of the preconditions

Precondition	Verification during Scoping Study
Commitment to environmental and social conservation	The Company has conducted environmental and social standard assessment, such as EIA, HCV, and SIA. However, the HCV assessment completed in March 2013 did not use HCVRN ALS scheme. During field visit, areas having been identified as HCV Areas (**"HCVA"**) are already appropriately protected. This demonstrates PT KML's strong commitment in environmental and social protection. The Company currently demonstrates its commitment through the Assessment using the latest RSPO scheme.

Company's commitment to a moratorium on any land clearing or land preparation until completion or finalisation of the proposed ICLUP	In compliance with its commitment to no land clearing, no evidence is found indicating land clearing. Based on Sentinel-2 satellite images per 19 September 2019, areas that look like cleared lands around Block C02 and H16 have been found. However, after field verification, those are found to have been affected by wildfires months before the activity was conducted. The fire was allegedly started by communities who were harvesting timber around these blocks and left the fire unattended at their work shacks.
Demonstration of legal rights to or permit to explore the AoI	Field visit team checked PT KML boundaries against its permit and found that the field condition was already in accordance with their documents.
FPIC process has been initiated with thorough dissemination of the proposed project to all potentially affected communities and stakeholders, and a process for further negotiation and consent has been agreed upon, with representatives appointed through a fair process	Field visit confirms that PT KML has initiated an FPIC process related to plantation development plan and Integrated HCV-HCSA Assessment. Village heads (representing their whole village communities) interviewed were aware of the planned HCV-HCS Assessment, and gave permission to the Assessment team to conduct the Assessment in their respective areas.

4.4.2. List of Consultation in the Scoping Study

This phase involves consultation with stakeholders (Table 16) to gain knowledge over important issues regarding the Assessment. They are selected as informants, considering their major activities and concerns related to the Assessment area, and potential HCV and HCSA elements.

Table 16. Summary of initial consultation in scoping study

Name	Organisation Social Group	Major Concern and Recommendation
Ridwan (M) _Head of Implementation Section	West Kalimantan Public Works and Spatial Planning Office	• Both provincial and district spatial plans are currently being evaluated. Results of evaluation and review will determine the revision phase. • Assessment will be conducted in accordance with the actual field conditions and the Company's development location must comply with applicable spatial regulations. • PT KML is located in the designated plantation cultivation zone.
Demiansyah (M) _Member of Security Unit	West Kalimantan Conservation of Natural Resources Agency (BKSDA)	(*Explains that authorised officials are not available and suggests making appointment and revisit the location*)
Hari Prayogo (M) _Lecturer	Faculty of Forestry, Tanjungpura University	• Connectivity between HCVA and riparian area conservation should be taken into account in HCVA designation. • It is common to find tembawangs containing a wide variety of fruit tree species in the Assessment area. They are commonly used as source of food to wildlife species, particularly during fruit season. However, they are used as trapping grounds to catch vulnerable wildlife species.
Loren (M) _Programme Manager	Sustainable Trade Initiative (IDH)	• West Kalimantan is part of IDH operational area concerned about area development, in which they apply landscape conservation principles. One of the approaches implemented is encouraging the establishment of alternative ecosystem conservation areas such as Essential Ecosystem Area (KEE). • Collaborate with BGA in orangutan corridor conservation for plantations and communities around Putri River and Mount Tarak. • Open opportunity for collaboration to solve issues, particularly concerning the implementation of sustainability principles.
Adi Susilo (M)_Head of Area Conservation Unit (SKW) Yoga Budihandoko (M)_Staff of Area Conservation Unit (SKW)	Ketapang SKW, BKSDA West Kalimantan Province	• BKSDA has the authority to manage flora and fauna within and outside conservation areas. • Forest areas outside conservation areas, such as Protection Forest, are under Forest Depatment authority. Ketapang includes North Ketapang and South Ketapang operational area. • BKSDA works together with companies and NGOs in managing flora and fauna, particularly popular species such as orangutan. • Recommend conducting assessment against available guidelines while maintaining precautionary principles.
Devis R. (M) _Programme Manager	AidEnvironment	• Collaborate with BGA in ecosystem conservation using landscape approach, e.g., in Kendawangan, as well as Melayu and Sungai Puteri.

		• Recommends that the Assessment should be carried out properly against applicable guidelines.
Sauni (M) _ Head of Environmental Protection and Management Division	Ketapang Environment Office	• HCV protection is related to Environmental Maintenance Division. • Many areas designated as HCVA are yet to be compensated by the Company. • Lands in the Assessment area need to have clear land ownership statuses, particularly related to lands potentially serving as conservation areas.
Ronie Andio (M) _ Head of Maintenance Section	Ketapang Environment Office	• Explains the West Kalimantan Provincial Regulation No. 6/2018 on obligation to allocate a minimum of 7% of IUP area for conservation area. • Currently has started compiling conservation area data in company's operational area in Ketapang
Hendra (M) Gusti Suganda (M) Abd. Hadidi (M)	Tropenbos International	• Describe Tropenbos work programme on tourism development and protection at landscape level in Mt.Tarak and Pematang Gadung. • Start the programme by empowering community economics, e.g., through mushroom cultivation development. • Recommend engaging community during the Assessment and important decision making regarding the proposed lands and conservation areas.
Lamto (M) _Head of Section	Department of Public Works and Spatial Planning	• Explains about protection areas adjacent to the Company's operational area, i.e., Lembuding and Batu Menangis Hills, Berubayan Protection Forest, and Sekelampai Production Forest. • Take into consideration the overlap between the Assessment area and mining concession. • The MU is located in the designated Non-Forestry Zone (APL).
Amonius (M)_Head of Village Simon Petrus (M)_Head of Village Consultative Body S. Patan (M)_Priest	Semandang Kanan Village	• Understand the benefits and objectives of carrying out HCV-HCSA Assessment. • Support and give permission to Aksenta team to conduct full Assessment in PT KML operational area in Semandang Kanan Village. • There are no sacred sites or sites of important cultural value in the Company's operational area in Semandang Kanan Village. • Several community members still use rivers for fishing and bathing, washing, and toilet - Potential HCV 5. • Semandang Kanan Village community members who have handed over their lands to the Company hope that land clearing and planting can be carried out immediately, as they would like to receive the 'Plasma Fee' as soon as possible. • All community members who have handed over their lands to the Company hope that HCVAs are not too large, as it is not in favour of those who have handed over their lands. • Representatives who should be included in the Assessment are Sekucing Baru and Sungai Tontang Subvillage Heads. • Advisors appointed during the Assessment are: customary leader and BPD Head
Markus Bolon (M) _Head of Village	Paoh Concong Village	• Representatives to include in the Assessment are: Sekucing Baru and Sungai Tontang Subvillage Heads. • Understands the benefits and objectives of carrying out HCV-HCSA Assessment. • Supports and give permission to Aksenta team to conduct full Assessment within KML operational area located in Semandang Kanan Village. • Village heads will facilitate Aksenta to conduct the Assessment and will not influence community when deciding whether or not they are to hand over their lands to the Company. • Paoh Concong Village community members generally prefer to hand over their lands to mining companies, as mining companies provide bigger compensation than plantation companies, and that the lands will be returned once mining activity is over. • No protected wildlife species are found, including orangutan, except in the Protection Forest towards MKS Plantation. Orangutans were last seen around 2010, and are now no longer present due to hunting by community. • There is a potential HCV 6 area known as 'Keramat Ikan', located by the river to the north of KML operational area. The site is protected and feared by community, and visiting it requires assistance from customary committee (or shaman) • Another potential HCV 6 area is the ironwood statue carved to imitate a dead body, and often visited by Dayak peoples to pray.

		• Representatives who should be included in the Assessment are: Pelipor Subvillage Head, customary leader, religious leader, and customary committee. • Advisors appointed during the Assessment are: customary leader and BPD Head
Kristianus Iskimo (M) _Head of Village	Kampar Sebomban Village	• Understands the benefits and objectives of carrying out HCV-HCSA Assessment. • Supports and gives permission to Aksenta team to conduct full Assessment within KML operational area in Semandang Kanan Village. • According to the Village Head, orangutan or other protected species are no longer present in Kampar Sebomban Village. • Several community members still hunt, but it is now difficult to find animals to hunt, such as deer or wild boar. • Aside from hunting, some of community members also fish in the river (Penyawan River) for consumption. Therefore, the river is considered a potential HCV 5 area. • There are no sacred sites or specific locations that are culturally respected. • Community hopes that the Company immediately clear lands and plant so that they who are part of the plasma scheme can receive the 'Plasma Fee' as soon as possible. • The Village Head hopes that land compensation can increase. • Representatives who should be included in the Assessment are: Laningius, Tito Ignasius, and Paolos Medan • Advisor appointed during the Assessment is Aweng
Karmele L. Sanchez (F)_Director Catur Y. Prasety (M)_Director	International Animal Rescue Foundation Indonesia	• Based on Population and Habitat Viability Assessment (PHVA) map, distribution of orangutans with healthy population is found in Protection Forest (PF) and Limited Protection Forest (LPF) areas of South Ketapang FMU. • The presence and distribution of orangutan is found along Kebungkau PF boundaries to the LPF at Unit 27 of North Ketapang FMU. • Important wildlife species such as orangutan and pangolin are still poached, and the centre of the illegal animal trade is in Sandai. • People still poach and keep orangutans in Simpang Dua and Batu Menangis. • There are five to six records of orangutan rescue up to 2018 from around Simpang Dua. • The presence and distribution of orangutan is documented around Mt. Juring Protection Forest which borders PT MKS (FR Group) to the LPF in Unit 26 of North Ketapang FMU. • Other key wildlife species such as pangolin are still poached. • BGA should not only identify the presence of endangered species, but also make actual efforts for protection in its operational areas
Agus Syamsudin (M) _Staff Member	North Ketapang FMU	• There are 17 FMUs in West Kalimantan, 2 of which are located in Ketapang District (North Ketapang FMU and South Ketapang FMU)

4.5. Full Assessment

4.5.1. Description of AoI

AoI Boundaries

The AoI boundaries are obtained by aggregating the biodiversity, hydrology and watershed, natural vegetation cover, and social landscape boundaries. This aggregation process also considers the connectivity of natural ecosystems within the Assessment area (PT KML) and others outside the area. Boundaries of Sei Semandang (or Batang Prodam) sub-watershed are used as the basis in determining the AoI. The western and eastern boundaries of the AoI follow the boundaries of Semandang Tengah and Hulu sub-watersheds. The southern AoI boundaries follow those of Semandang Tengah sub-watershed and protection forest, while the northern AoI boundaries follow those of Semandang Hulu sub-watershed.

The AoI includes Juring Hill Forest to the southeast, which is connected through forest fragments in the southern part of PT KML and PT MKS as the stepping stones, with forest landscapes in the western part of the Company. Therefore, considering the connectivity, all of the protection forest areas serve as the parts of the wider landscape (AoI). The total area of the AoI or the

Assessment area is 79,868.8 ha (**Map 5**). Meanwhile, boundaries and areas of villages adjacent to the Assessment area (i.e., Paoh Concong, Kampar Sebomban, and Semandang Kanan Villages) are used to determine the social AoI.
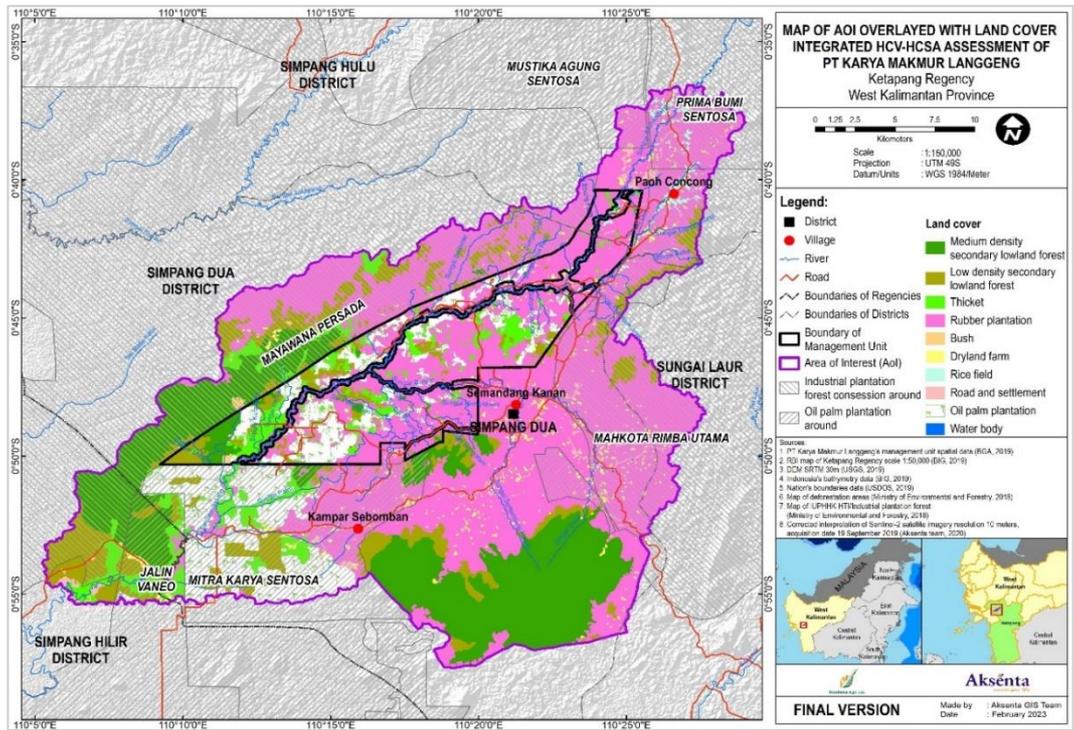
Map 5. AoI boundaries of the HCV – HCSA Assessment in PT KML

Landscape Context

<u>Physical Landscape</u>

Characteristics of physical environment in the MU and its surroundings are as follows.

- PT KML is located in a wet tropical climate area and has an equatorial rainfall pattern with two peaks in a year, i.e., February-March and October-November. The rainfall data collected from the nearest Ketapang Meteorological, Climatological, and Geophysical Agency (BMKG) indicates that the area's annual rainfall is 2,000-2,500 mm/year, while the air temperature is around 21-35°C with average of 27.4°C (Statistics Indonesia, 2019).
- Land surface morphology is dominated by flat to rolling areas with dominant elevation of <150 m a.s.l. Land slopes are mostly flat-undulating (0-8%) and rolling (8-15%). Flat areas are found in the south, while rolling, undulating areas are located in the north. Another form of land surface is hilly area, which are found in the southeastern part near Pantan Subvillage, and in the central part, such as Juring, Seriung, and Tujubelas Hills.
- Soil types in this area are mostly mineral soil from orders of Ultisol, Inceptisol, and Oxisol, and only few locations are Histosol/peat soil. The latter of relatively small area is found and connected to the same soil order in the southern part of the Company.
- Land system in the Assessment area according to RePPPort map (1990) include Natural Teak Forest (HJA), Sustainable Farming (PLN), Terraced Planting (TWI), and Crop Cultivation Movement (GBT), with HJA being the dominant system. HJA land system is flat terrain, PLN is hilly terrain, TWI is mountainous terrain, and GBT is peat swamp terrain. The majority of the MU is located in the HJA land system. This land system becomes a proxy in classifying ecosystem types in the Assessment area.

- Concerning the watershed, all Company areas are located in Pawan watershed, specifically in Semandang sub-watershed which directly borders Kualan sub-watershed to the north, Mata-Mata sub-watershed to the west, and Sei Laur sub-watershed to the east.

The physical environmental context leads to the conclusion that the environmental risks in this area include erosion and flood. Flood risk is caused by flat terrain morphology and high rainfall in an area. Silting risk may be caused by mineral soil erodibility and high rainfall erosivity.

Biological Landscape

The Assessment area is in Borneo, an island of high biodiversity. The island is included in the Sunda Shelf biodiversity hotspot, which is a global conservation priority (Myers *et al*., 2000). It also serves as habitats to 267 Dipterocarpaceae species (155 out of which are endemic to Borneo), 225 land mammal species (44 out of which are endemic (Payne *et al*., 2000)), 639 bird species (37 are endemic (MacKinnon *et al*., 2000)), 166 snake species (Stuebing & Inger, 1999), and around 140-150 amphibian species (Inger and Stuebing, 1997). It has around 15,000 flowering plant species that include 3,000 woody species, 155 endemic species, 200 orchid species, and more than a thousand fern species (Whitten *et al*., 1997).

The presence of directly connected conservation areas and Key Biodiversity Areas (KBA) around PT KML may indicate its biodiversity level. The following are the reasons why the AoI location is important to KBAs.

- The Assessment area is located 23.6 km to the north of Mt. Palung National Park. Between the National Park and the Assessment area, there are operational areas of PT Jalin Vaneo, PT Cipta Usaha Sejati, and PT Mitra Karya Sentosa. Corridors that connect the Assessment area and Mt. Palung National Park pass through the riparian areas of Prodam or Sei Semandang River which flow through the three companies' operational areas.
- There are four Ramsar Sites in Borneo, namely Kinabatangan-Segama, Kuching, Sentarum Lake, and Tanjung Puting. The Assessment area is 200 km away from the nearest Ramsar Site, i.e., Sentarum Lake and Tanjung Puting.
- There are two Key Biodiversity Areas (KBA) adjacent to the Company's operational area, namely Swamp KBA along Kapuas River to the north, and Mt. Palung KBA in Mt. Palung National Park. The Swamp KBA connects to the Company's operational area through a production forest in its northwestern part. Swamp KBA has swamp ecosystem.
- Important Bird Area (IBA) around the Assessment area is Mt. Palung IBA. Key species recorded in the IBA is Bornean peacock-pheasant (*Polyplectron schleiermacheri*), brown-backed flowerpecker (*Dicaeum everetti*), Malaysian honeyguide (*Indicator archipelagicus*), and black-throated wren-babbler (*Napothera atrigulari*).
- Endemic Bird Area (EBA) around the Company is Bornean Mountains EBA, which is distributed around highlands all over the island, including Indonesia, Malaysia, and Brunei. The nearest EBAs are in Mt. Palung National Park to the south and Mt Naning Protection Forest to the north. Bornean Mountains EBA is mostly Dipterocarp forests on hilly areas. Endemic species that can be found in the EBA include *Arborophila hyperythra, Psilopogon eximius, Calyptomena hosii, Yuhina everetti* and *Heleia squamifrons*.
- Intact Forest Landscape (IFL) is a natural ecosystem type that is yet to be disturbed by anthropogenic activities and has high biodiversity. The nearest IFL to the Company's operational area is located by upstream Pawan River, which is 53 km to the east.

Several species under IUCN Red List are indicated to be present in the Assessment area and its surroundings, i.e., species with 1) critically endangered (CR) status including Sunda pangolin (*Manis javanica*), Bornean orangutan (*Pongo pygmaeus ssp. wurmbii*), helmeted hornbill (*Rhinoplax vigil*), and straw-headed bulbul (*Pycnonotus zeylanicus*); 2) endangered (EN) status including Bornean white-bearded gibbon (*Hylobates albibarbis*), proboscis monkey (*Nasalis larvatus*), flat-headed cat (*Prionailurus planiceps*), otter civet (*Cynogale bennettii*), Bornean peacock-pheasant (*Polyplectron schleiermacheri*), and wrinkled hornbill (*Rhabdotorrhinus corrugatus*); and 3) vulnerable (VU) status including sun bear (*Helarctos malayanus*), binturong (*Arctictis binturong*), Philippine slow loris (*Nycticebus menagensis*), southern pig-tailed macaque (*Macaca nemestrina*), Sunda clouded leopard (*Neofelis diardi*), white-fronted surili (*Prebytis frontata*), whiskered flying squirrel (*Petinomys genibarbis*), tufted ground squirrel (*Rheithrosciurus macrotis*),

Bornean bearded pig (*Sus barbatus*), Bornean wren-babbler (*Ptilocichla leucogrammica*), hook-billed bulbul (*Setornis criniger*), false gharial (*Tomistoma schlegellii*), and Amboina box turtle (*Cuora amboinensis*).

Meanwhile, those from RTE plant species include 1) Critically Endangered (CR) species: agarwood (*Aquilaria malaccensis*) and merawan (*Hopea nervosa*); 2) Endangered (EN) species: several species from Dipterocarpaceae family (*Shorea bracteolate, S. gratissima*, *S. longisperma*, *Dipterocarpus grandifolius*) and titan arum (*Amorphophallus titanum*); and 3) Vulnerable (VU) species: several species from Dipterocarpaceae family (*Anisoptera laevis, D. gracilis, S. bracteolata*), ironwood (*Eusideroxylon zwageri*), ramin (*Gonystylus macrophyllus*), and agarwood (*A. beccariana* and *A. cumingiana*).

Land Covers of HCS in the Assessment Area

There are 10 land cover classes in PT KML operational area, including medium-density secondary lowland forest, low-density secondary lowland forest, thicket, palm oil plantation, rubber plantation, bush, rice field, dryland farm, road and settlement, and water body. There are two land cover classes based on HCS Toolkit Version 2 (HCS Approach Steering Committee, 2017), that belong to HCS category, i.e., medium-density secondary lowland forest and low-density secondary lowland forest. Considering the area of forest cover, the AOI is categorized as an area with low forest cover based on the HCS Toolkit Version 2, because it has an area less than 30% forest cover of the total AOI.

Social, Economic, and Cultural Characteristic

RBI map (BIG, 2017) indicates 6 villages within the AoI. However, based on scoping study, legal document, and tenurial assessment, only 3 villages interact with the MU, i.e., Kampar Sebomban, Semandang Kanan, and Paoh Concong. See **Table 17** for the population, main ethnic groups, and majority religions in the three villages.

Dayak Simpang in the AoI has traditions similar to other Dayak sub-ethnic groups in terms of rice farming and life cycle. Traditional ceremonies are performed for each farming phase, starting from land clearing to harvesting. At district level, Dayak peoples hold *Gawai* (harvest ceremony) alternately in villages they dominate. They also perform traditional wedding ceremonies that include the making of *sensayo* (a traditional ornament) as an important element in the ceremony. It is made of various plants to symbolise a long-lasting and happy marriage blessed with offspring.

Table 17. Demographic condition of Villages in the Assessment Area

Subdistrict	Village	Area (ha)	Population	Household	Main Ethnic Group	Majority Religion
Simpang Dua	Semandang Kanan	24,106	3,676	915	Dayak Simpang	Protestant
Simpang Dua	Kampar Sebomban	33,539	1,593	880	Dayak Simpang	Protestant
Simpang Hulu	Paoh Concong	25,910	1,579	368	Dayak Simpang	Protestant

Source: Kabupaten Ketapang dalam Angka 2020, Kecamatan Simpang Hulu dalam Angka 2019, Kecamatan Simpang Dua dalam Angka 2019, and field observation (2020)

The Central Government designed the AoI economy to be sustained by mining, palm oil plantation, and forestry sectors. On the small scale, the agricultural sector is dominated by rice farming, secondary crop farming, agroforestry, palm oil plantation, and community rubber plantation. Rice farming is mostly done through slash-and-burn method and the rice is harvested once a year. While rice fields have been developed by the Government, they are still limited. Many communities develop *padi paya* (i.e., rice planted on wetland) independently.

Rice yield is commonly used to meet community's subsistent needs. Village communities along riparian areas frequently use rivers as sanitation facility and fishing ground. Community rubber plantations are their important source of livelihood to earn cash, although plantations that are too old or already unproductive will be sold or cut down for conversion into rice farm.

The presence of palm oil companies and their workers has increasingly developed at subdistrict and village levels in Ketapang since 2006. This slowly forced community to have urban characteristics. Trade and service sector started to develop rapidly, particularly

in the capital of Simpang Hulu Subdistrict. Balai Berkuak has shopping centres, markets, restaurants, banks, and lodging houses similar to those in a small town.

Both subdistricts have community economic organisations with significant impacts on village community livelihoods, i.e., Credit Union (**"CU"**), a saving-and-loan cooperative that provides trainings for its members. Semandang Jaya CU, one of the largest CUs in West Kalimantan, was established in Simpang Hulu Subdistrict. Meanwhile, Pancur Dengari CU is headquartered in Simpang Dua Subdistrict.

Although already connected to asphalt roads, Simpang Dua Subdistrict is relatively underdeveloped compared to Simpang Hulu because it is not accessible by the main road to Pontianak. However, it has adequate health facilities, such as public health centre (*Puskesmas*), pharmacy store, and health clinic. Nearly all villages in the AoI are already connected to asphalt roads. Small subvillages are connected to company roads. Cellular telecommunication network connected to internet network is available in the capitals of Simpang Hulu and Simpang Dua Subdistricts. Kelipor Subvillage in Paoh Concong Village, which is isolated and situated in the AoI, is already connected with concrete roads.

Spatial Plan and Land use History

Based on Ketapang District Regulation No. 3/2015 on Ketapang District 2015-2035 Spatial Plan it is known that the Company's operational area is in the cultivation zone. Referring to Map of West Kalimantan Forest Functions (SK 733/Menhut-II/2014), it is also understood that this area is designated as a Non-Forestry Zone (APL).

Initially, the AoI was rice farms developed along riparian areas. Since the 15th century, the area that is now the AoI has served as an important area producing Non-Timber Forest Products (NTFP), such as rattan, resin (dammar), latex, and agarwood (which are mostly found in *Aquilaria malaccensis* in Indonesia). These livelihood patterns then changed into sedentary rubber farming (Verheye, 2010; Dove, 1994). To date, Semandang River is still passed through by boats carrying rubber sap *(Hevea brasiliensis)* which was introduced to community in the area in the 1970s.

Regarding the use of these natural and land resources, local community manages cultivation areas that are divided into *Kampung Tembawang, Bawas Belukar, Damar Pangkong,* and *Sempuan Pelalau*. *Kampung Tembawang* is developed from *dukuh* (old village) that turned into settlement and is planted with fruit trees before developing gradually into currently known as *tembawang*. *Bawas Belukar* is an ex-rice field covered with trees. *Dammar Pangkong* is an area planted with dammar-producing from Dipterocarpaceae and *bengkirai* (*Shorea laevis*) species. *Sempuan Pelalau* is an area with trees used by honeybees to nest. These areas, according to Lukas Moses, can be cleared if permitted by the village or the owners.

The first logging companies in the AoI in the 1980s were PT Duaja (PT Hutan Raya subsidiary) and PT Rimba Ramin. Following the significant declination in large timber potentials, village community carried out their own logging on logged-over areas. Forest concessions were granted based on 2018 Map of Business Permit for Timber Forest Product Utilisation in Industrial Plantation Forest (IUPHHK-HTI). Meanwhile, palm oil as an internationally traded commodity currently affects economic characteristics and landuse in the AoI.

Development in the AoI is expected to lead to the expansion of palm oil plantation and mining areas. Industrial Plantation Forest (HTI) sector will replace community rubber plantations that dominate landuse in the AoI. Given the decreasing trend of rubber sap price, rubber plantation areas are expected to decrease, and most of them may be replaced with palm oil plantation or mining concessions that are believed to be more attractive. The Government will develop food crop sector, particularly rice field to replace slash-and-burn method in rice farming that will lack for space.

Image Analysis and Land Cover Classification

This Assessment uses Sentinel-2 satellite images with 10 m spatial resolution and < 5% (in the AoI) and < 2% (in the MU) cloud cover, acquired on 19 September 2019 (**Map 6**). Image pre-processing includes spectral enhancement and radiometric-atmospheric calibration using Sen2Cor tool on SNAP (Sentinel Application Platform) software.
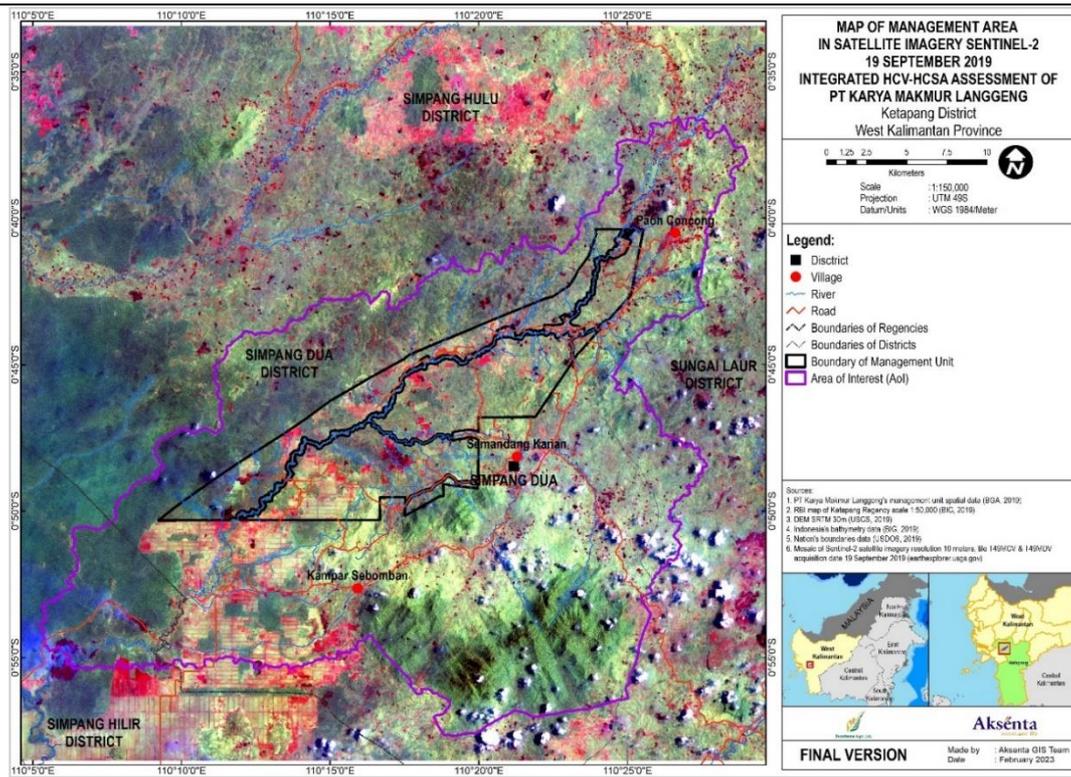
Map 6. Sentinel 2 satellite image on the Assessment Area and its surroundings in September 2019

Land cover is classified combining Object-Based Image Analysis (OBIA) and visual interpretation method with manual digitising on mosaic Sentinel-2 image. Combined altogether, both result in polygon shape with object lines referring to pixels and smooth lines from the manual digitising. Segmentation process and spatial operation are conducted using ArcGIS 10.4 software, while OBIA segmentation process use eCognition Developer 64 software.

Land cover classes are named based on SNI 7645-1:2014 on land cover classification - Section 1: Small and Medium Scales (**Table 19**). Initial land cover classes are obtained from pre-assessment phase which results in corrected initial land cover at scoping study phase. At the assessment phase, forest inventory plots are included as corrective factors to produce final land cover and HCS cover.

Initial land covers are interpreted using 160 training samples in the form of imaginary points which are control points representing each land cover class, referring to colour hues and textures of hi-res satellite images (acquired in June 2019). Land covers are verified through 423 groundtruthing locations that are determined based on purposive sampling method taking into account land cover classes that presumably have different colour hues. Accuracy assessment in this assessment includes overall accuracy and kappa accuracy (Cohen, 1960).

Field verification indicates differences in interpretation and field condition, e.g., areas previously interpreted as medium-density secondary lowland forests are turns out to be low-density secondary lowland forests or thickets. This is because these land cover classes are inundated, resulting in colour hues that resemble forest-vegetated area. One of the satellite image canals uses Short-Wave Infrared (SWIR) that is sensitive to water content (Hoffer, 1978). In addition, areas previously interpreted as natural vegetation are turns out to be rubber plantations because of their similar colour hues. This is because of the Sentinel-2 image's limited ability to divide objects based on the colour hues.

Initial land cover re-classification results in overall accuracy and kappa accuracy of respectively 79.9% and 74.2%. These values already meet the HCSA Toolkit's requirements (> 70%). In addition, the kappa accuracy value belongs to 'almost perfect opportunity' category (Cohen, 1968). Corrected land covers are then verified through accuracy assessment on the corrected land covers and 423 groundtruthing points, 185 forest inventory points, and 51 additional verification points during full assessment. The overall accuracy of 91.7% and kappa accuracy of 89.1% for the final land covers already meet HCSA Toolkit requirements (> 80%). See **Table 18** and **Map 7** for the final land covers.

Table 18. Land Cover Classes and Areas

Land Cover Class *	HCS Cover Class **	Area (ha)	%
Medium-density secondary lowland forest	Low-Density Forest (LDF)	636.5	3.8
Low-density secondary lowland forest	Young Regeneration Forest (YRF)	1,377.3	8.2
Thicket	Shrub (S)	1,988.1	11.9
Palm oil plantation	Agriculture Estate (AGRI)	3,952.9	23.7
Rubber plantation	Smallholder Agriculture and Use (SH)	8,275.8	49.5
Bush	Open Land (OL)	85.1	0.5
Rice field	Others	24.6	0.1
Dryland farm		306.3	1.8
Road and settlement		61.4	0.4
Water body		1.0	0.0
Total		**16,709.0**	**100.0**

Notes: * SNI 7645-1:2014 Land cover classification – Section 1: Small and medium classes

** HCS Approach Toolkit Version 2 (HCSA Steering Group, 2017)
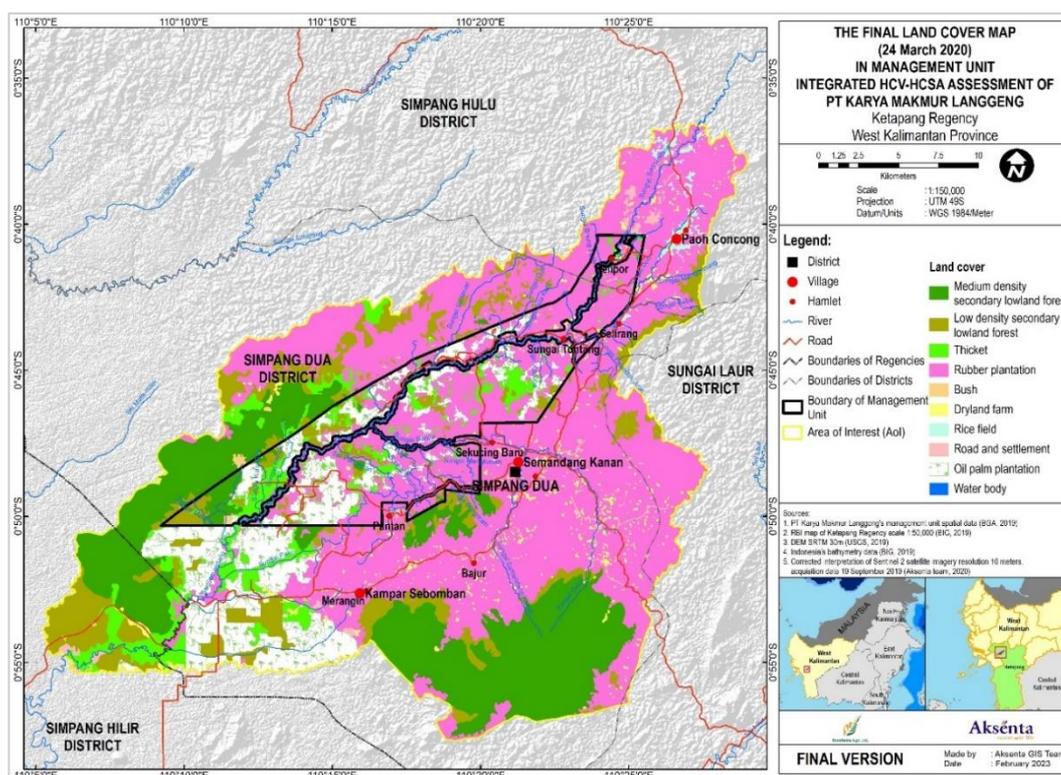
Map 7. Final land covers in the Assessment Area

Table 19. Land Cover Classification Referring to Indonesia National Standard (SNI)
and its Equals under HCS Land Cover Classification

No	Land Cover Class	SNI Definition*	HCS Land Cover Class	HCS Definition**
1	Medium-density secondary lowland forest	Forest that grows and develops in dryland habitat in the form of lowland forest, and has been exposed to human intervention, with density of 41%-70%.	Low-Density Forest (LDF)	Natural forest with closed to open canopy, ranging from low to medium density. Inventory data indicates the presence of trees with > 30 cm diameter dominated by climax species. LDF has carbon value range of 75-90 Ctonnes/ha, while MDF has 90-150 Ctonnes/ha
2	Low-density secondary lowland forest	Forest that grows and develops in dryland habitat taking the form of lowland forest, and has been exposed to human intervention, with density of 10%-40%.	Young Regeneration Forest (YRF)	Severely disturbed forest or otherwise forest area that are in the regeneration process towards their original structure. The diameter distribution is dominated by trees with Diameter at Breast Height (**"DBH"**) of 10-30 cm and with pioneer species frequency higher than that of LDF. In this land cover class, it is likely to find small areas in the form of agricultural areas or plasma plantations. It has carbon value range of 35-75 Ctonnes/ha.
3	Thicket	Vegetation formation or structure in the form of groups of shrubs with height ranging from 50 cm to 2 m, dominated by woody vegetation alternated with very short trees (≤ 5 m tall). Or: Dryland on which various heterogeneous and homogeneous natural vegetation grows with low-to high-density. Such area is dominated by (natural) short vegetation.	Shrub (S)	Land that was once a forest that has been cleared not so long ago. Dominated by short shrubs with limited canopy cover. It includes areas with grasses as well as distributed ferns and pioneer tree species. Several old forest patches are also likely to find under this land category. It has carbon value range of 15-35 Ctonnes/ha.
4	Palm oil plantation	Land planted with oil palms, taking the form of a vast expanse, with regular planting pattern, and is industry-oriented.	Agriculture Estate (AGRI)	For example, large-scale palm oil plantations overlapping with development areas.
5	Rubber plantation	Land planted with rubber trees, in the form of a vast and homogeneous expanse, with regular planting pattern, and is managed by individuals and companies.	Smallholder Agriculture and Use (SH)	This area can be differentiated further as a system of plantation forest/mixed agroforestry having a potential role as wildlife corridor, shifting agricultural system for subsistent food production, etc. Abandoned plantation whose > 50% of the base area contains planted trees.
6	Bush	Land cover in the form of natural plants with average height of 0.5-2 m, some of which are woody while some are not.	Open Land (OL)	Recently cleared land dominated by grass or plants and contains few woody plants.
7	Rice field	Wetlands in the form of rice fields that is continuously planted with paddy rice twice or thrice a year, depending on paddy rice varieties, without rotation with other crops.	Others	Water bodies, such as rivers and lakes. Development area, settlement area, roads, etc.
8	Dryland farm	Drylands (not rice fields) planted with seasonal secondary crops		
9	Road and settlement	**Road network**: Developed area that includes one or more lanes and lands on both sides that are part of non-railway transportation. These lanes may take the form of concrete, asphalt, or hardened and consolidated soil. For areas that are less than 1 mm wide on an image, they need to be represented with straight lines, and if they are too small to be seen in an image, data can be obtained from basemaps, such as Indonesia Topographic Map (RBI) or other topographic maps. **Urban settlement**: Manmade land cover in the form of buildings mainly used for urban population residence. Urban settlement buildings are characterised by high building density and made of permanent/long-lasting materials, such as brick walls, roof tile/concrete roof/zinc roof. **Rural settlement**: Manmade land cover in the form of premises for rural population residence. Rural settlement is characterised by relatively low-density buildings, can be constructed out of permanent/long-lasting materials, such as concrete wall, roof tile/concrete roof/zinc roof, but also non-permanent materials, such as wooden wall, and thatched roof, and is associated with use of agricultural lands, such as rice field, dryland farm, or mixed garden and house yard.		
10	Water body	Any naturally occurring body of water (including natural lake/pond, river/stream, marine waters, and swamp).		

4.5.2. Social Section: Method and Output

Social Assessment Method

This is a rapid assessment focusing on collection of data and information on HCV attributes or elements. FPIC principles are used to identify HCV 5 and 6 areas together with local community. The presence (or absence) of HCV elements or attributes is identified combining the following several methods.

1. Participatory mapping

    This activity is conducted towards all HCV types (biodiversity, environmental services, and socio-cultural HCVs). This involves stakeholders in the Assessment area and its surroundings, including the Company that has information on locations within the Assessments area and its surroundings, which include:

    a) the presence of forests and natural ecosystems, as well as wildlife species;

    b) the presence of water catchments, hills, swamps, and water bodies (river, lake, spring); and

    c) the presence of areas whose locations or natural resources are traditionally used by local communities, both for meeting basic needs or as part of cultural identity and tradition.

2. Groundtruthing and field data collection

    For HCV 4, any Assessment objects found must have the following: (i) toponyms; (ii) location description; (iii) current status (e.g., type and intensity of use); (iv) threats and potential threats; (v) coordinates; and (vi) documentation in the form of field photographs. In addition, groundtruthing is also conducted to check the connectivity between the identified HCVA and other areas around the Assessment area, such as the connectivity of forest areas or natural ecosystems, water catchments, and river network. For HCV 5 and 6, groundtruthing is conducted engaging community or their representatives after interview or participatory mapping indicates the presence of HCV.

3. In-depth interview

    Information on the presence of HCV elements is also collected through a purposive interview (**Table 20**) and snowball sampling with the following informant criteria: (i) community traditionally using natural resources in the Assessment area; (ii) local community that has (cultural) interaction with lands or natural resources; and (iii) local community knowing historic use of natural resources and lands in the Assessment area.

    Information on the presence of HCV attributes or elements covers current and historical occurrences. The collected information is always verified or validated through a triangulation process, which is the process of checking the truth and accuracy of information from an informant by asking similar questions to others. The verification or validation process is carried out by comparing data and information from the informants to those from trusted references.

4. Stakeholder consultation

    Consultation is carried out through formal and non-formal meetings. The latter are held throughout all Assessment phases, starting from scoping study, field survey, to report preparation. Consultation is conducted through in-depth interview and dialogue/discussion. Public consultation in the form of formal meetings is carried out by presenting key stakeholders, i.e, local communities (community, traditional , and religious leaders, as well as community representatives), government bodies (village government, Village Consultative Board/BPD, and subdistrict government), relevant agencies at the district level (Natural Resources Conservation Agency/BKSDA, Environment and Plantation Office, Local Environmental Agency/BLHD), and NGOs or companies working or operating around the Assessment area. Public consultation employs presentation and discussion approach with the following main objectives: (i) deliver field findings of the HCV Assessment; (ii) obtain additional data and information, and clarification towards the Assessment output; and (iii) collect inputs for report preparation and recommendation for HCV management.

In all Assessment phases, informants are selected through purposive sampling method. They are selected considering key stakeholders or social groups and those representing administrative areas within the AoI. In this case, they represent social groups within the assessed village/subdistrict. Subsequently, snowball sampling is conducted towards the select respondents (Hendricks

et al., 1992), using triangulation method to reduce bias (Olsen, 2004). Limiting factors in snowball sampling method, which do not represent the entire population, are compensated with purposive sampling and triangulation. Therefore, the Assessment is not a census and number of respondents is not quantitatively predetermined. Number of respondents grows and represents the AoI from spatial aspect and is accountable to qualitatively represent social groups.

Interviews and discussions are carried out in 48 locations involving stakeholders, while field observation is conducted in 56 locations (**Map 8**). Informants interviewed include nine stakeholder groups, i.e., the Company field management, affected community (fisher), seller, housewife, worker, community/youth leader, traditional/ethnic leader, village/subdistrict government, and NGO.
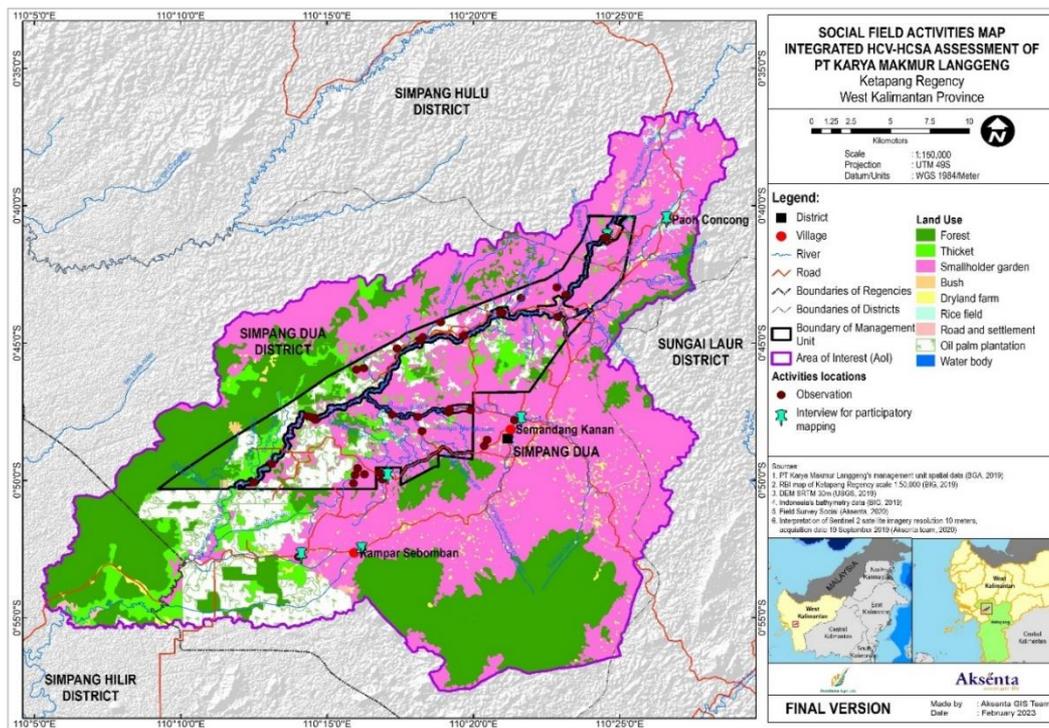
Map 8. Map of Social Field Activity

Table 20. Summary of Interview and Discussion in the Assessment Phase

Expert/ Organisation/ Social Group	Name/ Role	Interaction Type	Concern and/or Recommendation
Paoh Concong Village Government	- Markus Bolon/Village Head - Albinus Biris/Kelipor Subvillage Head - F. Kaiim/ Community Leader - Selito/Head of Neighbourhood Unit (RT) 01	Participatory mapping and interview	▪ The majority of local community is Dayak people who are Catholics. ▪ Community livelihoods include farming (rubber, rice, secondary crops), trade, and fishing in the river in and outside the village. ▪ Only a small area is included by PT KML's operational area, and not many local landowners are interested to hand over their lands to the Company. ▪ Customary belief, in the form of respect for sacred sites, remains strong. Several sites are considered sacred, including *tembawangs* that have sacred statues locally known as *ponti*. ▪ Rumour has it that mining company will operate in Paoh Concong Village.
Kampar Sebomban Village Government	- Kristianus Iskimo/Village Head - Yohanes Pujin/Tunas Kampar Subvillage Head - Paulus Medan/ community member - Laningsius/Pantan Subvillage Head - P Aceng/ Head of RT 01	Participatory mapping and interview	▪ Village community members, village boundaries, customary practices, community education ▪ Community livelihoods include palm oil and secondary crop farming, trade, and fishing. ▪ Scarcity of animals to hunt ▪ Opinions towards PT KML ▪ Expectation on the Company's plantation development plan

	- Tito Ignasius/ Mentawa Biring Subvillage Head		
Semandang Kanan Village Government	- Amonius/Village Head - Sepasius Joni/Sungai Tontang Subvillage Head - Benyamin/Sek Baru Subvillage Head - Simon Petrus/Head of BPD	Participatory mapping and interview	▪ Village community members, village boundaries, customary practices, community education ▪ Community livelihoods include palm oil and secondary crop farming, trade, and fishing. ▪ Scarcity of animals to hunt ▪ Opinions towards PT KML ▪ Expectation on the Company's plantation development plan
Housewives/ Farmers/Farm Workers	- Yulin - Lusiana Veronik - Yuliana Aki - Teresia Setia Budi - Yuli Talumerang	Interview	▪ Family prosperity level ▪ Women play roles as housewife/farmer/farm worker/village agency ▪ Involvement in decision making process in family, including in land hand over to the Company. ▪ Women in relation to traditional, cultural, and religious restrictions
Fisher	- Mama Hendi - Pia - Lajur	Interview	▪ People fish irregularly, only in their spare time. ▪ Most fish found include *baung*, catfish, and snakehead. ▪ People fish in small ponds or canals around palm oil plantations, while some others prefer to fish in rivers around the villages, which include Penyawan, Semandang, Bengoram, and other rivers. ▪ Fish that they catch is usually for family consumption. However, it can be sold if other people would like to have it, which is the case when they have lots of catches. If they only have few, it would be better only for family consumption. ▪ There are many methods to fish, i.e., using trawls, rods, traps, nets, or *tajur* (fishing poles nailed and tied onto a tree). ▪ Before the expansion of palm oil plantations, it was very easy to fish and they could catch many species of fish. ▪ In general, community members have no interest in aquaculture as fish are still relatively easy to find in the rivers and canals. Although there are not so many fish, people find it sufficient to feed their family.
Sustainable Trade Initiative (IDH)	- Lorens	Consultation (via phone call)	▪ Different from Kampar Sebomban and Semandang Kanan Villages, Paoh Concong has a completely limited access to roads. ▪ The communities in these villages have learnt from their bitter past experiences, or at least heard of tragic stories on false promises of palm oil companies, told by communities in other areas. ▪ Particularly for Paoh Concong Village, the community prefers to work for the Company while waiting to harvest their plasma palm oil plantations rather than handing over their lands. ▪ FPIC principles in BGA should be implemented to the lowest level. Company elites should ensure that all FPIC procedures under BGA policies are appropriately met to the lowest level of the Company. ▪ In the area, young people have almost forgotten the concept of 'Forest is the Answer to Everything'. Their perception on forest sustainability has changed. It is significantly different from their parents/previous generations who are still upholding the ethics when using the nature. ▪ Several sacred sites and objects can still be found, particularly in Paoh Concong. Similarly, concerning the presence of old burial grounds, it is understood that some of them are preserved, although some others are willing to relocate their families' tombs on specific conditions. The Company should be very careful when clearing lands to avoid unintentional reconstruction/demolition. As such, the presence of objects sacred/protected by community should be identified.
Traditional/Ethnic Leader	- Yulius Atu/ Paoh Concong Traditional Chief - Kwetiti/ Pantan Traditional Chief	Interview and participatory mapping	▪ History and description on Dayak Simpang and Kayong ▪ Pointed out HCV 6 area locations on the map and assisted the team during groundtruthing.

FPIC status

Minute of Company information dissemination event to community regarding plantation development plans is a documentation that the Company has established communication with local community since 5 March 2012. Freedom to make decision (without time limit) was provided to landowners in the community as to whether or not to hand over their lands to the Company and expressed in the information dissemination document: "*in the event that the community declination is on an individual basis, palm oil plantation development shall be directed to those who are willing to do so. If declination, however, is made collectively, the development shall be directed to other subvillages/villages willing to accept the operation of palm oil plantation*". The 'Free' element in FPIC is already met by the Company since the information dissemination event.

According to Bernadinus (a youth leader/palm oil smallholder in Semandang Kanan Village), complete information on palm oil development has been explained by the Company at the time of the event. In addition, the community has the freedom afterwards to secure additional information through discussions between community members, NGOs, or consultation with specific stakeholders who understand about or have experiences on positive and negative impacts from palm oil plantation company presence on the surrounding community. As such, the community is well informed on potential impacts of such development programme by the Company.

Well-established communication between the Company and local community also helps the Company and the Assessment team obtain consent from all village leaders in conducting HCV-HCS Assessment in their respective areas. The communication at the time the consent was sought was mutual, ensuring that the village leaders fully understand the purpose and objective of the integrated HCV-HCS Assessment carried out by the Assessment team, until they finally approved and requested the Assessment to be carried out immediately.

The FPIC status during the Assessment already meets expectation, so that the community in all villages warmly welcomes the presence of the Company and Assessment team. Village community members participate during the Assessment by assisting the Assessment team in mapping landuses in the AoI and land tenures and landuses in the Assessment area, as well as collecting other information. Furthermore, all respondents request that the HCV-HCS Assessment be immediately conducted to make it clear as to which areas contain HCV-HCS. For community, such confirmation is very important as it affects the development of plasma plantation, in terms of the locations, areas, and potential income that they can earn. In general, those who handed over their lands to the Company have similar reasons as described below.

1. They are in needs for money for important and urgent needs, such as to pay for school/university tuition, wedding expenses, and others.

2. The lands are unproductive because of its distance, limited access, and always getting flooded when it rains.

3. They expect to get the better road access by handing over their lands to the Company that would convert them into plantations. This will in turn allow them to easily distribute their yields from the lands that remain in their possession.

4. They will earn passive income from plasma plantation developed by the Company.

Based on document review and interview prior to the full Assessment, the FPIC principles in this Assessment are confirmed to have been well-conducted.

HCV 4: Ecosystem services in Critical Situations

Each HCV 4 area has ecosystem service functions and values that play an important role in critical situations referring to the situations qualified as HCV 4 (**Table 21**). These situations are found in the Assessment area. In addition to Common Guidance, the Assessment in this area also refers to MEA (2005).

HCV 4 locations in the Assessment area are found in all rivers and their riparian areas, hills, peat swamp forests, and lowland forests. The existing and potential HCV 4 areas in the AoI is 21,366.6 ha in total, including 1,738.8 ha within the Company's IUP concession that includes existing and potential HCV 4 areas (respectively 1,588.9 ha and 149.9 ha). Some of them are connected to other HCV 4 areas outside the MU (**Map 9**).

In this Assessment, the width of a riparian area is set using *RSPO Manual on Best Management Practices (BMPs) for the Management and Rehabilitation of Riparian Reserves* (Barclay *et al.*, 2017) and *Simplified Guide Management and Rehabilitation of Riparian Reserve* (Lucey *et al.*, 2018) as the guidelines. Riparian forest cover outside buffer is also included as HCV 4 area. Meanwhile, riparian areas that have already been planted with oil palms may still potentially have HCV 4. For this reason, they are

categorised as potential HCV 4 area. These areas still need to be managed to support the HCV 4 functions and values, or otherwise categorised as HCV Management Area (**"HCVMA"**)

Table 21. Summary of Situations Indicating HCV 4 Presence

Situations that qualify as HCV 4	Assessment area
Maintenance of extreme flow events, including vegetated riparian buffer areas or intact floodplains	**Present**. The presence of rivers with naturally vegetated riparian areas still has key elements and roles in flood event regulation. **Potential:** Riparian areas that have already been converted into palm oil plantations
Maintenance of downstream river regime	**Present:** Hilly areas that are still naturally vegetated in the form of lowland forest, such as Seriung Hill in Patan Subvillage, Tujuhbelas Hill and Juring Hill (outside PT KML operational area) which are the upstream parts of several Semandang tributaries and serve as important water catchments that can maintain the downstream river regime **Potential:** Riparian areas that have already been converted into palm oil plantations
Maintenance of water quality characteristics	**Present.** Riparian areas with forests and natural vegetations can maintain water quality. Almost all riparian areas have natural vegetation. Area designated as PT KML IUP concession has excluded main riparian areas. **Potential:** Riparian areas that have already been converted into palm oil plantation
Fire prevention and protection	**Present**. Semandang River and constantly wet peat swamp forest in the south. **Potential:** Riparian areas that have already been converted into palm oil plantation
Protection of vulnerable soils, aquifers, and fisheries	**Present**. Natural vegetation on Seriung, Tujuhbelas, and Juring Hills protects and maintains the function of groundwater infiltration to recharge water into the ground aquifer.
Provision of clean water, for example where local communities rely on rivers and natural springs for drinking water	**Present**. Clean water sources in Juring Hill water catchments and rivers that flow through community settlements are still used to meet their needs for clean water.
Provision of natural ecosystems play an important role in stabilising steep slopes	**Present.** Lowland forests on Seriung, Tujuhbelas, and Juring Hills, as well as riparian forests or natural vegetation in riparian areas that stabilise slopes/riverbanks from the risk of morphoerosion or landslides.
Protection against winds, and regulation of humidity, rainfall, and other climatic elements	**Present**. Riparian forests function to stabilise river ecosystem microclimate. **Potential:** Riparian areas that have already been converted to palm oil plantation
Pollination service	**Present**. There are mixed dipterocarp lowland forests that serve as habitat to pollinating bees (especially in Seriung Hill).
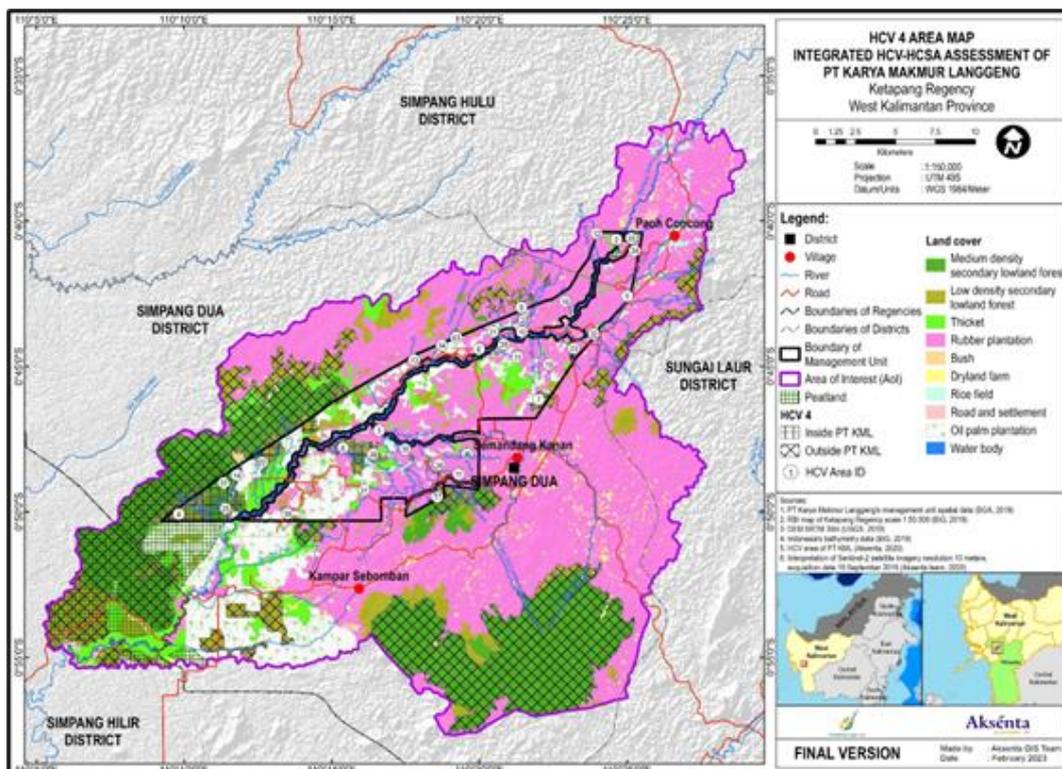
Map 9. HCV 4 within Management Unit and AoI

HCV 5: Basic Needs of Local Communities

Assessment, observation, and consultation with local community (village officials, community leaders, customary leaders, and community members) indicate that most of them do not depend on forest resources to meet their needs. In the past, people used to hunt, especially wild boar and deer, to meet their family needs for protein. However, when the Assessment was conducted, it was revealed that community is no longer interested in hunting as it is difficult to find the animals. To some community members in the Assessment area, fishing in the river is the only activity that uses the nature. Normally the fish that they catch are only for consumption (subsistence), but they will sell the fish if there is more than they need.

Local community easily meets their basic needs by buying from local grocery stores around their village settlements or vegetable peddlers. They regularly sell a variety of staple necessities, mainly meat, fish, and vegetables. Community members usually shop in large quantities (for weekly inventory) at the market or large shops in the subdistrict capital using motorbikes and cars. A few families still grow vegetables and tubers to meet their basic needs.

Some of the rivers and tributaries in the AoI are still used by community for fishing and bathing, washing, and toilet. Most fish species found include *baung* (*Hemibagrus nemurus*), catfish, and mudfish. They are caught using trawls, fishing rods, *bubu*, tabing (fish net), or tajur (fishing rod that is stuck and tied to a tree trunk). The rivers are included in HCV 5 as some of community members still use them for fishing and/or bathing, washing, and toilet. Bathing in the river is an old habit that some of them continue to practice, although their houses already have clean water from wells and hilly springs.

The HCV 5 area and its management area have a total of 47.3 ha inside the IUP concession boundary of PT KML and 996.7 ha for the entire AoI. HCV 5 objects include rivers and their riparian areas, water sources, and rice fields (**Table 22** and **Map 10**). River polygons are obtained from baseline data (RBI map) verified with GPS points from groundtruthing.

Table 22. Summary of HCV 5 Presence in the Assessment Area

HCV 5	Finding
Sites and resources fundamental to meet the basic needs of local communities or indigenous peoples (for livelihoods, health, nutrition, water, etc.), identified through engagement with communities or indigenous peoples.	**Present**: (i) Rivers are used by local community as a fishing ground, and (ii) a spring reservoir managed by the village serves as a source of clean water for community. **Potential**: -
Situations that qualify as HCV 5	**Indication in the Assessment area**
Hunting and trapping grounds (for game meat, skin, and fur)	**Absent**. There are no longer community members who hunt and gather. Hunting is opportunistic and commercial, with no designated hunting grounds.
Presence of non-timber forest products (NTFP), such as nuts, berries, mushrooms, medicinal plants, and rattan	**Absent**. No NTFPs are available. Fruit crops (especially durian) in the forest are not used to meet basic needs, but rather for commercial purposes.
Fuel for household activities such as cooking, lighting, and heating	**Absent**. Energy for lighting is obtained from State Electricity Company (PLN). There is no need for heating. Most of the community members use Liquid Petroleum Gas (LPG) for cooking. A few community members still use firewood as an alternative if LPG is difficult to obtain in the market. Some community members also use firewood for cooking during weddings or other big events, so they do not rely on LPG purchase/use.
Fish (as an essential source of proteins) and other freshwater species relied on by local communities	**Present**. Fish is an alternative source of protein that is still easily obtained in the rivers around the village, in addition to domesticated pork or poultry which are easily purchased.
Building materials (poles, thatching, timber)	**Absent**. Most of the buildings are made of modern building materials such as cement, iron, roof tiles, and zinc. These are easily purchased at material stores in the subdistrict capital.
Fodder for stock and seasonal grazing	**Absent**. There is no seasonal grazing, while fodder for stocks is purchased or comes from the yard or bushes that grow between oil palm crops.

Water sources essential for drinking water and sanitation	**Present**. Clean sources of water for drinking are obtained from wells and springs from the hills that are distributed through pipes to community houses. In addition, some people still use rivers for sanitation/bathing, washing, and toilet.
Items that are exchanged for other essential items, or sold for cash which is then used to purchase essential items, or to pay for school tuition	**Absent**. Fish, rubber, and fruits, especially durian, and palm oil fruits are the main trade commodities to buy essential goods.
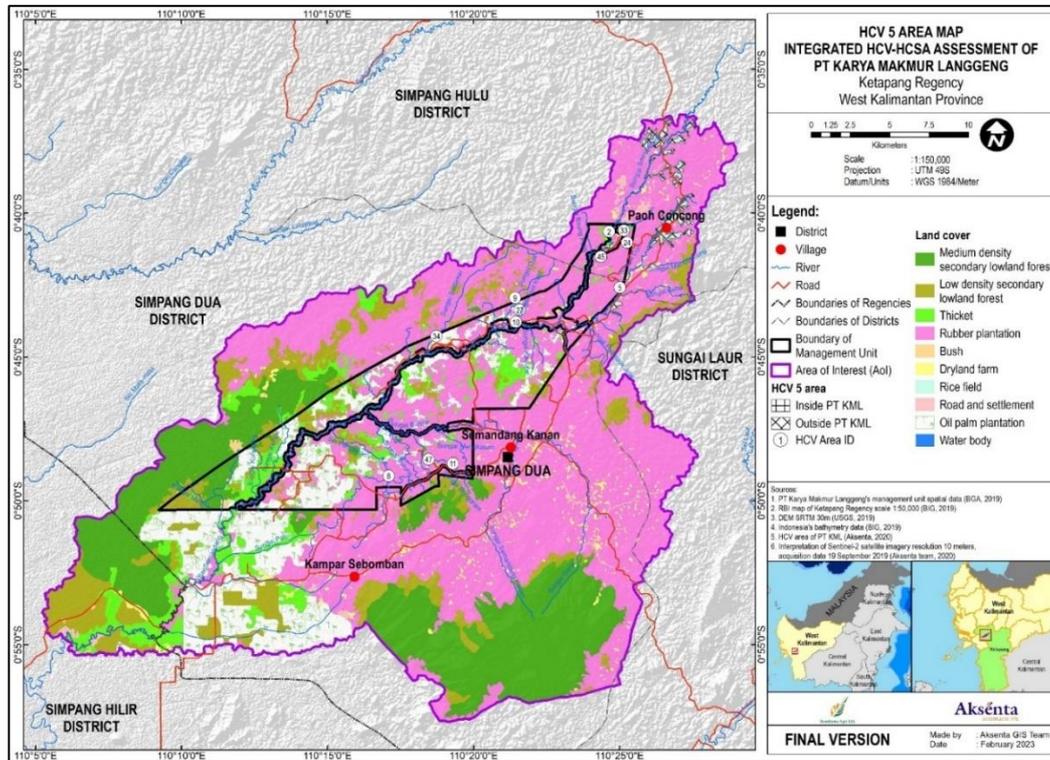
Map 10. Locations of HCV 5 Area within PT KML IUP Operational Area and AoI

HCV 6: Socio-Cultural Values

Two situations qualify as HCV 6 within the Assessment area (Table 23): i) sites that are recognised as containing important historical and cultural values, even if they are not protected under the laws; and ii) religious or sacred sites, burial grounds, or ceremonial sites that are important to local community or indigenous peoples.

At the initial phase, *tembawang* was designated as HCV 6 to meet the precautionary principle. However, at the final consultation phase attended by representatives from all villages in the Assessment area, it is verified that not all *tembawangs* contain HCV 6. However, the Company is required to maintain their presence before their owners hand them over to the Company with mutually agreed compensation value. Kelipor *tembawang* in Paoh Concong Village is the only *tembawang* under customary protection because the area contains *Ponti Kelipor* (*Ponti Patih Jagam Ratu Jagum*), which is highly safeguarded and respected by the community.

HCV 6 areas within the MU include six burial grounds, namely Kamong, Kek Gosot, Sei Tempoyan, Benyamin Family, Saih Family, and Bukit Lundang. Meanwhile, the AoI has 13 burial grounds, 1 *tembawang*, 2 *pontis*, and 4 sacred sites. The estimated sites of HCV 6 area (including its management area) based on field survey in the MU is 1.2 ha, while the total area of HCV 6 located in the AoI (outside PT KML IUP concession) is 4.8 ha. See **Map 11** for HCV 6 area locations.

Table 23. Summary of HCV 6 Presence in the Assessment Area

HCV 6	Finding
Sites, resources, habitats, and landscapes of global or national cultural, archaeological or historical significance and/or of critical cultural, ecological, economic, or religious/sacred importance to the traditional cultures of local communities or indigenous peoples, identified through engagement with local communities or indigenous peoples	**Present**: There are historical, cultural, and sacred sites. The MU has 6 burial grounds, while the AoI has 13 burial grounds, 1 *tembawang*, 2 *pontis,* and 4 sacred sites. **Potential**: - **Absent**: -

Situations that qualify as HCV 6	Indication in the Assessment area
Sites recognised by national policy and legislation as having high cultural value	**Absent**. No sites, cultural reserve or others recognised by national legislation are found in the AoI.
Sites with the official designation by national government and/or international organisations such as UNESCO	**Absent**.
Sites with recognised historical and cultural significance, even if not protected by legislation	**Present**. The MU has burial grounds including Kamong, Kek Gosot, Sei Tempoyan, Benyamin Family, Saih Family, and Bukit Lundang. Meanwhile, the AoI has 13 burial grounds, 1 *tembawang*, 2 *pontis,* and 4 sacred sites.
Religious or sacred sites, burial grounds, or sites at which traditional ceremonies take place that has importance to local community or indigenous peoples	
Plant or animal resources with totemic values or used in traditional ceremonies	**Present**. Hornbill is a wildlife species that is considered to have totemic value for Dayak peoples, so they are often symbolised in various traditional ceremonies.
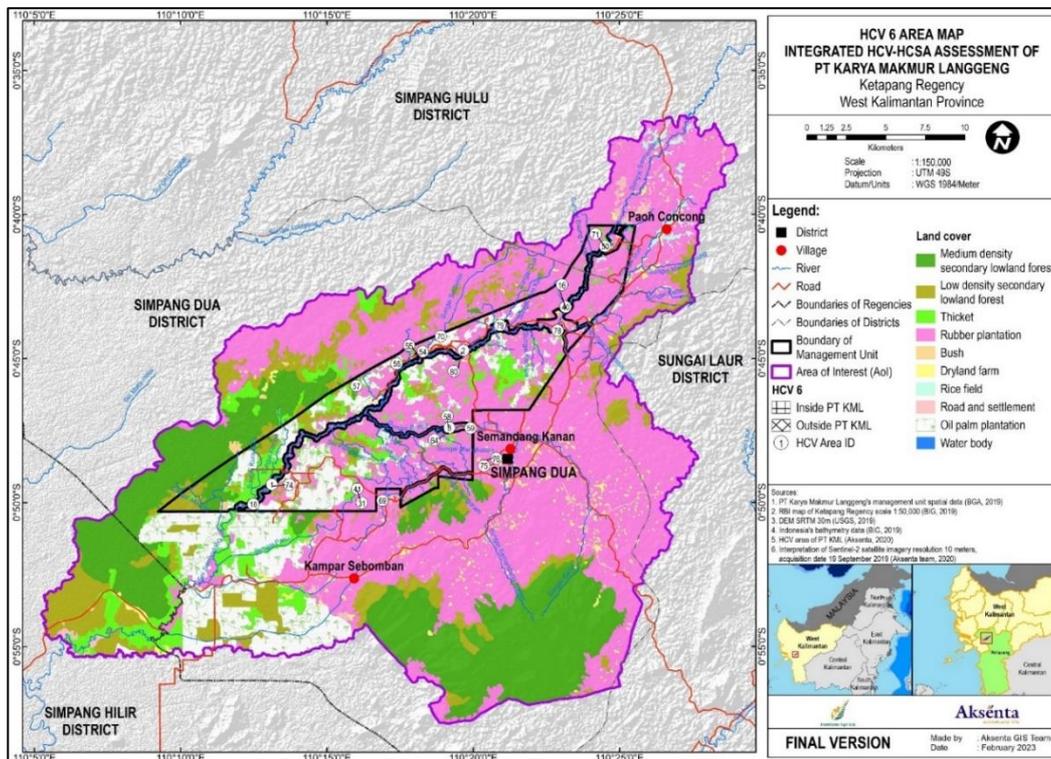
Map 11. HCV 6 Area within PT KML IUP Area and AoI

Community Lands and Future Livelihood

In discussions with the community, including Teresia Setia Budi (farm worker and housewife), Lajur (fisher), Markus Bolon (Paoh Concong Village Head), and Lorens (Green Trade Initiative Foundation staff), information on community's lands and their future livelihoods was revealed. Community land tenure/ownership in the Assessment area will definitely get reduced through hand over of lands to companies conducting development in the area. Apart from financial needs, the reasons for handing over lands are also motivated by other expectations, such as job availability for local community, opportunity for cooperation, and roads for distributing community crops, and when the lands are considered unproductive by the owners.

In general, communities in the Assessment area still have lands to use, especially for plantation (palm oil and rubber) and farming activities, and a few are used as rice fields. Some community members continue to maintain their rubber plantations as their families' future assets, especially since rumours circulate among them that a foreign company uses rubber as its raw materials, potentially forcing the rubber price to increase. Based on field assessment, community-owned rubber and palm oil plantations can be found in all of the assessed villages. Meanwhile, rubber and palm oil plantations serve as a source of future livelihood for community in the AoI.

According to the HCV-HCS Assessment guidelines, size of lands to allocate for food security is (at least) 0.5 ha per person. During the Assessment, the community lands in the AoI that can be used for food security/future livelihood in Semandang Kanan, Kampar Sebomban, and Paoh Concong Villages already meets the minimum requirement. Land covers in the areas allocated for community food security include rubber plantations, dryland farms, and rice fields (**Map 12**).
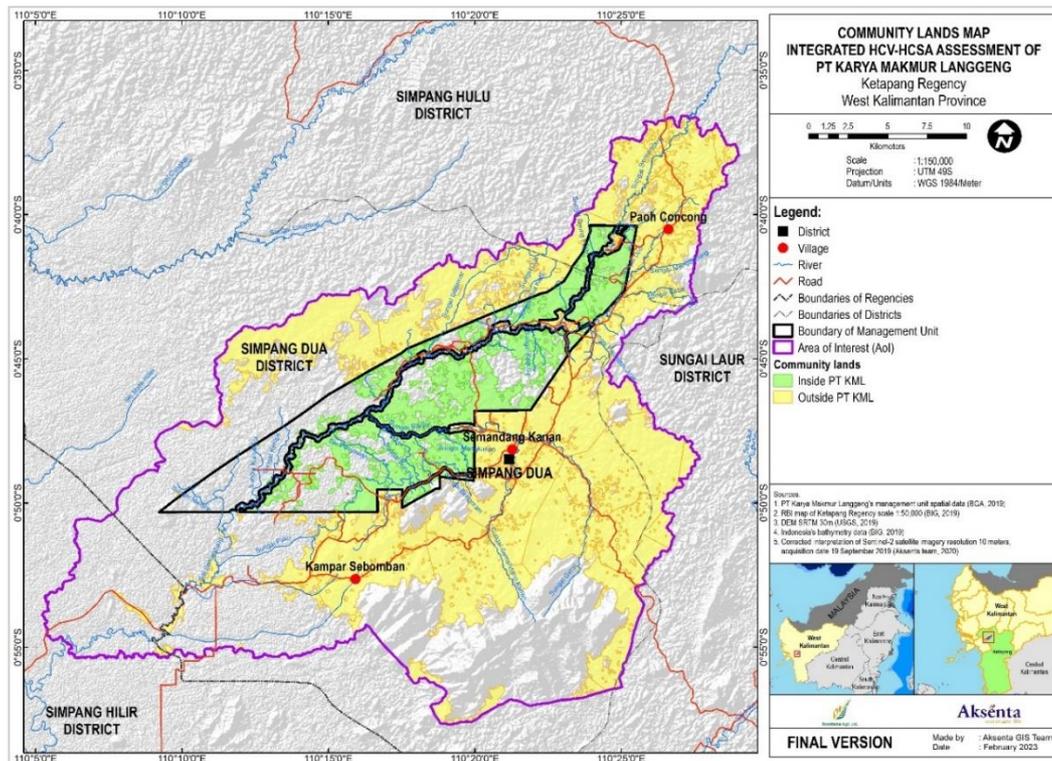
Map 12. Community Lands for Food Security

4.5.3.   Environmental field: method and output

Environmental assessment method

Secondary data is collected from pre-assessment phase and is used until the report is prepared. Method used in the desktop study phase includes desktop review and secondary data analysis through tracing and searching from providers (data management unit). Relevant information is collected through desktop review. Thematic maps of Borneo biodiversity and the latest important species information in global and national contexts are also taken into account when determining HCVA, e.g., IUCN distribution and species

status, Important Bird Area, and Endemic Bird Area (BirdLife International), wetlands (Ramsar Forum), Intact Forest Landscape (IFL), and distribution of conservation areas (MoEF).

Semi-detailed soil survey and peat survey in particular are yet to be conducted during the Assessment. However, soil assessment is already included in the 2013 Environmental Impact Assessment (AMDAL) as one of the requirements for the Company to carry out its operations. The Company has previously conducted an HCV assessment which also includes peat area identification.

Field survey uses the existing land and river routes. The observation area is divided into 15 blocks (**Map 13**) with a total of 372 observation points. The survey points include flora and fauna observation sites, rare and threatened ecosystem areas, land cover verification, river and hill locations, and forest inventory plots.
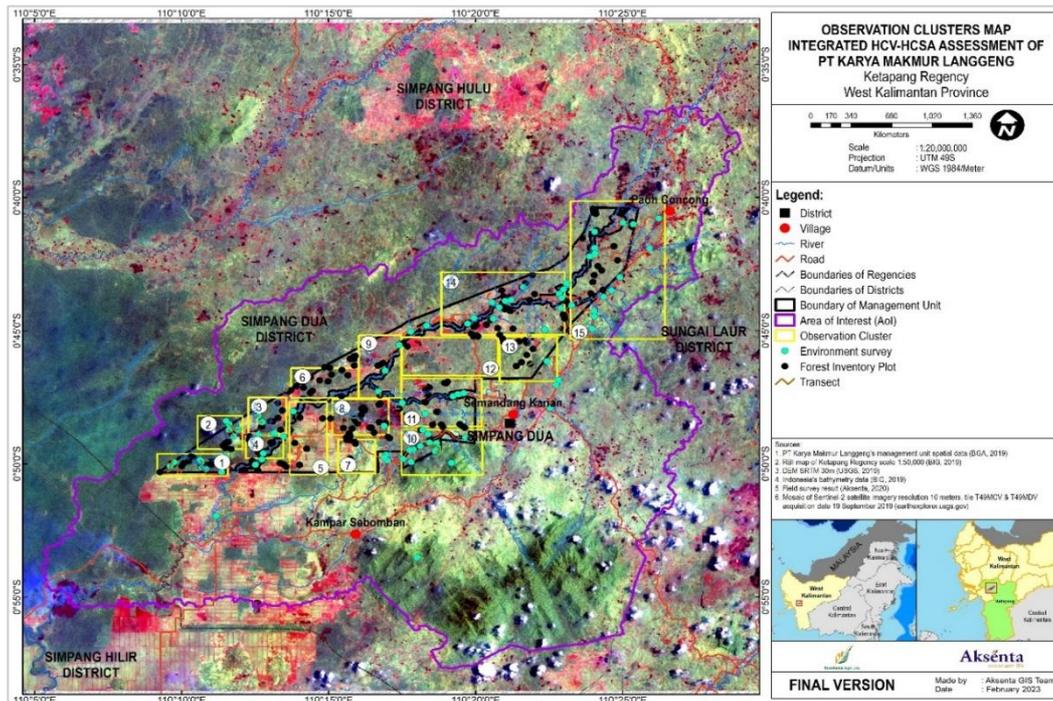
Map 13. Locations of Field Data Collection in Environmental Survey
(HCV 1, HCV 2, HCV 3, including HCV 4, and Forest Inventory)

HCV 1: Wildlife and Plant Species

Survey and field data collection for HCV 1 involves the following data collection methods: (i) exploration, where all wildlife and plant species data is collected along the routes of field survey and groundtruthing; (ii) line transect, where wildlife and plant species data is collected in particular distance (distance between observation plots is 200-400 m); (iii) line transect for inventorying orangutan nests (if there is indication of orangutan presence); (iv) circular-shaped microhabitat sample plot with radius of 12.61 m; and (v) interview with local community on the presence of wildlife species and threats to them in the Assessment area.

Wildlife and plant species observation focuses on identifying the presence of RTE species or restricted range species (**Map 14**). Wildlife species presence is identified based on one or more of the following field data: (i) direct encounter; (ii) voice; (iii) footprints or marks they leave, e.g., scratches on the trunk, faeces, nest, remains of body parts (e.g., outer skin, scale, fur or hair that falls off, skull, horns, fangs, or other body parts) that remain identifiable. Plant species presence is identified through observation during exploration along the route.

HCV 2: Wider Landscape

HCV 2 is identified by combining qualitative field observation and spatial analysis concerning important landscapes, e.g., IFL and conservation areas designated by the Government. Spatial analysis is also carried out to identify the connectivity function of

indicative HCV 2 areas with these important landscapes. Field observation is conducted against several indicators, focusing on (i) the presence of natural ecosystems; (ii) verification of natural ecosystems in the wider landscape context; and (iii) verification of land cover in forest fragments functioning to provide connectivity between potential areas and the wider forest landscapes. If any smaller natural ecosystems are found providing key functions to landscape (e.g., connectivity and buffering), the area in question will be considered HCV 2 area.

HCV 3: Rare Ecosystem

HCV 3 is identified by combining spatial analysis and field observation. Spatial analysis method uses Precautionary Approach in HCV Toolkit for Indonesia (Consortium for Revision of the HCV Toolkit for Indonesia, 2008). This approach is applied through (i) mapping of ecosystem types in the entire AoI based on land system map; (ii) identification of threatened and rare ecosystem types; (iii) overlaying the maps of threatened and/or rare ecosystem types with others on the remaining natural vegetation obtained from field observation and land cover interpretation based on Forest Inventory and HCS team analysis. The final analysis results in naturally vegetated areas in threatened/rare ecosystems containing HCV 3.

Land Cover Verification and Forest Inventory

Land cover is verified through two methods, i.e., visual groundtruthing and field measurement (Congalton & Green, 2009) through biomass estimation (Bakker *et al.,* 2009). Visual observation is carried out by observing land cover in the form of dominant species or canopy stratification (Congalton & Green, 2009), while field measurement is carried out by establishing measurement plots to calculate DBH to estimate the biomass value of each individual tree.

Number of samples for biomass estimation is set using the statistically acceptable experimental design method by considering the Above Ground Biomass (AGB) carbon amount deviation standard variables for each land cover class (*equation 1*). Measurement plots are placed systematically by plotting each vegetation patch in the Assessment area based on the variety level of vegetation stands found in each patch. Land cover class used as the basis to determine the biomass sample is the corrected initial land cover classification. The planned number of biomass sampling points is then tallied, resulting in 182 sample points (**Table 24**).

$$N = \frac{t^2 \times s^2}{E^2} \qquad (equation\ 1)$$

Note:

N = number of samples

t = value of t from Student's t-Test table for confidence interval of 90%

s = standard deviation estimated based on available data set from the similar forest type

E = standard error as the percentage of estimated average value

Table 24. The designed number of biomass measurement plots

Land Cover Class	HCS Classification	t Value	Variance (s^2)	E	N
Medium-density secondary lowland forest	Low-Density Forest (LDF)	1.66	1.3	5	**38**
Low-density secondary lowland forest	Young Regeneration Forest (YRF)	1.66	6.2	18	**56**
Thicket	Shrub (S)	1.66	17.7	46	**88**
				Total	**182**

Carbon samples measured in this Assessment is Above Ground Biomass (AGB). The measurement is carried out in circular-shaped observation plots. The sample plot design includes two concentric circles from central point with total area of 500 m² (0.05 ha). The small sub-plot circle with 5.64 m radius and stands with DBH of 5-14.9 cm are measured in these plots. A large circle plot with radius

of 12.61 m and stands with DBH > 15 cm are measured in these plots. Biomass variables are measured in each sub-plot, i.e., DBH, tree height, and vegetation type. See **Figure 2** for overview of the plot design.
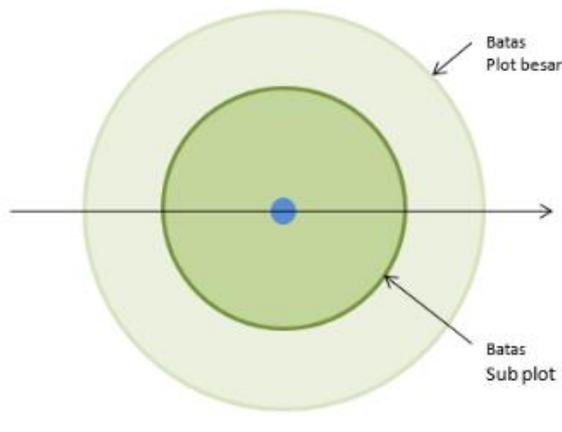
Figure 2. Shape and size of forest inventory plots and subplots

Field visit (**Map 14**) identifies that several naturally vegetated areas where the measurement plots are planned are those dominated by stands of rubber trees, as also evidenced by the vegetation analysis. In addition, it is known through the carbon calculations that certain plots have carbon stocks that do not correspond to their land cover class. As such, the number of plots for each land cover class does not match with the design. The biomass allometric equation is used for carbon stock estimation. Carbon stock values are derived using coefficient of 0.47 from tree biomass values according to HCS Approach Toolkit Version 2 (HCSA Steering Group, 2017).

$$UB \quad = \quad WW \; x \; \frac{0.64}{PS}$$

$$BI \quad = \quad f(allometric, DBH)$$

$$TB \quad = \quad \frac{BI}{PS}$$

$$AGB \quad = \quad TB \; + \; UB$$

$$CS \quad = \quad 0{,}47 \; x \; AGB$$

Note:

UB	= Understory Biomass (tonne/ha)	DBH	= Diameter Breast Height (cm)
WW	= Destructive Sample Wet Weight (tonne)	TB	= Tree Biomass (tonne/ha)
PS	= Plot Size (ha)	AGB	= Above Ground Biomass (tonne/ha)
BI	= Biomass of each individual stand (tonne)	CS	= Carbon Stock (tonne-C/ha)

Statistical tests are then conducted to assess the data quality and distribution from the carbon value estimation. Simple statistical tests are carried out to determine the mean, standard deviation, standard error, and coefficient of variance, while Anova test and Scheffee analysis are carried out to determine the significance of carbon values between land cover classes.

Summary of Interview and Discussion

Table 25. Summary of Interview During Field Data Collection

Expert/Organization/ Social Group	Name	Type of Interaction	Concern and/or Recommendation
Employee (field assistant)	Kaum	Interview	▪ There are naturally vegetated areas (< 5 ha) in the centre of a rubber plantation in the northern part of PT KML operational area. The landowners normally leave these areas to be inherited and managed by their heirs. ▪ Generally, community members only plant rubber crops in hills/*mungguk* areas rather than lowland areas since they are prone to flooding.
Employee (field assistant)	Markus Ruju	Interview	▪ Explains the presence of important species, names of rivers, and species commonly consumed by community. ▪ Never saw any orangutan in PT KML operational area and its surroundings. This species is commonly encountered in the southern part of PT MKS operational area bordering PT CUS and PT JV up to Mt. Palung National Park. ▪ Mt. Seriung is a customary area protected by Pantan Subvillage community. Timber harvest and hunting activities are prohibited in the area.
Paoh Concong Village Head	Markus Bolon (M)	Interview	Orangutans were once seen in PT MKS operational area, while none has been found in PT KML operational area since 2010.
Kampar Sebomban Village Head	Kristianus Iskimo (M)	Interview	Kampar Sebomban Village community often hunts in the forest. Today, their hunted animals, such as deer and wild boar, are difficult to find. The last orangutan individual is spotted in PT MKS.

HCS Forest Classification and Carbon Assessment

a. Strata description

Table 26. HCS Cover Description and Documentation

HCS Land Cover Class	Land Cover Class	Description	Photo
HCS Potential Class			
High-Density Forest (HDF)	-	*Not found.*	-
Medium-Density Forest (MDF)	-	*Not found.*	-
Low-Density Forest (LDF)	Medium-density secondary lowland forest	Forest that grows and develops in dryland in the form of lowland forest, and has been exposed to human intervention. The areas include peat forest, peat swamp forest, freshwater swamp forest, and lowland-mixed dipterocarp forest. These areas are found in the northwestern part of the Assessment area and are connected to the wider forest landscape to the west. The species composition is dominated by climax species of Dipterocarpaceae family and others, including *Shorea parvifolia, Syzygium elliptilimbum, Hopea beccariana, Baccaurea angulata, Palaquium sericeum*, and *Hopea dasyrrachis*.	

Young Regeneration Forest (YRF)	Low-density secondary lowland forest	Severely disturbed forest or otherwise forest area that are in the regeneration process towards their original structure. These areas are found in the transition between low-density forest and other land cover classes, as well as in several hilly areas with steep slopes. The species composition is dominated by climax species and some transitional species, including *Shorea parvifolia*, *Hopea dasyrrachis*, *Palaquium sericeum*, and *Alseodaphne borneensis*.	
Non-HCS class			
Shrub (S)	Thicket	Land that was once a forest that has been cleared not so long ago. These areas are sporadic and scattered within the Assessment area. Generally, they are succession of former community lands that have been abandoned and are now dominated by natural vegetation. The species composition is dominated by pioneer and transitional species, including *Hopea dasyrrachis*, *Gluta wallichii*, *Syzygium elliptilimbum*, and *Alseodaphne borneensis*.	
Agriculture Estate (AGRI)	Palm oil plantation	Palm oil plantation is the most dominant land cover in the Assessment area after rubber plantation. It consists of oil palms planted in 2013 to 2018, including nucleus and plasma crops of PT KML.	
Smallholder agriculture and Use (SH)	Rubber Plantation	Abandoned plantations with >50% of the base area consisting of planted trees, or lands planted with rubber in the form of a large, homogeneous expanse and regular planting pattern, both managed by individuals and companies. These areas are type of land cover dominating the Assessment area and often found in the northern part of the Assessment area and on the riverbanks since people accustomed to plant rubber crops on the riverbanks.	
Open Land (OL)	Bushes	In general, this area is dominated by stands with DBH < 5 cm and understory species, such as *imperata cylindrical* and *Themeda arguens herbaceous* plants, such as *Physalis angulata*, *Momordica balsamina*, *Ageratum conyzoides* and *Desmodium* spp. And low shrubs, such as *Melastoma malabathricum*, *Lantana camara*, and *Glichenia linearis*.	
Others	Rice Field	-	-
	Dryland Farm	-	-
	Road and Settlement	-	-
	Water Body	-	-

Field verification and forest inventory activities result in 20 LDF plots, 38 YRF plots, 52 S plots, 49 SH plots, and 26 OL (BS) plots. The number of plots is different from the initial design because of differences between image interpretation and field verification output. Based on forest inventory analysis, it is known that 14 plots and 35 planned measurement plots in YRF and S cover classes are considered SH cover class or rubber plantation as the percentage of planted trees (rubber/sap) in these plots has reached >50%. As stated in HCSA Toolkit Version 2, abandoned plantations with >50% of the base area consisting of planted trees are not considered HCS class, but plantation instead. As such, these areas should be classified

separately. The outputs of this field verification and forest inventory serve as adjustment factors for the final land cover classification.

b. Area Estimation for Vegetation Stratification

Table 27. Classification of HCS in the Assessment Area

HCS Land Cover Class	Land Cover Class	Area (ha)	% Total Assessment Area
Potential HCS Class			
High-Density Forest (HDF)	-	-	-
Medium-Density Forest (MDF)	-	-	-
Low -Density Forest (LDF)	Medium-density secondary lowland forest	636.5	3.8
Young Regeneration Forest (YRF)	Low-density secondary lowland forest	1,377.3	8.2
Sub-Total		**2,013.8**	**12.0**
Non-HCS Class			
Shrub (S)	Thicket	1,988.1	11.9
Plantation Area (PA)	Palm oil plantation	3,952.9	23.7
Smallholder Agriculture and Use (SH)	Rubber plantation	8,275.8	49.5
Open Land (OL)	Bush	85.1	0.5
Others	Rice field	24.6	0.1
	Dryland Farm	306.3	1.8
	Road and settlement	61.4	0.4
	Water body	1.0	0
Subtotal		**14,695.1**	**88**
Total		**16,709.0**	**100.0**

c. Map of Vegetation Stratification

See Map 14 for map of vegetation stratification and Map 8 for map of final land covers.
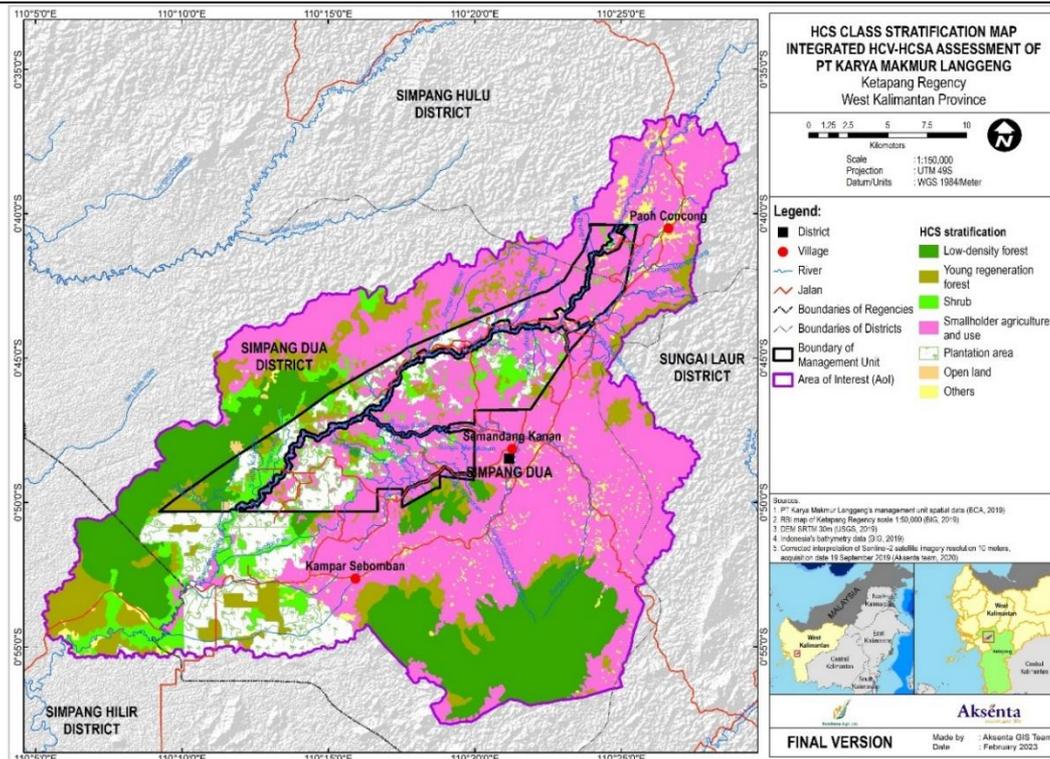
Map 14. Map of vegetation stratification (HCS classes) in the Assessment area

d. Carbon Stock Estimation for Vegetation Stratification

Table 28. Estimated Carbon Stock by Land Cover Class

HCS Land Cover Classification	Area (ha)	Number of Plots	Average Carbon Stock (tonnes-C/ha)	Standard error of the mean	Confidence limits (90%)		Total Carbon Stock (kilo tonnes-C)
					Lower	Upper	
Potential HCS land cover class							
High-Density Forest (HDF)	-	-	-	-	-	-	-
Medium-Density Forest (MDF)	-	-	-	-	-	-	-
Low-Density Forest (LDF)	636.5	20	102.5	3.2	96.9	108	65.2
Young Regeneration Forest (YRF)	1,377.3	38	56.2	2.3	52.3	60	77.4
Land cover class without potential HCS							
Shrub (S)	1,988.1	52	26.5	2	23.2	29.8	103.4
Agriculture Estate (AGRI)	3,952.9	-	-	-	-	-	-
Smallholder Agriculture and Use (SH)	8,275.8	49	48.0	3.3	42.5	53.4	405.5
Open Land (OL)	85.1	26	6.7	4.5	-0.9	14.4	2.2
Others	363.2	-	-	-	-	-	-

e. Carbon Stock Statistical Analysis

Based on Anova test and Scheffe analysis, the F Value is found greater than F-90% CL, P-Value < 0.05, while the Scheffe comparison value is lower than pair wise difference (**Table 29** and **Table 30**). This is an indicator that the three land cover classes are significantly different and proves that the S land cover class is significantly different from the YRF land cover

class. These statements confirm that S land cover class is not classified as potential HCS cover, hence no necessity to include it in the patch analysis.

Table 29. ANOVA test to LDF, YRF and S

Source	SS	df	MS	F	P-value	F 90% CL	Significance
Between Groups	71,763.9	2.0	35,881.9	176.7	0.0	2.4	Significant
Error	18,482.0	91.0	203.1	-	-	-	-
Total	**90,245.9**	**93.0**	**970.4**	-	-	-	-

Table 30. Scheffe analysis to LDF, YRF and S

Variables	N	SS	Avg
LDF	20	11,982.4	102.5
YRF	38	4,602.0	56.2
S	52	1,897.6	26.5
	SSE	18,482.0	
	MSE	203.1	
	p	0.1	
	k-1	3.0	
	N	110.0	
	F	2.4	
Pair Wise Difference (Absolute values)			
Type	**LDF**	**YRF**	**S**
LDF	-	46.3	75.9
YRF	-	-	29.7
S	-	-	-
Scheffe Comparison Values			
Type	**LDF**	**YRF**	**S**
LDF	-	8.6	8.1
YRF	-	-	6.6
S	-	-	-
Significant Differences			
Type	**LDF**	**YRF**	**S**
LDF	-	Significantly Different	Significantly Different
YRF	-	-	Significantly Different
S	-	-	-

HCV 1: Concentration of Biodiversity

During field survey, the team found flora and fauna species listed under IUCN Red List, as well as protected and endemic species, making the area qualified as HCV 1. See **Table 31** for summary of HCV 1 presence.

Table 31. Summary of HCV 1 Presence in the Assessment Area

HCV 1	Finding
Concentration of biological diversity, including endemic species and RTE species, that are significant at global, regional, or national levels.	**Present**: Concentration of RTE and/or endemic species, including proboscis monkey, Müller's gibbon, bear, false gharial, yellow meranti, *keladan*, *mengerawan*, *tengkuyung*, *seraya majau*, *mampan*, *belobal*, light red meranti, *linggis*, *pakit tengkuyung*. **Potential**: -
Situations that qualify as HCV 1	**Indication in the Assessment area**
A high overall species richness, diversity, or uniqueness	**Present.** Forests in the southwestern part of PT KML operational area, forest patches in the north of Simpang Dua Village, and Seriung Hill are still in a good condition, and contain richness, diversity, or uniqueness of RTE and/or endemic flora and fauna species.
Populations of multiple endemic or RTE species	**Present**. *See* **Table 32.**
Important populations or a great abundance of individual endemic or RTE species	**Present**. Müller's gibbon and rhinoceros hornbill are found in forests in the southwestern part of PT KML operational area connected to a Production Forest landscape to the west of the operational area.
Small populations of individual endemic or RTE species, in cases where the national, regional or global survival of that species is critically dependent on the area in question	**Present**. Proboscis monkey, wrinkled hornbill, Müller's gibbon, and dipterocarp species are found in small populations. These species rely on forest areas in the southwestern part of the Company's operational area and use these areas as corridor connecting forest in the western part and others by the downstream Batang Prodam.
Sites with significant RTE species richness	**Present**. There are areas in which RTE species are concentrated, i.e., forests in the southwestern part of PT KML operational area and Seriung Hill.
Particularly important genetic variants, subspecies, or varieties	**Present.** Young-clouded leopards (*Neofelis diardi* ssp. *borneensis*) are often encountered in Seriung Hill by Pantan Subvillage community. **Potential**: Orangutans were seen in 2010 by community and never seen again even during this Assessment. It is believed that the forest landscape in the western part of PT KML is their habitat.

As many as 70 RTE species (flora and fauna) are documented with threatened status under IUCN Red List, including 9 bird species, 14 mammal species, 4 reptile species, and 43 fauna species (**Tabel 34**). Species with the highest threatened status, i.e., critically endangered (CR), include helmeted hornbill (*Rhinoplax vigil*), Sunda pangolin (*Manis javanica*), dipterocarpus kunstleri (*Dipterocarpus kunstleri*), *keladan* (*D. validus*), *mengerawan* (*Hopea mengarawan*), *tengkuyung* (*Shorea gibbosa*), *pakit tengkuyung* (*S. induplicata*), *searaya majau* (*S. johorensis*), *pakit* (*S. lamellata*), *belobak* (*S. leptoclados*), light red meranti (*S. palembanica*), and *lingis* (*S. seminis*). Through the interview, it is confirmed that one of the critically endangered bird species, i.e., helmeted hornbill (*R. vigil*), is often found in Seriung and Juring Hills. Threatened aquatic reptile species, including false gharial (*Tomistoma schlegelii*) and asiatic softshell turtle (*Amyda cartilaginea*), are often found around the estuary of Kenipe and Kura-Kura Rivers as well as in Semandang River.

Field survey also verifies a global-concern species, i.e., Bornean orangutan (*Pongo pygmaeus*). According to interview, community has no longer seen this species in the Assessment area (PT KML operational area) since 2010. Field verification in forest vegetated area also indicates no signs of their presence. They are found in small forest fragments in PT Jalin Vaneo and PT Cipta Usaha Sejati operational areas to the south of PT MKS operational area (Aksenta, 2018). International Animal Rescue Indonesia (YIARI) provides information that their habitat is in the forest to the west of the Company's operational area. Their presence in PT KML operational area and its surroundings needs to be further verified in coordination with West Kalimantan BKSDA and YIARI.

Out of 373 plant species identified, 64 Dipterocarpaceae species are documented. A total of 33 out of 43 plant species from threatened category belong to Dipterocarpaceae. Concentrated in Seriung Hill forests and in the southwestern part of PT KML operational area, these species are also found in several forest fragments in the Assessment area. However, these fragments are not significant enough to be identified as HCVA. HCVA for protecting threatened plant species are focused on the forests on Seriung Hill and other areas in the southwestern part of the Company's operational area.

Important areas to preserve in their natural conditions as they are qualified as HCV 1 areas include Seriung Hill forests and the southwestern part of PT KML operational area, forest fragments in the northern part of Simpang Dua Village, as well as riparian areas and water bodies of Semandang, Kura-Kura, Kenipe, Banjur, and Melake Rivers. The total size of HCV 1 areas along with their management areas in the AoI is 20,531.9 ha, 1,316.8 ha out of which are situated in the Company's IUP concession, and out of the 1,316.8 ha, 1,288.1 ha are the existing HCV 1 areas (**Map 15**).

Table 32. List of Important Wildlife and Plant Species in the Assessment Area

No.	Family	Scientific Name	Common Name	Distribution	IUCN	CITES	Law	Remark	Location
Bird									
1	Accipitridae	*Accipiter trivirgatus*	Crested goshawk	-	LC	II	D	L	Commonly found
2	Accipitridae	*Elanus caeruleus*	Black-winged kite	-	LC	II	D	L	Commonly found
3	Accipitridae	*Ictinaetus malaiensis*	Black eagle	-	LC	II	D	L	10
4	Accipitridae	*Nisaetus cirrhatus*	Changeable hawk-eagle	-	LC	II	D	L	Commonly found
5	Accipitridae	*Spilornis cheela*	Crested serpent eagle	-	LC	II	D	L	Commonly found
6	Falconidae	*Microhierax fringillarius*	Black-thighed falconet	-	LC	II	D	L	Commonly found
7	Bucerotidae	*Anthracoceros albirostris*	Oriented pied hornbill	-	LC	II	D	L	1,2,3,4,10
8	Bucerotidae	*Anthracoceros malayanus*	Black hornbill	-	VU	II	D	L	1,2,3,4,10,13
9	Bucerotidae	*Buceros rhinoceros*	Rhinoceros hornbill	-	VU	II	D	L	1,2,3,10
10	Bucerotidae	*Rhabdotorrhinus corrugatus*	Wrinkled hornbill	-	EN	II	D	L	1,2
11	Bucerotidae	*Rhinoplax vigil*	Helmeted hornbill	-	CR	I	D	W	1,2,10
12	Bucerotidae	*Rhyticeros undulatus*	Wreathed hornbill	-	VU	II	D	L	1
13	Columbidae	*Treron capellei*	Large green pigeon	-	VU	-	-	L	Commonly found
14	Phasianidae	*Argusianus argus*	Great argus	-	NT	II	D	L	10
15	Phasianidae	*Lophura ignita*	Crested fireback	E	NT	II	-	L	10
16	Phasianidae	*Lophura pyronota*	Bornean crestless fireback	E	VU	II	-	L	10
17	Phasianidae	*Synoicus chinensis*	King quail	-	LC	II	-	L	Commonly found
18	Chloropseidae	*Chloropsis cyanopogon*	Lesser green leafbird	-	NT	-	D	L	Commonly found
19	Chloropseidae	*Chloropsis sonnerati*	Greater green leafbird	-	VU	-	D	L	Commonly found
20	Estrildidae	*Lonchura fuscans*	Dusky munia	E	LC	-	-	L	Commonly found
21	Hirundinidae	*Hirundo rustica*	Barn swallow	M	LC	-	-	L	Commonly found
22	Nectariniidae	*Aethopyga siparaja*	Crimson sunbird	-	LC	-	D	L	Commonly found
23	Rhipiduridae	*Rhipidura javanica*	Malaysian pied fantail	-	LC	-	D	L	Commonly found
24	Sturnidae	*Gracula religiosa*	Common hill myna	-	LC	II	D	L	Commonly found
25	Capitonidae	*Psilopogon chrysopogon*	Golden-whiskered barbet	-	LC	-	D	L	Commonly found
26	Capitonidae	*Psilopogon rafflesii*	Red-crowned barbet	-	NT	-	D	L	Commonly found
27	Psittacidae	*Loriculus galgulus*	Blue-crowned hanging parrot	-	LC	II	D	L	Commonly found
28	Psittacidae	*Psittacula longicauda*	Long-tailed parakeet	-	VU	II	D	L	Commonly found
Mammal									
1	Felidae	*Neofelis diardi* ssp. *borneensis*	Sunda clouded leopard	E	DD	I	D	I	10
2	Felidae	*Prionailurus bengalensis*	Leopard cat	-	LC	II	D	I	10
3	Mustelidae	*Aonyx cinereus*	Asian small-clawed otter	-	VU	I	-	I	Commonly found in river
4	Mustelidae	*Lutra sumatrana*	Hairy-nosed otter	-	EN	II	D	I	Commonly found in river
5	Ursidae	*Helarctos malayanus*	Sun bear	-	VU	I	D	I, C	1,2,3,10
6	Viverridae	*Cynogale bennettii*	Otter civet	-	EN	II	D	I	River
7	Cervidae	*Cervus unicolor*	Sambar deer	-	VU	-	D	I	1,2,3,4,6,10
8	Cervidae	*Muntiacus muntjac*	Southern red muntjac	-	LC	-	D	I	1,2,3,4,6,10
9	Suidae	*Sus barbatus*	Bornean bearded pig	-	VU	-	-	I, F	Commonly found
10	Tragulidae	*Tragulus javanicus*	Java mouse deer	-	LC	-	D	I	1,2,3,4,6,10
11	Manidae	*Manis javanica*	Sunda pangolin	-	CR	I	D	I	1,2,3,4,6,10
12	Cercopithecidae	*Macaca fascicularis*	Long-tailed macaque	-	LC	II	D	D	Commonly found
13	Cercopithecidae	*Macaca nemestrina*	Southern pig-tailed macaque	-	VU	II	D	D	Commonly found
14	Cercopithecidae	*Nasalis larvatus*	Proboscis monkey	-	EN	I	D	D	Around rivers in 1,3,4
15	Cercopithecidae	*Presbytis frontata*	White-fronted surili	-	VU	II	D	D	Commonly found

16	Cercopithecidae	*Presbytis rubicunda*	Maroon leaf monkey	E	LC	II	D	D	1,2,3,4,10
17	Hylobatidae	*Hylobates albibarbis*	Bornean white-bearded gibbon	E	EN	I	D	D	1,2,10
18	Lorisidae	*Nycticebus menagensis*	Philippine slow loris	E	VU	I	D	I	10
19	Tarsiidae	*Tarsius bancanus* ssp. *Borneanus*	Horsfield's tarsier	E	VU	-	D	I	10
20	Hystricidae	*Hystrix crassispinis*	Thick-spined porcupine	E	LC	-	-	I	10
21	Sciuridae	*Ratufa affinis*	Cream-coloured giant squirrel	-	NT	II	-	D	Commonly found
Reptile									
1	Crocodylidae	*Crocodylus porosus*	Saltwater crocodile	-	LC	II	D	I	Around rivers in 1, 4
2	Crocodylidae	*Tomistoma schlegelii*	False gharial	-	VU	I	D	I	Around rivers in 1, 4
3	Elapidae	*Naja sumatrana*	Equatorial spitting cobra	-	LC	II	-	D	Commonly found
4	Elapidae	*Ophiophagus hannah*	King cobra	-	VU	II	-	I	Commonly found
5	Gekkonidae	*Gekko gecko*	Tokay gecko	-	LC	II	-	D	Commonly found
6	Pythonidae	*Malayopython reticulatus*	Reticulated phyton	-	LC	II	-	I	Commonly found
7	Pythonidae	*Python breitensteini*	Borneo phyton	-	LC	II	-	I	Commonly found
8	Varanidae	*Varanus salvator*	Asian water monitor	-	LC	II	-	D	Commonly found
9	Geoemydidae	*Heosemys spinosa*	Spiny turtle	-	EN	II	-	D	1
10	Trionychidae	*Amyda cartilaginea*	Asiatic softshell turtle	-	VU	II	-	I	Batang Prodam River
11	Trionychidae	*Dogania subplana*	Malayan softshell turtle	-	LC	II	-	I	Batang Prodam River
Flora									
1	Orchidaceae	*Appendicula cornuta*	Horned appendicula	-	DD	II	-	Ex	1,10
2	Orchidaceae	*Arundina sp.*	Mini bamboo orchid	-	DD	II	-	Ex	1,10
3	Orchidaceae	*Bulbophyllum cernuum*	Nodding Bulbophyllum	-	DD	II	-	Ex	10
4	Orchidaceae	*Bulbophyllum refractilingue*	Abruptly Back Curved Lip Bulbophyllum	-	DD	II	-	Ex	10
5	Orchidaceae	*ulbophyllums p.*	Orchids of Bulbophyllum genus	-	DD	II	-	Ex	10
6	Orchidaceae	*Dendrobium indivisum*	Undivided Dendrobium	-	DD	II	-	Ex	10
7	Orchidaceae	*Dendrobium leonis*	The Lion-Like Dendrobium	-	DD	II	-	Ex	10
8	Orchidaceae	*Plocogotis sp.*	orchids of Plocoglottis genus	-	DD	II	-	Ex	1
9	Araucariaceae	*Agathis borneensis*	Borneo kauri	-	EN	-	-	Ex	10
10	Icacinaceae	*Cantleya corniculata*	Bedaru	-	VU	-	-	FI, Ex	1,2,7,8,9,11,
11	Dilleniaceae	*Dillenia borneensis*	Simpur/Doga	E	VU	-	-	FI, Ex	Commonly found
12	Sapotaceae	*Palaquium pseudocuneatum*	Nyatoh Jangkar	E	LC	-	-	FI, Ex	3,4,11
13	Fabaceae	*Archidendron triplinervium*	Jaring/ Jering hantu	E	DD	-	-	FI, Ex	4,9,11
14	Fabaceae	*Sindora beccariana*	Siur	E	DD	-	-	FI, Ex	8
15	Fagaceae	*Castanopsis motleyana*	Berangan Jumpo	E	DD	-	-	FI, Ex	10
16	Lauraceae	*Eusideroxylon zwageri*	Belian/Ulin	-	VU	-	-	FI, Ex	1,3,5,7,8,12,14,15
17	Linaceae	*Ctenolophon parvifolius*	Kayu Buluh	-	VU	-	-	FI, Ex	11,13
18	Myristicaceae	*Horsfieldia laticostata*	Kumpang piango	E	DD	-	-	FI, Ex	1,2,7
19	Myristicaceae	*Knema latericia*	Kumpang Arang	E	VU	-	-	FI, Ex	1,2,13
20	Myristicaceae	*Knema percoriacea*	Kumpang	E	DD	-	-	FI, Ex	1
21	Euphorbiaceae	*Glochidion littorale*	Kase	E	LC	-	-	FI, Ex	2,5,8
22	Flacourtiaceae	*Baccaurea angulata*	Katikal/ Ketikal/ As. Ketikal	E	DD	-	-	FI, Ex	2,5,7,9,11
23	Dipterocarpaceae	*Anisoptera costata*	Kenuar	-	EN	-	-	FI, Ex	10
24	Dipterocarpaceae	*Anisoptera grossivenia*	Penyau Batu	E	LC	-	-	FI, Ex	10
25	Dipterocarpaceae	*Anisoptera laevis*	Kayu kelasi	-	VU	-	-	FI, Ex	1,3,10,11
26	Dipterocarpaceae	*Dipterocarpus costatus*	Keruing Bukit	-	VU	-	-	FI, Ex	10
27	Dipterocarpaceae	*Dipterocarpus crinitus*	Keruing Bulu	-	VU	-	-	FI, Ex	10
28	Dipterocarpaceae	*Dipterocarpus hasseltii*	Keruing Kerukup Kecil	-	EN	-	-	FI, Ex	10
29	Dipterocarpaceae	*Dipterocarpus kerrii*	Keruing Gondol	-	EN	-	-	FI, Ex	10
30	Dipterocarpaceae	*Dipterocarpus kunstleri*	Keruing	-	CR	-	-	FI, Ex	10
31	Dipterocarpaceae	*Dipterocarpus lowii*	Penyau Tanduk	-	VU	-	-	FI, Ex	10
32	Dipterocarpaceae	*Dipterocarpus tempehes*	Karuing/ Keruing	E	EN	-	-	FI, Ex	1,2,9
33	Dipterocarpaceae	*Dipterocarpus validus*	Keladan	-	CR	-	-	FI, Ex	8,10,11,13
34	Dipterocarpaceae	*Dryobalanops beccarii*	Kapur/ Pondo	E	EN	-	-	FI, Ex	10,11
35	Dipterocarpaceae	*Dryobalanops lanceolata*	Kapur	E	LC	-	-	FI, Ex	10,14,15
36	Dipterocarpaceae	*Hopea beccariana*	Bengkirai/ Bangkirai	-	VU	-	-	FI, Ex	Commonly found

37	Dipterocarpaceae	*Hopea griffithii*	*Meranti Amang*	-	EN	-	-	FI, Ex	10
38	Dipterocarpaceae	*Hopea mengerawan*	*Mengerawan*	-	CR	-	-	FI, Ex	10
39	Dipterocarpaceae	*Hopea odorata*	*Cengal*	-	VU	-	-	FI, Ex	8,10
40	Dipterocarpaceae	*Shorea amplexicaulis*	*Engkabang Pipit*	E	NT	-	-	FI, Ex	10
41	Dipterocarpaceae	*Shorea bracteolata*	*Meranti Bukit*	-	EN	-	-	FI, Ex	10
42	Dipterocarpaceae	*Shorea brunnescens*	*Pakit Mengkunyit*	E	EN	-	-	FI, Ex	1,3,6,8,10
43	Dipterocarpaceae	*Shorea coriacea*	*Benuah, Damar benuah*	E	NT	-	-	FI, Ex	10,11
44	Dipterocarpaceae	*Shorea dasyphylla*	*Tekam*	-	EN	-	-	FI, Ex	1,3,4,5,8,9,10
45	Dipterocarpaceae	*Shorea gibbosa*	*Tengkuyung*	-	CR	-	-	FI, Ex	10
46	Dipterocarpaceae	*Shorea guiso*	*Majau/ Majo*	-	VU	-	-	FI, Ex	1,3,4,6,8,10,11
47	Dipterocarpaceae	*Shorea induplicata*	*Pakit Tengkuyung*	E	CR	-	-	FI, Ex	1,2,10
48	Dipterocarpaceae	*Shorea johorensis*	*Meranti merah*	-	CR	-	-	FI, Ex	1,2,3,5,8
49	Dipterocarpaceae	*Shorea laevifolia*	*Bengkirai/Benuah*	-	VU	-	-	FI, Ex	4,8,10,13,14
50	Dipterocarpaceae	*Shorea lamellata*	*Pakit/Mampan*	-	CR	-	-	FI, Ex	1,2,3,8,10
51	Dipterocarpaceae	*Shorea leptoclados*	*Belobak*	-	CR	-	-	FI, Ex	1,3,5,13
52	Dipterocarpaceae	*Shorea macrophylla*	*Engkabang*	E	LC	-	-	FI, Ex	10
53	Dipterocarpaceae	*Shorea macroptera*	*Meranti-1*	E	LC	-	-	FI, Ex	10
54	Dipterocarpaceae	*Shorea mecistopteryx*	*Tengkawang Layar*	E	VU	-	-	FI, Ex	1,8,13
55	Dipterocarpaceae	*Shorea ovalis*	*Tekam Padi*	E	LC	-	-	FI, Ex	10
56	Dipterocarpaceae	*Shorea pachyphylla*	*Berambang*	E	EN	-	-	FI, Ex	11
57	Dipterocarpaceae	*Shorea palembanica*	*Majau*	-	CR	-	-	FI, Ex	1,2,3,10
58	Dipterocarpaceae	*Shorea pallidifolia*	*Meranti Batu*	E	EN	-	-	FI, Ex	1,3
59	Dipterocarpaceae	*Shorea pauciflora*	*Maja/Meranti Samak*	-	EN	-	-	FI, Ex	1,10
60	Dipterocarpaceae	*Shorea pinanga*	*Meranti Gunung/ Engkabang Bukit*	E	LC	-	-	FI, Ex	15
61	Dipterocarpaceae	*Shorea seminis*	*Lingis*	-	CR	-	-	FI, Ex	Commonly found
62	Dipterocarpaceae	*Shorea smithiana*	*Mahambung*	E	VU	-	-	FI, Ex	5,10
63	Dipterocarpaceae	*Shorea stenoptera*	*Tengkawang*	E	NT	-	-	FI, Ex	2,3,5,8
64	Dipterocarpaceae	*Shorea teysmanniana*	*Penyau Lilin*	-	EN	-	-	FI, Ex	1
65	Dipterocarpaceae	*Vatica micrantha*	*Resak*	E	LC	-	-	FI, Ex	3,5,10,15
66	Malvaceae	*Durio kutejensis*	*Pekawai*	E	VU	-	-	FI, Ex	11
67	Thymelaeaceae	*Aquilaria beccariana*	*Gaharu/Engkaras*	-	VU	-	-	FI, Ex	1,3,5
68	Crypteroniaceae	*Dactylocladus stenostachys*	*Mentibu*	E	DD	-	-	FI, Ex	1,8
69	Melastomataceae	*Pternandra cogniauxii*	*Jome/Jeme*	E	DD	-	-	FI, Ex	Commonly found
70	Myrtaceae	*Syzygium creaghii*	*Ubah jangkar*	E	DD	-	-	FI, Ex	8
71	Myrtaceae	*Syzygium elliptilimbum*	*Ubah/ Obah*	E	DD	-	-	FI, Ex	Commonly found
72	Moraceae	*Artocarpus anisophyllus*	*Mentawa*	-	VU	-	-	FI, Ex	Commonly found
73	Moraceae	*Ficus geocharis*	*Timo/ Timau/Mentimau*	E	DD	-	-	FI, Ex	9,11
74	Moraceae	*Ficus uncinata*	*Pampan*	E	DD	-	-	FI, Ex	5,9,11,14,15
75	Anacardiaceae	*Dracontomelon costatum*	*Sengkuang*	-	EN	-	-	FI, Ex	4,8,9
76	Sapindaceae	*Nephelium cuspidatum*	*Rambutan Hutan*	E	DD	-	-	FI, Ex	3
77	Sapindaceae	*Nephelium lappaceum*	*Rambutan*	E	LC	-	-	FI, Ex	4,15

Note:
Distribution: E= Endemic; M= Migrant
IUCN status: CR= Critically Endangered, EN= Endangered, VU= Vulnerable, NT= Near Threatened, LC= Least Concern dan DD= Data Deficient
CITES status: App. I= listed under Appendix I, II= listed under Appendix II (26 November 2019)
Law: Legal protection under Law 5 of 1990, Minister of Environment and Forestry Regulation No. P.106/MENLHK/SETJEN//KUM.1//6/2018
Remark: D= Direct encounter, I= Interview, F= Footprint, C= Claw, FI = Forest Inventory, Ex = exploration
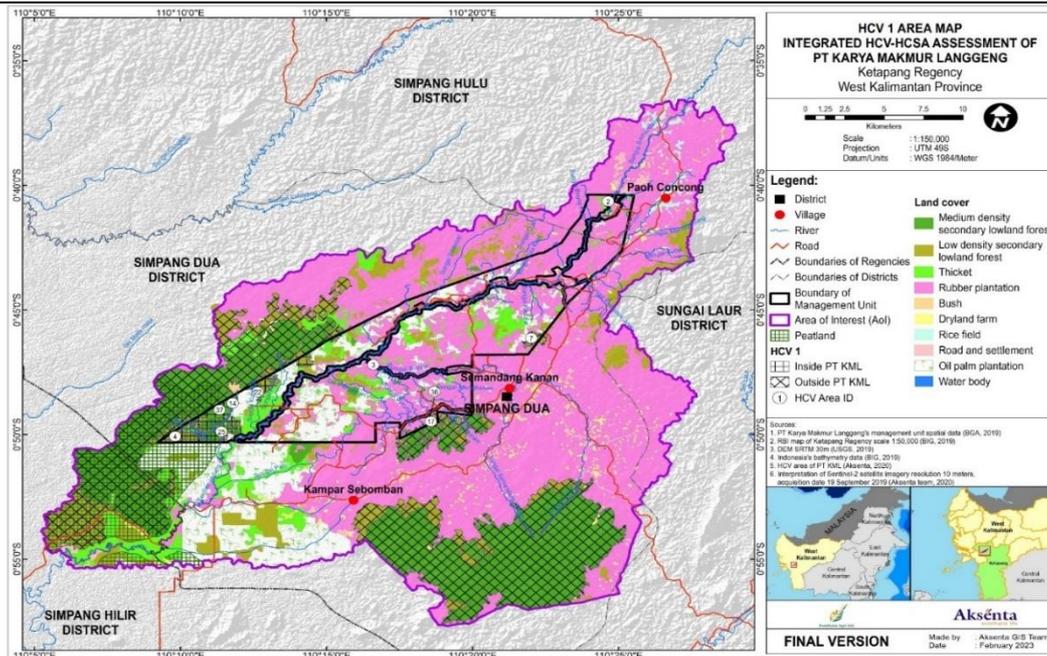
Map 15. Map of HCV 1 areas in the AoI and PT KML Assessment Area

HCV 2: Wide Landscape

The Assessment indicates smaller naturally vegetated areas qualifying as HCV 2 areas (**Table 33**). Field verification of potential HCV 2 areas around the Assessment area is conducted in the southwestern part of PT KML operational area adjacent to PT MKS and PT Jalin Vaneo's. The verified areas are still covered by forests, in which logging activities are identified.

Natural ecosystems identified in PT KML operational area include peat swamp forest, mixed dipterocarp forest on hilly areas, freshwater swamp forest, heath forest, and interconnected riparian forest (ecotone). Based on spatial analysis, these forest landscapes have 80,000 ha connected to the swamp KBA in Kapuas riparian areas (**Map 16**). A small part of the forest landscape (9,271.7 ha) is included in the Assessment's AoI, and only 1,169.0 ha out of which is situated in the Company's IUP concession (**Map 17**).

Table 33. Summary of HCV 2 Presence in the Assessment Area

HCV 2	Finding
Wide landscape-level ecosystems and ecosystem mosaics that are significant at global, regional or national levels, and contain viable populations of the great majority of the naturally occurring species in natural patterns of distribution and abundance	**Absent**: There are no important forest landscapes in the Assessment area, such as conservation area, IFL, Heart of Borneo (HoB), KBA, and IBA or EBA. However, forest areas in the southwestern part of PT KML operational area are only a small part of the forest landscape in production forest with currently natural land cover. **Potential**: -
Situations that qualify as HCV 2	**Indication in the Assessment area**
Wide areas (e.g., could be greater than 50,000 ha) that are relatively far from human settlement, roads or other access	**Present**. The forest landscape in the production forest (>50,000 ha) in the eastern part of the Company is surrounded by palm oil concessions, industrial forest plantations, and road access. These indicate that this landscape is already disturbed.
Smaller areas that provide key landscape functions, such as connectivity and buffering	**Present**. The forest landscape in the western part of PT KML operational area provides connectivity with swamp KBA in Kapuas riparian areas to the west of the Assessment area.

Wide areas that are more natural and intact than other similar areas	**Present.** The forest landscape in the western part of PT KML operational area is an area with more natural and intact forest cover compared to others around the Assessment area.
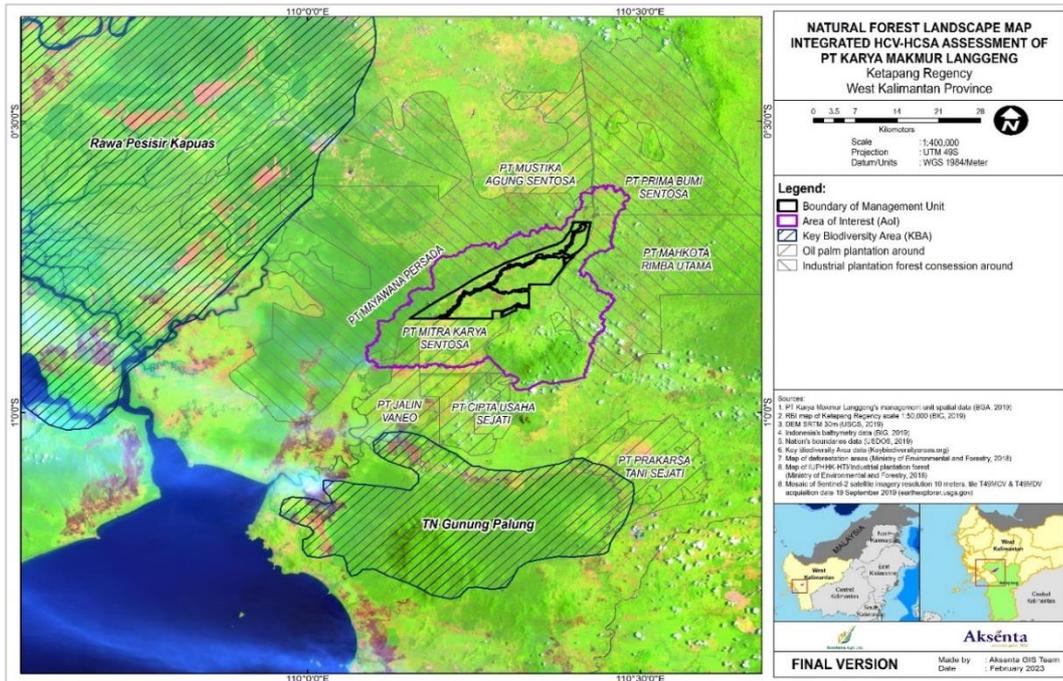
Map 16. Natural Forest Landscape at the Western Part of PT KML
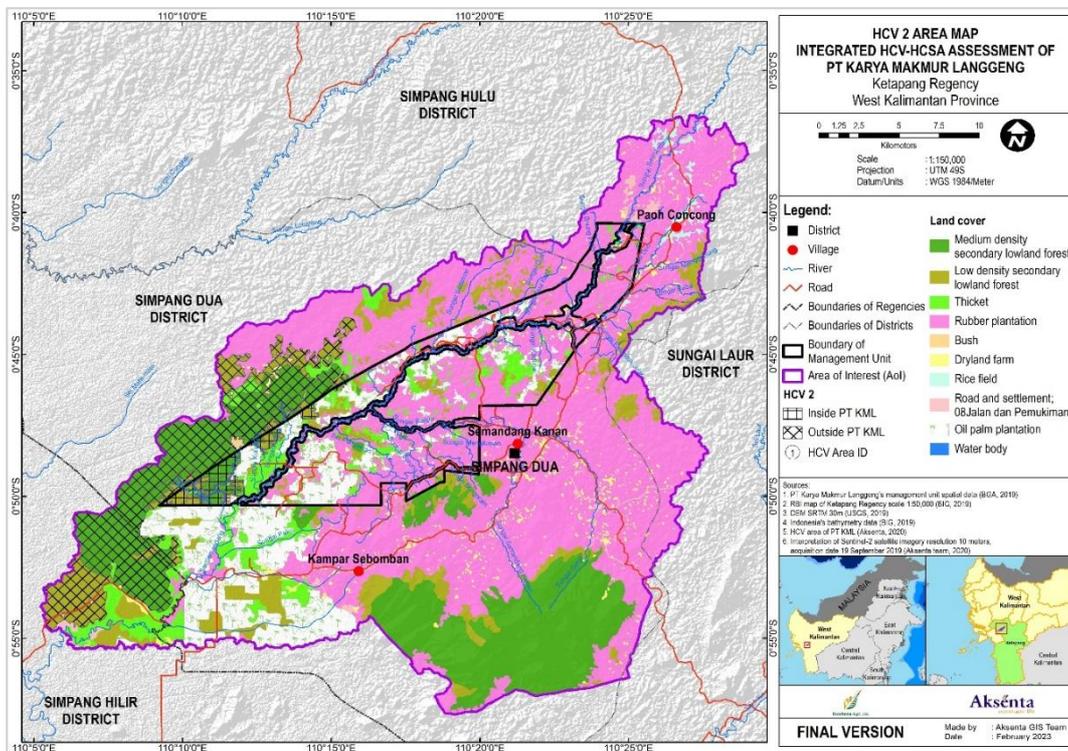
Map 17. Map of HCV 2 in the Assessment Area and its Surroundings

HCV 3: Rare ecosystem

HCV 3 presence is identified using a precautionary approach based on the Indonesian Guide for HCV Identification, also known as HCV Toolkit Indonesia 2008 (HCV Toolkit Indonesia). The approach used to determine ecosystem types is land system based on RePPPRoT data (1990). Field survey is carried out to verify ecosystem types based on the approach. HJA, PLN, RGK, and TWI land systems indicate the presence of mixed dipterocarp forest ecosystem, while MDW and GBT systems indicate peatland ecosystems.

Peatland ecosystems in GBT land system is verified to take the form of peat swamp forest in a small area. However, the peat swamp location does not correspond with the initial indicative map based on the land system. Apart from both ecosystems, riparian forest, freshwater swamp forest, and heath forest are also identified through field verification (**Map 18**).

Types of ecosystems in forest areas in the southwestern part of PT KML operational area is an ecosystem mosaic which includes mixed dipterocarp forest, peat swamp forest, freshwater swamp forest, riparian forest, and heath forest, qualifying as HCV 3 areas. Other HCV 3 areas are identified on Seriung Hill in the form of mixed dipterocarp forest. Total size of HCV 3 areas identified in the AoI is 21,628.5 ha, including 1,616.0 ha in PT KML operational area with existing HCV 3 of 1,498.6 ha and potential HCV 3 of 117,4 ha. See **Map 19** for locations of HCV 3 areas.
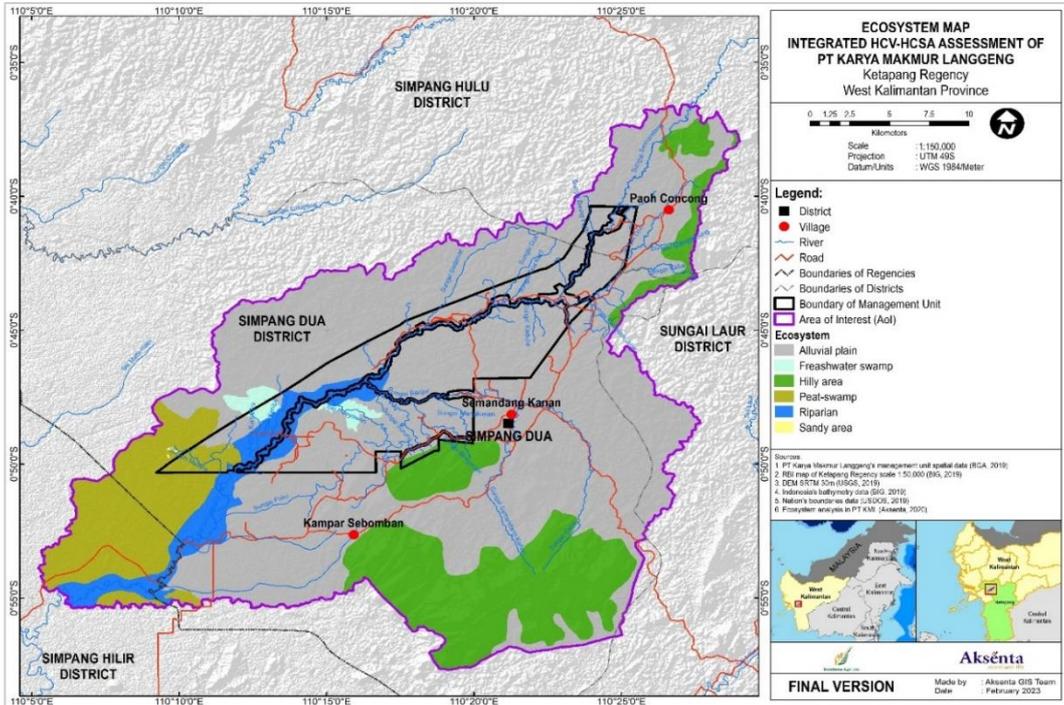
Map 18. Map of Ecosystem Distribution in the AoI
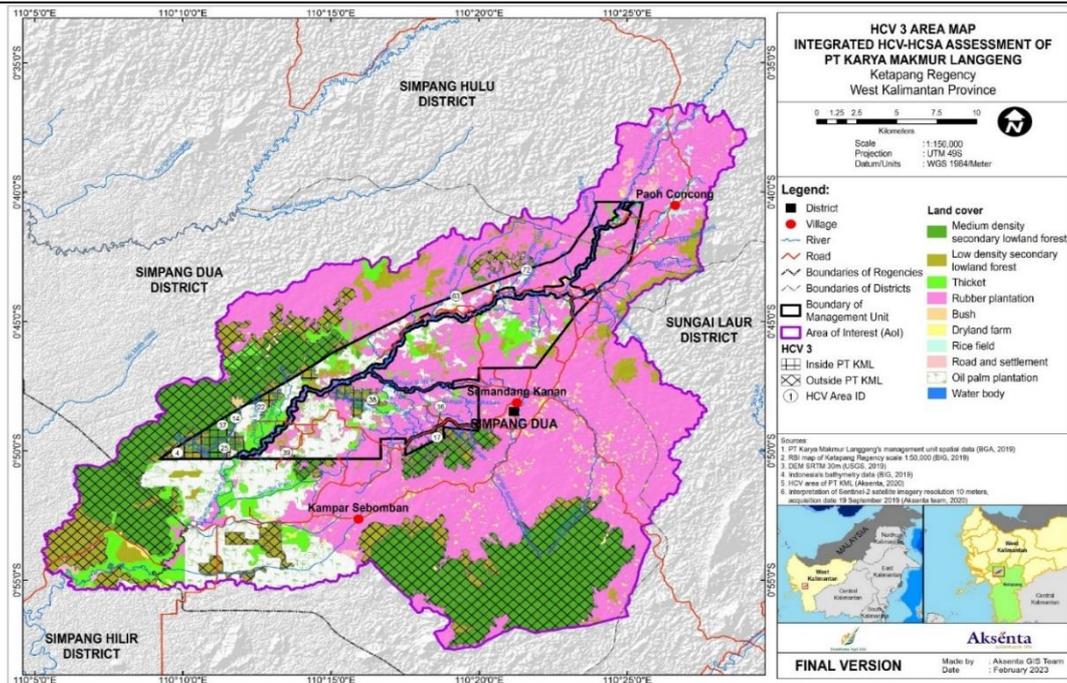
Map 19. Map of HCV 3 in the Aoi and its Surroundings

Peat

Peatland is in the southern part of the AoI. Based on the 1:250,000-scaled map of Peat Hydrological Unit (PHU) (MoEF, 2017), the peatland is part of the Matan-Durian Rivers PHU and Matan-Semandang Rivers PHU. Since there has been no detailed or semi-detailed peat or land survey, this analysis uses PHU map to identify the total size of peatland in the Assessment area.

Based on the previous HCV assessment, total size of peatland in the Assessment area is 179.6 ha in the southwestern part of the MU. Meanwhile, based on this Assessment, the total size is 693.2 ha, which is situated in the southwest, as identified in the previous assessment. However, due to the size difference, a semi-detailed/detailed peat survey or land survey is required as a follow up to obtain the more precise peatland area and its distribution.

Field finding indicates the presence of peatlands with land covers of forest, shrub, thicket, and palm oil plantation (**Map 20**). Peatlands located in the AoI (outside of MU) is partly cleared for the neighbouring palm oil plantation companies to the south of PT KML. Meanwhile, peatlands in the Company's IUP concession are mostly forests and shrubs, with total area of 693.2 ha. Referring to HCV IDs, peatland includes several IDs, i.e., ID 4 (599.1 ha), ID 14 (18.4 ha), ID 25 (40.6 ha), and ID 37 (35.1 ha).
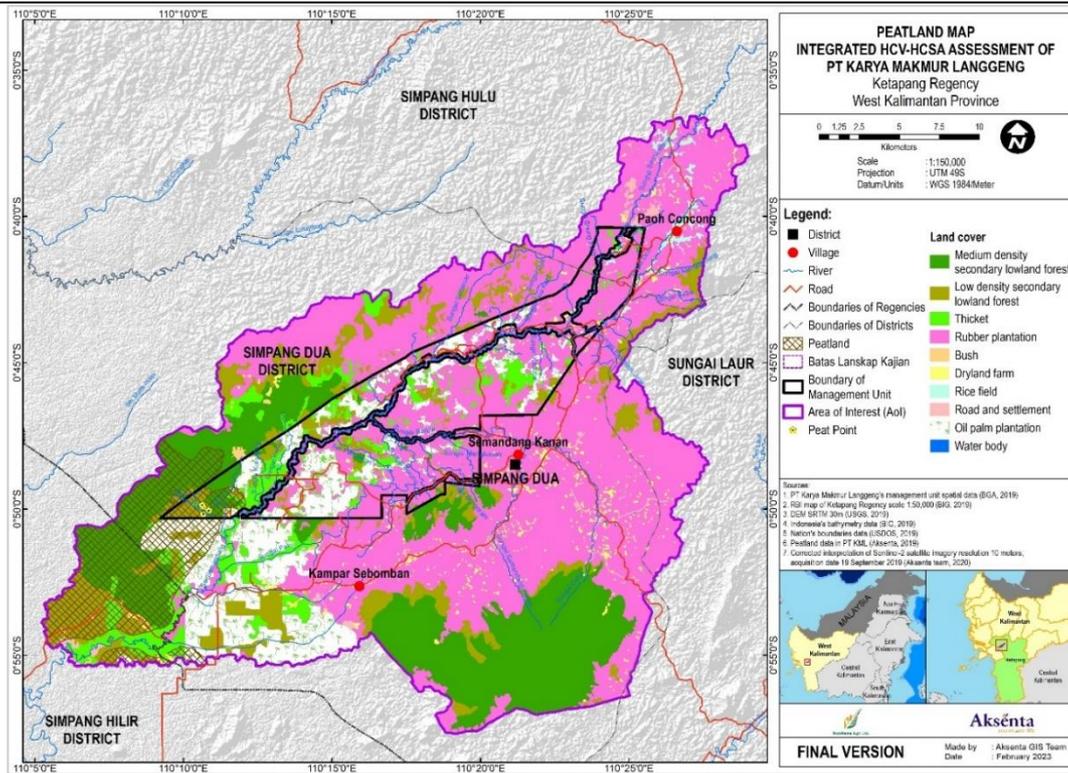
Map 20. The Presence of Peatland in PT KML

Patch Analysis

Phase 1 to 13 of HCS forest patch analysis are conducted without any modifications at each phase. Give-and-take scheme produces the size of HCS conservation area of 1,695.9 ha, which is an accumulation of indicative conservation patches, give-and-take conservation patches excluding the give-and-take scheme, and additional areas from the give scheme. Additional areas from the take scheme and give-and-take-development patches not included in the give-and-take scheme are set as patches for potential development. See **Table 34** and **Map 21** for more details on the give-and-take scheme.

Table 34. Give and Take Scheme Process

No	Description	Initial area (ha)	Process		Final area (ha)
			Give area	Take area	
1	Indicative conservation patches	1,489.0	-	-	1,695.9
2	Give-and-take conservation patches	154.8	-	89.3	-
3	Give-and-take development patches	370.0	73.7	-	-
4	Non-HCS patches	67.8	67.8	-	-
5	Patches for potential development	-	-	-	385.7
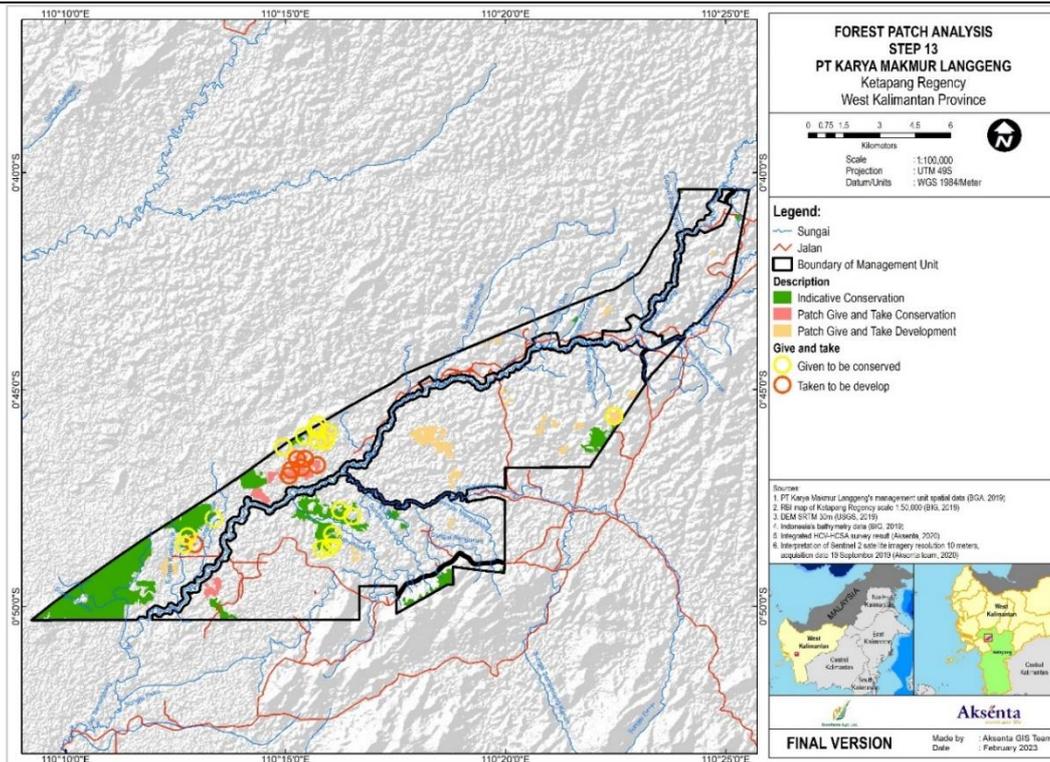
Map 21. Give and Take Process of Conservation Area

The assessment shows that the proposed integrated conservation area consist of the HCVMA, peatland and HCS conservation with a total area of 2,763.8 ha. The area that has been planted is 3,952.9 ha and community land is 8,606.7 ha, so the total area of the proposed development is 2,149.3 ha. (**Table 35** and **Map 22**).

Table 35. Integration of Conservation Areas into Potential Development Area

No	Description	Area (ha)*
1	Assessment area	16,709.0
2	HCVMA (1-6)	2,557.1
3	HCS Conservation Area	1,695.9
4	Peatland	693.2
Sub-total of conservation area		**2,763.8***
5	Net Conservation Area	2,000.0**
6	Community land reserve	8,606.7
7	Planted Area	3,952.9
8	Potential development area	2,149.3

*   Overlap between HCVMA 1-6, HCS land cover, and peat is 571.7 ha

Overlap between HCVMA 1-6 and HCS land cover is 917.3 ha

Overlap between HCVMA 1-6 and peat is 121.5 ha

**   Overlap between conservation area and community land is 660 ha

Overlap between conservation area and planted area is 103.8 ha
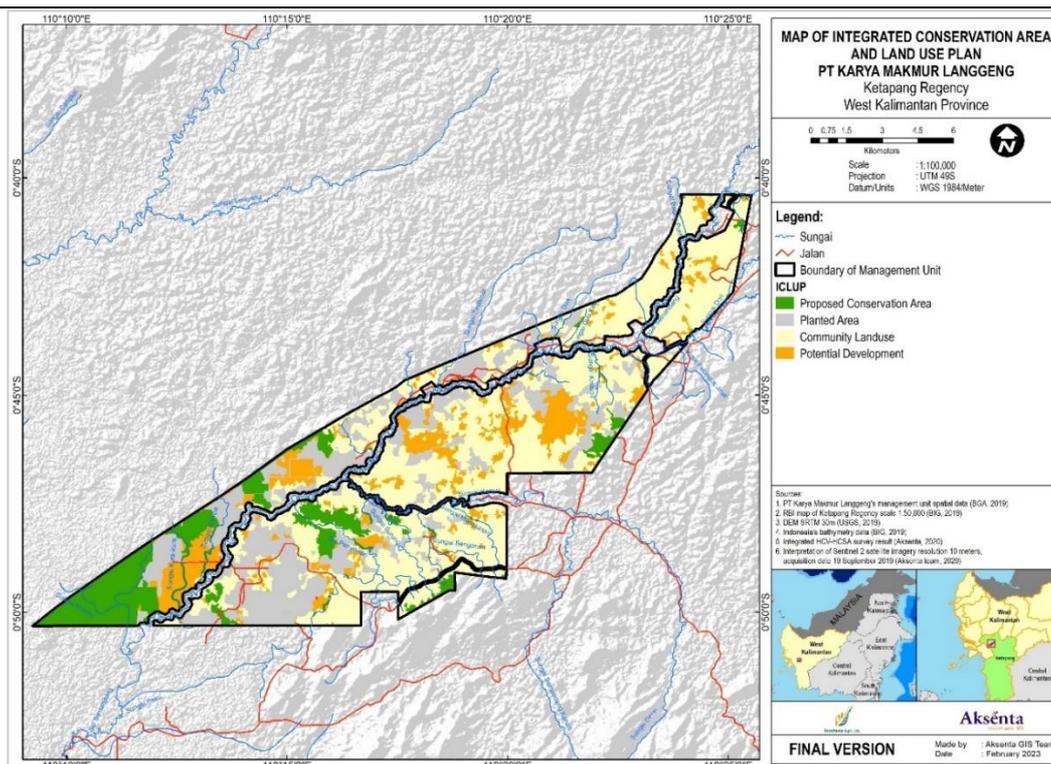
Map 22. Map of Integration of Conservation Area into Landuse Plan

Summary on Conservation Areas

The HCV-HCS Assessment output indicates that 52 HCVAs/HCVMAs are situated in PT KML's MU. The HCVMA total area covers 2,557.1 ha (15.3 %) of Company's total operational area (**Tabel 39** and **Map 23**). This is based on West Kalimantan Local Regulation No. 6/2017 stating that each business actor is required to set aside conservation areas of at least 7% of their business permit concession. The following (**Tabel 38** and **Map 24**) is the summary of the identified conservation areas in the Assessment area as well as the potential development area.

- Total conservation management area (HCVMA+HCS area+Peatlands): 2,763.8 ha
- Total HCVA: 1,640.6 ha
- Total allocated HCVMA: 2,557.1 ha
- Total set-aside community lands: 8,606.7 ha
- Total conservation areas (HCVMA+HCS area+Peatlands+Community lands): 10,710.5 ha
- Total conservation areas outside the planted area: 10,606.7 ha
- Total area proposed for development: 2,149.3 ha

Tabel 38. Summary of Areas for Conservation and Management in the Assessment Area

Environmental and social conservation values	Conservation area (ha) in the Assessment area	Management area (ha) in the Assessment area
HCV 1	1,288.1	1,316.8
HCV 2	1,149.7	1,169.0
HCV 3	1,498.6	1,616.0
HCV 4	1,588.9	1,738.8
HCV 5	6.5	47.3

	HCV 6	1.1	1.2
	Subtotal of HCVA	**1,640.6**	**2,557.1**
	HCS Forest		1,695.9
	Peatland		693.2
	Subtotal net conservation (HCVMA+HCS area+Peatland)		**2,763.8***
	Community lands		8,606.7
	Subtotal net conservation area (HCVA+HCS area+Peatland+Community lands):		**10,710.5***
	Planted area		3,952.9
	Conservation area outside the planted area		**10,606.7***

Note:

*   Overlapping of HCVMA 1-6, HCS land cover and peat of 571.7 ha

      Overlapping of HCVMA 1-6 and HCS land cover of 917.3 ha

      Overlapping of HCVMA 1-6 and peat of 121.5 ha

**   Overlapping of conservation area and community lands of 660 ha

**** Overlapping of conservation area and planted area of 103.8 ha

Table 36. Location and Size of the Proposed HCVAs and HCVMAs in the MU

ID	Location	HCV/HCS type	Buffer (m)	HCVMA (ha)		
				Existing	**Potential**	**Total**
1	Sei Semandang and its riparian area	HCV 1, 4, 5, and 6 in the AoI	50	-	0.4	0.4
2	Semandang and its riparian area	HCV 1, 4, 5, and 6 in the AoI	50	-	1.5	1.5
3	Banjur and its riparian area	HCV 1, 4, and 6 in the AoI	-	2.0	25.6	27.6
4	Peat soil*)	HCV 1, 2, 3, 4, and HCS	-	599.1	-	599.1
5	Batang Dori and its riparian area	HCV 4 and 5	50	-	19.2	19.2
6	Temperingat and its riparian area	HCV 4	50	-	9.7	9.7
7	Tujubelas Hill	HCV 1, 4, and HCS	-	67.3	8.9	76.2
8	Sei Penyawan and its riparian area	HCV 4, 5, and HCS	50	11.2	68.3	79.5
9	Dua and its riparian area	HCV 4 and 5	50	-	17.1	17.1
10	Dua Keci' and its riparian area	HCV 4, 5, and HCS	50	0.1	18.8	18.9
11	Bengoram and its riparian area	HCV 1 & 3 (AoI), HCV 4 & 5 (KML)	50	-	57.3	57.3
12	Baung Putih and its riparian area	HCV 4 and HCS	50	2.7	13.6	16.3
13	Gemuruh and its riparian area	HCV 4	50	-	11.4	11.4
14	Melake tributary riparian area (18.4 ha of which is peat)	HCV 1, 2, 3, 4, and HCS	50	32.9	6.3	39.1
15	Jangku and its riparian area	HCV 4	50	-	24.8	24.8
16	Kamong and its riparian area	HCV 4 and 6	50	3.0	16.0	19.0
17	Seriung Hill	HCV 1, 3, 4, and HCS	-	66.8	-	66.8
18	Kedio riparian area	HCV 6 in the AoI	50	-	4.7	4.7
19	Kedupe and its riparian area	HCV 4	50	-	49.6	49.6
20	Kenipe riparian area	HCV 1, 2, 3, 4 in the AoI	50	-	50.6	50.6
21	Kompas and its riparian area	HCV 4 in AoI	50	-	20.8	20.8
22	Kura-Kura riparian area	HCV 1, 2, 3, 4, and HCS	50	14.4	32.8	47.2
23	Lunyau and its riparian area	HCV 4	50	-	13.4	13.4

ID	Name	HCV Type				
24	Source of water for Kelipor Subvillage (Sebuluh River upstream)	HCV 4 and 5	-		4.1	8.6	12.8
25	Melake riparian area (overlapping with peat of 40.6 ha)	HCV 1, 2, 3, 4, and HCS	50		40.6	0.2	40.8
26	Mengkasan and its riparian area	HCV 1 & 3 (AoI) and 4 (KML)	50		-	49.1	49.1
27	Dua Keci' water reservoir	HCV 4, 5, and HCS	-		4.0	0.4	4.4
28	Nek Gabang and its riparian area	HCV 4	50		-	5.6	5.6
29	Mun riparian area	HCVMA	50		-	33.5	33.5
30	Naung riparian area	HCVMA	50		-	30.9	30.9
31	Paku and its riparian area	HCV 4 and 6	50		21.4	10.3	31.6
32	Pelanduk Jirak and its riparian area	HCV 4	50		-	3.0	3.0
33	Sebuluh and its riparian area	HCV 4 and 5	50		-	22.5	22.5
34	Sedamar and its riparian area	HCV 4 and 5	50		-	18.9	18.9
35	Surung riparian area	HCV 4 and HCS	50		25.1	65.3	90.4
36	Serukan riparian area	HCV 1, 3, 4, and HCS	50		1.4	17.9	19.3
37	Secondary forest in Division 1-2 (35.1 ha of which is peat)	HCV 1, 2, 3, 4, and HCS	-		474.9	19.3	494.2
38	Sei Penyawan dryland forest	HCV 3, 4, and HCS	-		225.9	98.1	324.0
39	Paku River dryland forest	HCV 3, 4, and HCS	-		41.5	-	41.5
40	Kamong burial ground	HCV 6	-		0.1	0.1	0.2
41	Kek Gosot burial ground	HCV 6	-		0.1	-	0.1
42	Angkis River riparian area	HCVMA	50		-	3.4	3.4
43	Penyawan tributary riparian area	HCVMA	50		-	18.6	18.6
44	Surung tributary riparian area	HCVMA	50		-	15.3	15.3
45	Rice field	HCV 5	-		-	22.6	22.6
47	Rice field	HCV 5	-		-	2.0	2.0
56	Sei Tempoyan burial ground	HCV 6	-		0.2	-	0.2
57	Benyamin Family burial ground	HCV 6 and HCS	-		0.2	-	0.2
63	River Sedamar dryland forest	HCV 3, 4, and HCS	-		0.8	-	0.8
70	Saih Family burial ground	HCV 6	-		0.2	-	0.2
72	River Dua dryland forest	HCV 3, 4, and HCS	-		0.2	-	0.2
78	Bukit Lundang burial ground	HCV 6	-		0.2	-	0.2
	Total HCVA/HCVMA in the MU		(ha)		1,640.6	916.5	2,557.1
	Size of Assessment Area		(ha)				16,709.0
	Percentage of HCV/HCVMA in the MU		(%)		9.8	5.5	15.3

Note:
[*] Total peatland area is 693.2 ha, that includes several IDs, i.e., ID 4 (599.1 ha), ID 14 (18.4 ha), ID 25 (40.6 ha), and ID 37 (35.1 ha). Peatland in ID 4 does not overlap with other HCVAs, while those in ID 14, ID 25, and ID 37 overlap with some of riparian areas.
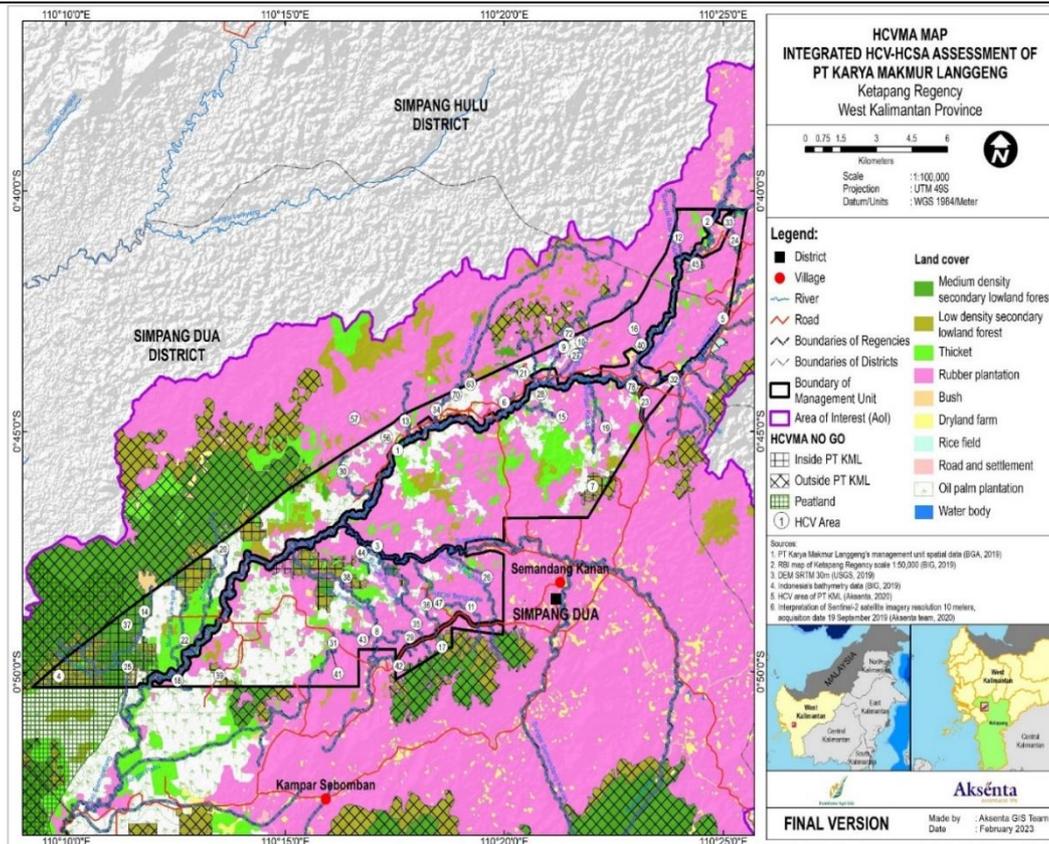
Map 23. HCVMA in the Assessment Area
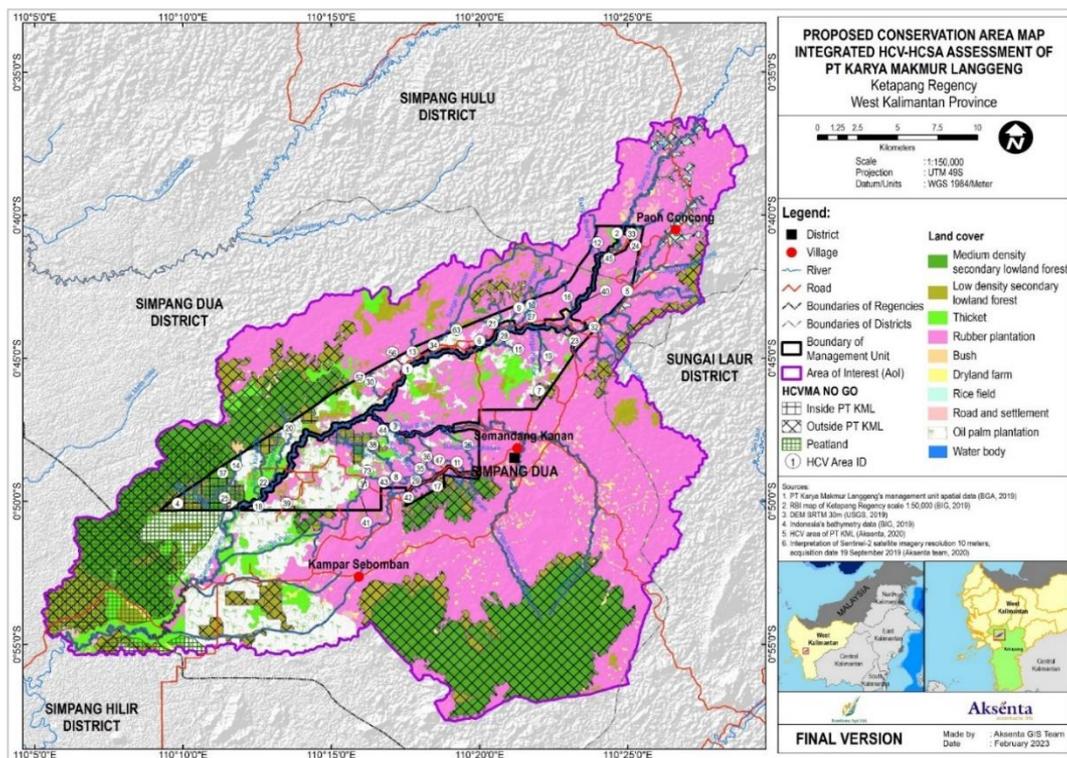
Map 24. Map of Summary of the Proposed Conservation Area

Section 5: FPIC

In FPIC Activities, the company uses several methodologies as follows:

- Document Review;
- Interviews;
- Participatory Mapping;
- FGDs and Field Visits.

For the first step, the company formed a Survey Team, this team consisted of company staff who handled social management, conflict management, agronomy, GIS, environmental planning, and other related divisions. In FPIC activities and other socialization activities, the company's survey team will be assisted by the Satlak Team (public relation team) formed by the village government, whose function is to become a liaison between the company and the local community/community.

Document Review/ Desk Study

Document review activities include:

- Identification of villages, hamlets that will be affected by the company's operations, as well as the existence of customary community rights.
- Preparation of materials and methods of socialization to the community
- Overview of community development/ CSR program planning
- Study of local tenure system and mapping of local tenure systems
- Procedures for implementing participatory mapping

Participatory Mapping

PT KML carried out Participatory Mapping and Land Tenure Study in 2012. This assessment was carried out by Bumitama's internal team, which included:

a) History of land use and control by the community
b) Patterns of land use and control by the community
c) Legality of land use and control by the community
d) Potential conflicts related to land in the community

It was carried out in each village, followed by searching for information from participatory mapping through interviews and field visits.

Participatory mapping was carried out jointly by the Company's Survey Team, local communities, and Satlak Team, ensuring that the representatives of the subject of tenure rights were met. Participatory mapping is expected to cover:

- Indicative boundaries of villages/hamlets/villages within the company's concession;
- Areas of designation and use by the community (gardens, rice fields, fields, non-timber forest product areas, cultural sites, sacred areas, village forest areas/other customary rights, land reserves, springs, and settlements); and
- Main access locations along with supporting infrastructure

Therefore, the description of the land category in the location of the company's permit will be obtained.

Participatory mapping was carried out in the three villages that were the assessment areas.

Focus Group Discussion

The socialization and FGD were carried out by considering the following:

- Adjustment of the language and media used to the conditions of society and the community
- Information on personnel who will be responsible for community complaints and aspirations
- Explanation of the company's objectives and operational areas. Location and purpose of allocation of conservation areas/other protected areas within the company area, if any
- Procedures for handling conflicts and complaints
- Availability of time to think/consider options for the community
- Freedom to obtain information/assistance from other parties, and free from any form of intimidation, especially in processes that require negotiation, building agreements, deliberation to reach consensus and decision making.

The first socialization of PT KML related to its operational to the community around the company in March 2012. The participant(s) and summary of the meeting as follows:

Table 5.1:

Date/ time of Meeting	Participant	Summary of Meeting
5 March 2012 09:00 am – 12:00 pm Dusun Pantan Church, Village of Kampar Sebomban, Sub-district of Simpang Dua	- TP3K Ketapang - Muspika Simpang Dua - Simpang Dua DAD Head - Kampar Sebomban Village Head - BPD of Kampar Seomban - Pantan Hamlet Head - Mentawa Biring Hamlet Head - Some community representatives	- Most of the community accepts the company's presence, although there are some individuals who refuse. - The people of Pantan and Mentawa Biring Hamlet, through their representatives present requested that the plasma composition could be increased, previously 20% to 30% of the plantation area will be built by the Company. - The company is committed, in addition to building a plasma plantation for the community, to building a 6 ha of Tanah Kas Desa - The company will carry out more intensive socialization to reach the community regarding land acquisition by considering the principle of FPIC
5 March 2012 13:30 – 16:30 pm Sub-district office hall of Simpang Dua	- TP3K Ketapang - Muspika Simpang Dua - Simpang Dua Customary Leaders - Semandang Kanan Village Head - Sekucing Baru Hamlet Head - Sei Tontang Hamlet Head - Selantak Hamlet Head - Some community representatives	- Most of the community accepts the company's presence, although there are some individuals who refuse - The people of Sekucing Baru Hamlet, through their representatives present requested that the plasma composition could be increased. Previously 20% to 30% of the plantation area will be built by the Company. - The company is committed, in addition to building a plasma plantation for the community, to building a 6 ha of Tanah Kas Desa - There is a mining company permit in the same location, so if the mining company wants to do business first, they are welcome on condition that they carry out reclamation before the plantation starts - The land allocated for the partnership must be agreed in advance between the company and the community,

		- preventing the community from acquiring plasma land in ex-mining areas - The company will carry out more intensive socialization to reach the community regarding land acquisition by considering the principle of FPIC
6 March 2012 10:00 am – 12:30 pm SDN Dusun Kek Lipur, Village of Paoh Concong	- TP3K Ketapang - Muspika Simpang Hulu - Paoh Concong Village Head - Kek Lipur Hamlet Head - Baram Hamlet Head - Some community representatives	- The people of Kek Lipur Hamlet, through their representatives present requested that the partnership program will be in the form of a Partial Partnership Pattern (Independent Plasma holders), not 80% vs 20% - The company may only be able to do this if the development of the plantation under the company's permit has been completed, and the community owns land outside the company's permit

Further socialization was carried out in 2013, which focused on the plantation development program and partnership patterns offered by the company and agreed upon by the village community. This socialization is carried out continuously, in accordance with the company's priorities and community's requests for land compensation, partnership programs and other CSR activities.

Through the company's PR officer, PT KML has also prepared participatory maps of land ownership and boundaries in certain villages. Participatory mapping with communities aims to look at Customary Land, land rights, land boundaries, and land use patterns. At the time of land release, the Company collaborated with the Satlak Desa Team for the processes of measuring and leveraging the land. From this process, community spatial data are generated in the form of maps, which will then become the basis for land compensation (GRTT).

PT KML carries out socialization and engagement with the surrounding community continuously, until now.

FPIC process have been showed by evidence of land compensation process, for examples; Letter of Land Delivery (included attachment of land position & boundaries), Citizenship Card of landowner and Payment Receipt by company to landowner. There is summary of land compensation process within this period (2013 – 2022) covering 6,976 hectare and divided in two villages. Of these, 4,000 ha have obtained HGU certificates based on the Decree of the Head of BPN No. 30/HGU/KEM-ATR/BPN/IV/2020 dated 20 April 2020.

Section 6: Soil and topography

The soil type and suitability survey activity at PT Karya Makmur Langgeng was carried out in May – August 2023, by the Bumitama Internal Team.

Table 37. Soil Type and Suitability Survey Team

No.	Name	Position	Expertise
1.	Husri Batubara	Team Leader, Research Dept.	Surveyors, Soil Surveys, Morphological Identification and Soil Classification
2.	Ardian S. Tambunan	Team Member, Research Dept.	Surveyors
3.	Aldi Apriandi	Team Member, GIS Dept.	Delineation, Mapping and Supporting data
4.	M. Vikky Arindi	Team Member, Sustainability Dept.	Delineation, Mapping and Supporting data. Reviewer related to RSPO Guidelines

Soil Type Analysis & Survey

The activity is divided into three stages, as follows: 1) Preparation; 2) Field survey; 3) Analysis and preparation of reports.

This soil survey and mapping activities in the area of PT KML uses SNI 8473:2018 on semi-detailed land surveys and mapping at a scale of 1:50,000 as a guideline. Of all the stages and methods in the manual, there are several sections that are adapted to the objectives of this activity, for example regarding the interpretation of landforms using pre-existing data, namely maps of land systems at a scale of 1:250,000. Soil type data also follows the soil type approach in the surrounding area that has been carried out in previous surveys.

Methodology

1. Preparation

Supporting materials and data used:

- A 1:50,000 scale digital base map of Indonesia's topography (RBI) published by the Geospatial Information Agency (BIG);
- Digital elevation model (DEM) maps of 30 m resolution from SRTM, topographic digital contour maps, or from other sources;
- Landsat remote sensing/satellite imagery;
- Digital geological maps with a scale of 1:100,000 - 1:250,000 published by the Geological Research and Development Centre (Puslitbang);
- 1:250,000 scale land system map published by the Geospatial Information Agency (BIG);
- Map of existing land use from previous studies; and
- Climate data from the nearest weather station.

1.1 Land Unit Analysis

A land unit is defined as an expanse of land that has uniform or similar characteristics in terms of landform, lithology/parent material and relief/slope, which can be delineated and depicted on a map. This analysis aims to compile a land unit analysis map as a basis for planning field observations and preparing soil type maps.

Land unit analysis is differentiated based on landform unit, source rock unit, and relief/slope unit which can be performed simultaneously. This activity does not create a new land map unit, but uses the existing one, namely the 1:250,000 scale RePPPort land system map as a reference. Land system map attributes used to describe land units are variables that affect the process of soil formation and determine soil properties and can be used as a basis for distinguishing soil map units and/or soil types. The analyses in this stage consist of lithology, landform, relief/slope analysis and actual land use.

1.2 Preparation of the Field Observation Plan

Planned maps of soil observations in the field are prepared by considering the diversity of land units, observation techniques, transect systems, accessibility (easy to reach) and available time.

Semi-detailed soil mapping requires 1 observation point for every 250-500 m with an interval between pilot lines/transects of 1 km. The combination of the two transect systems becomes a working map for field observations. In addition, as a consideration of the difficulty level of access in the field, the working map is overlaid with satellite images that can describe land use and cover.
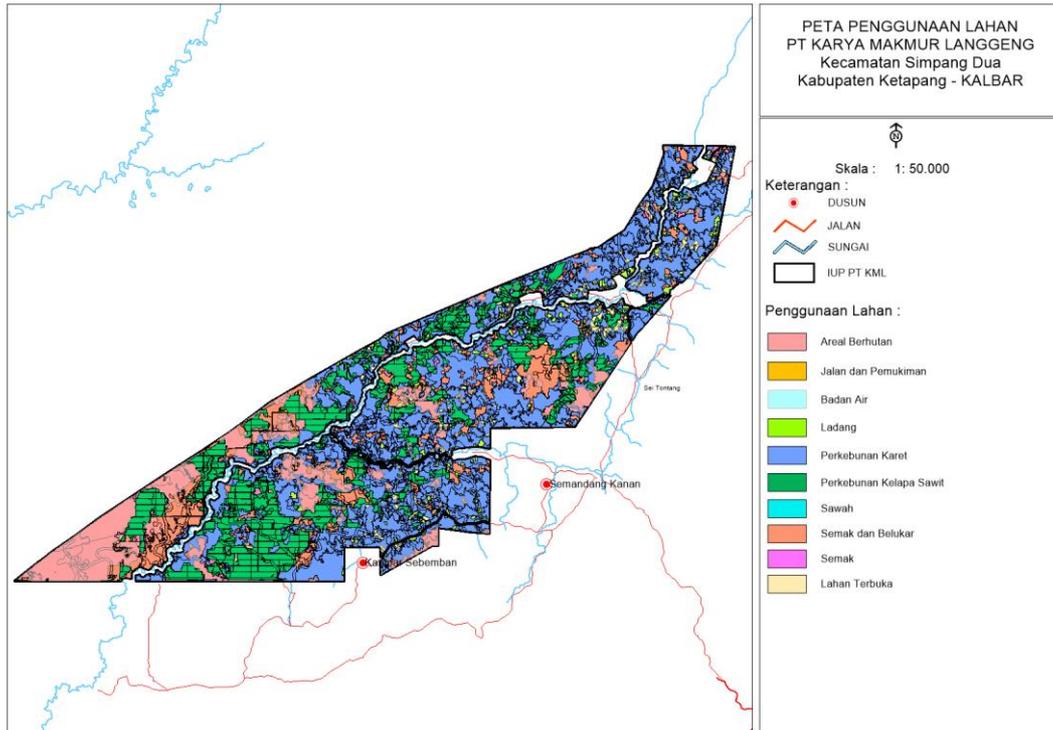
Map 25. Map of Land use and Land Cover on PT KML
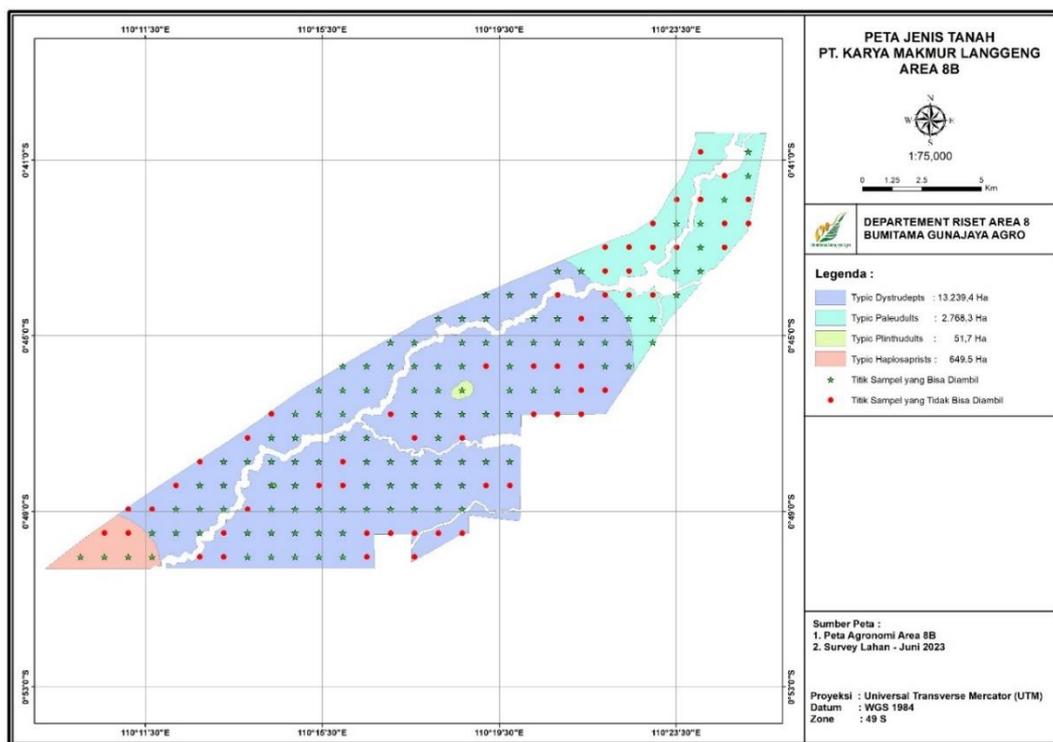
Map 26: Map of Soil Type Observation Survey Point

2. Land Suitability Classification

Classification of land suitability for oil palm growing on mineral soil and peat soil surveyed at the research location refers to the land suitability criteria for oil palm on mineral soil based on technical guidelines for oil palm management published by the Palm Oil Research Center (PPKS) 1995.

Table 38: Land Suitability Criteria for Oil Palm on Mineral Soil

No.	Land Characteristics	Symbol	Limiting Factor Intensity			
			Without (0)	Ringan (1)	Moderate (2)	Berat (3)
1.	Rainfall (mm)	h	1.750-3.000	1.500-1.750; >3.000	1.250-1.500	<1.250
2.	Dry Moon (<60 mm)	k	<1	1-2	2-3	>3
3.	Elevation (m dpl)	l	1-100	200-300	300-400	>400
4.	Territory shape/ Slope (%)	w	Flat- undulating <8	Wave - Undulating 8-15	Undulating – hilly 15-30	Hilly- Mountain >30
5.	Rocks on the surface and underground (% v)	b	<3	3-15	15-40	>40
6.	Effective Depth (cm)	s	>100	75-100	50-75	<50
7.	Soil Texture	T	Dusty loam, Sandy clay loam, Dusty clay loam, Clay loam	Clay, Sandy clay, Sandy loam, Loam	Sandy loam, Dusty	Heavy clay, Sand
8.	Drainage Class	D	Good, Moderate	Slightly Hindered, Fast	Fast, Hindered	Very fast, Very Inhibited, Flooded
9.	Soil Acidity (pH)	A	5,0-6,0	4,0-5,0	3,5-4,0	<3,5

The analysis will be carried out tabulated or matched using limiting factors between the parameters that have been prepared previously in a desk study with the results of surveys and sampling from the research location.

Table 39: land suitability classification for oil palm plants

Land Suitability Class	Criteria
S1 (Very Appropriate)	Land units having no more than one light delimiter (optimal)
S2 (Appropriate)	Land units that have more than one light barrier and/or do not have more than one moderate barrier
S3 (Fairly Appropriate)	Land units that have more than one medium barrier and/or do not have more than one heavy barrier

N (Not Appropriate))	Land units that have two or more weight barriers that can still be repaired

*Source: Buana, L., D. Siahaan, dan S. Adiputra. 2003. Modul M-100-203. Kultur Teknis Kelapa sawit, penilaian kesesuaian lahan, disain kebun dan pembukaan lahan. Pusat Penelitian Kelapa Sawit. Medan. Hal:1-9

The primary data required is the physical and chemical properties of the soil through taking whole or composite soil samples. The parameters for compiling a community oil palm technology assembly consist of overflow typology, plant age, seed preparation, land preparation and planting, fertilization, maintenance and harvesting. Secondary data includes climate data and production data.

Study and Analysis

Soil characteristics and classification

Description of Cross Section or Soil Profile

Representative soil profiles are described and represent each soil unit (soil group/subgroup). This profile is important for determining and classifying soil types. The data and information presented in the soil profile description are field observation data. The following is a description of each soil map unit and soil type.

Dystrudepts

Uraian Morfologi	Kedalaman (cm)		
	0-22	22-70	70-100
Warna	10YR 5/1 Gray	10YR 4/1 Dark Gray	10YR 3/1 Very Dark Gray
Tekstur	Lempung	Lempung	Lempung Liat Berpasir
Struktur	Angular	Angular	Angular
Konsistensi	Gembur	Gembur	Liat
Plastisitas	Plastis	Plastis	Sangat plastis
Batuan	Tidak ada	Tidak ada	Tidak ada
Perakaran	Akar halus	Tidak ada	Tidak ada

Endoaquepts

Uraian Morfologi	Kedalaman (cm)		
	0-45	45-92	>92
Warna	10YR 4/2 Dark Grayish Brown	2,5 Y 8/1 Very Pale Brown	2,5 Y 7/4 Pale Yellow
Tekstur	Lempung Berpasir	Lempung Liat Berpasir	Lempung Liat Berpasir
Struktur	Angular	Angular	Angular
Konsistensi	Gembur	Gembur	Liat
Plastisitas	Plastis	Plastis	Sangat plastis
Batuan	Tidak ada	Tidak ada	Tidak ada
Perakaran	Akar halus	Tidak ada	Tidak ada

Paleudults

Uraian Morfologi	Kedalaman (cm)	
	0-25	25-100
Warna	10YR 6/6 Brownish Yellow	5YR 5/8 Yellowish Red
Tekstur	Lempung Berpasir	Lempung Liat Berpasir
Struktur	Angular	Angular
Konsistensi	Gembur	Gembur
Plastisitas	Plastis	Plastis
Batuan	Tidak ada	Tidak ada
Perakaran	Akar halus 5%	Tidak ada

Plinthudults

Uraian Morfologi	Kedalaman (cm)	
	0-10	10-100
Warna	10YR 4/1 Dark Gray	10YR 5/8 Brown
Tekstur	Lempung berpasir	Lempung
Struktur	Angular	Angular
Konsistensi	Gembur	Gembur
Plastisitas	Sedikit Plastis	Sedikit Plastis
Batuan	30% > 2mm	80% > 2mm
Perakaran	Akar halus 25%	Tidak ada

Udifluvents
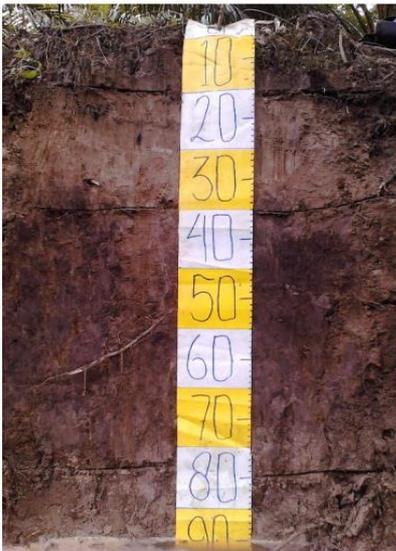
Uraian Morfologi	Kedalaman (cm)		
	0-30	30-75	75-100
Warna	10YR 5/3 Brown	10YR 3/2 Very Dark Grayish Brown	10YR 4/4 Dark Yellowish Brown
Tekstur	Lempung berpasir	Lempung Liat Berpasir	Lempung Liat Berpasir
Struktur	Angular	Angular	Angular
Konsistensi	Gembur	Teguh	Teguh
Plastisitas	Plastis	Sedikit Plastis	Sedikit Plastis
Batuan	Tidak Ada	Tidak Ada	Tidak Ada
Perakaran	Akar halus 45%	Akar halus 1%	Tidak Ada

Quartzpsamments

Uraian Morfologi	Kedalaman (cm)		
	0-20	20-40	40-100
Warna	2,5 Y 4/1 Dark Gray	2,5 Y 8/1 White	2,5 Y 6/3 Light Yellowish Brown
Tekstur	Pasir	Pasir	Pasir
Struktur	Granular	Granular	Granular
Konsistensi	Lepas	Lepas	Lepas
Plastisitas	Tidak Plastis	Tidak Plastis	Tidak Plastis
Batuan	Tidak Ada	Tidak Ada	Tidak Ada
Perakaran	Akar halus 25%	Akar halus 15%	Tidak Ada

Haplosaprists

Mature Peat Soil (Typic Haplosaprists) Depth > 3 m

Description: 0-60 cm (saprists, 7.5 YR 3/3-dark brown)

Soil Type Classification and Mapping

Soil type mapping provides information about soil types up to subgroup level. The observation in the field and analysis, it shows that there are 7 types: Dystrudepts, Endoaquepts, Paleudults, Plinthudults, Quartzpsamments, Udifluvents, and Haplofibrists. This difference is more due to factors that make up the parent material of the soil and the environment that forms soil pedogenesis.

Table 40: Total area by soil type in PT KML

Soil Type	Area	
	Ha	%
Dystrudepts	8,972.82	54
Endoaquepts	2,860.00	17
Haplofibrists	753.90	5

Paleudults	945.35	6
Plintudults	196.80	1
Quartzpsamments	660.28	4
Udifluvents	2,319.81	14
Total	16,708.96	100
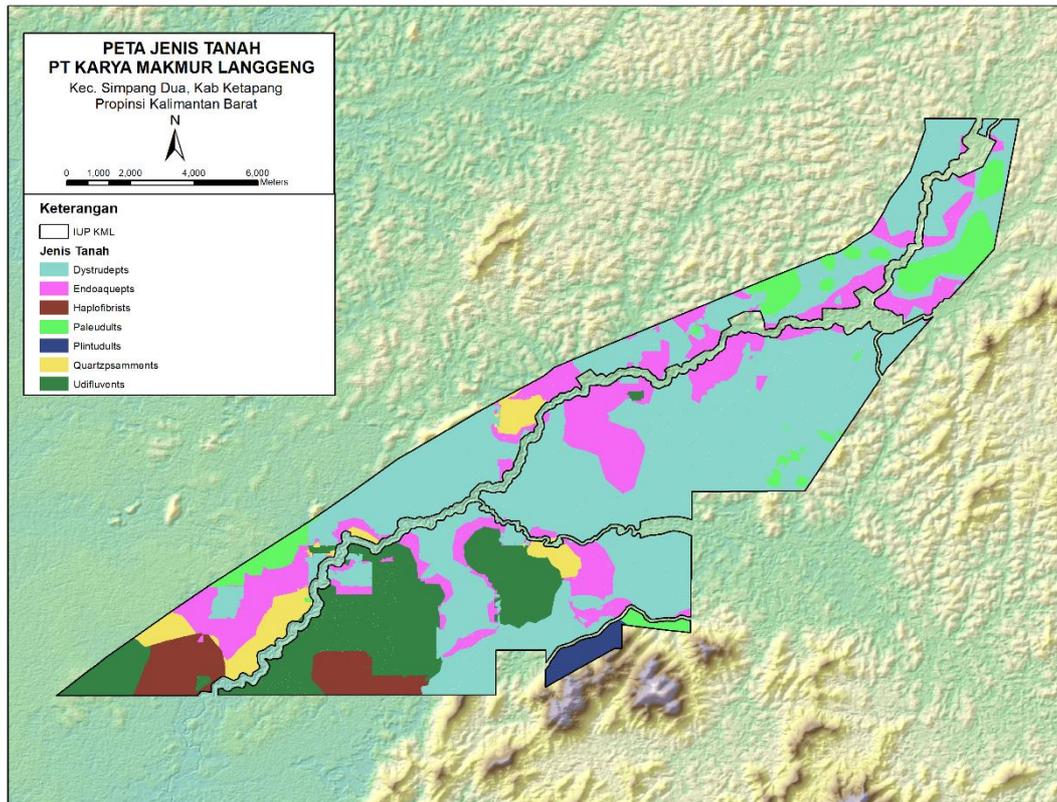
Map 27: Soil Type in the area of PT KML

The following is an explanation of each type of soil and its classification:

Inceptisols

Inceptisols are a type of young soil and are starting to develop. The profile has a horizon that forms rather slowly as a result of alteration of the parent material. The horizons do not show the results of incentive weathering. The Epipedon includes Umbric and the Endopedon includes Kambic where the description of this soil shows weak indications of being an argillic or Spodic horizon, but there is no indication that it falls into these two horizons.

In the survey area, 2 sub-orders of Inceptisol were found, namely Typic Dystrudepts and Typic Endoaquepts.

Ultisols

Ultisols are soils that have acidic properties, low base saturation and clay accumulation in the lower horizon. Found in wet tropical forest areas, usually in old and stable landscapes. The process of Ultisol formation is from weathering, translocation and accumulation of clay minerals in Horizon B. The characteristic epipedon is ochric or umbric and at the bottom you find argillic or kandic which is more acidic than the upper horizon. Ultisol has relatively low natural fertility and a yellowish or reddish color due to the formation of Fe oxide.

In the survey area, 2 Ultisol sub orders were found, namely Typic Paleudults and Typic Plinthudults.

Entisols

Entisols are included in the category of young soil because they are only in the initial development stage. The word Entisol itself comes from the word Ent (Recent) which means new. Entisol soil has the main characteristic, namely that mineral materials have not yet formed into a pedogenic horizon.

In the survey area, 2 Entisol sub-orders were found, namely Typic Udifluvents and Typic Quartzpsamments.

Histosols

Histosol soil or popular in Indonesia as peat is soil that is formed as an accumulation of organic material, such as the remains of plant tissue, which lasts for a long period of time.

In the survey area, 1 sub-order of Histosols was found, namely Typic Haplosaprists.

Land Suitability

To determine the condition of the land according to the land suitability classification for oil palm at PT KML with the PPKS criteria for mineral soil as presented in the table below.

Table 41: Oil Palm Land Characteristic in the area of PT KML

No.	Land Characteristic	Symbol	Environmental Conditions
1.	Rainfall (mm)	h	2,700 – 3,000
2.	Dry Moon (<60 mm)	k	1 – 2
3.	Elevation (m dpl)	l	9.6 - 892
4.	Territory shape/ Slope (%)	w	Undulating – hilly 0 - 45
5.	Rocks on the surface and underground (% v)	b	< 3
6.	Effective Depth (cm)	s	75 - 100
7.	Soil Texture	t	Sandy Loam, Dusty Loam
8.	Drainage Class	d	a bit hindered, hindered, a bit fast
9.	Soil Acidity (pH)	a	3.8 - 5

Topography

The land surface morphology in this region is dominated by flat to undulating landforms with the height above sea level in most areas being less than 150 meters above sea level. The slope level of the land is mostly flat-wavy (0-8%) and undulating (8-15%). Flat land is located in the South, while undulating landforms are located in the North. Other landforms are hilly areas in the southeastern part around Pantan Hamlet and in the central part, such as Bukit Juring, Seriung and Bukit Tujubelas.
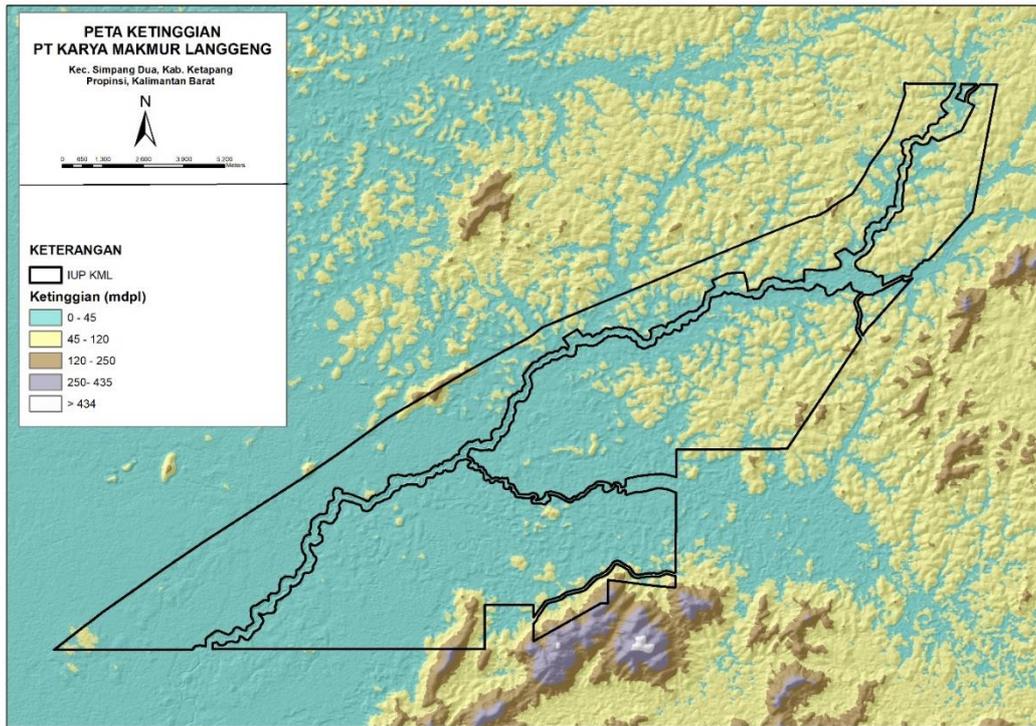
Map 28a: Map of Topography
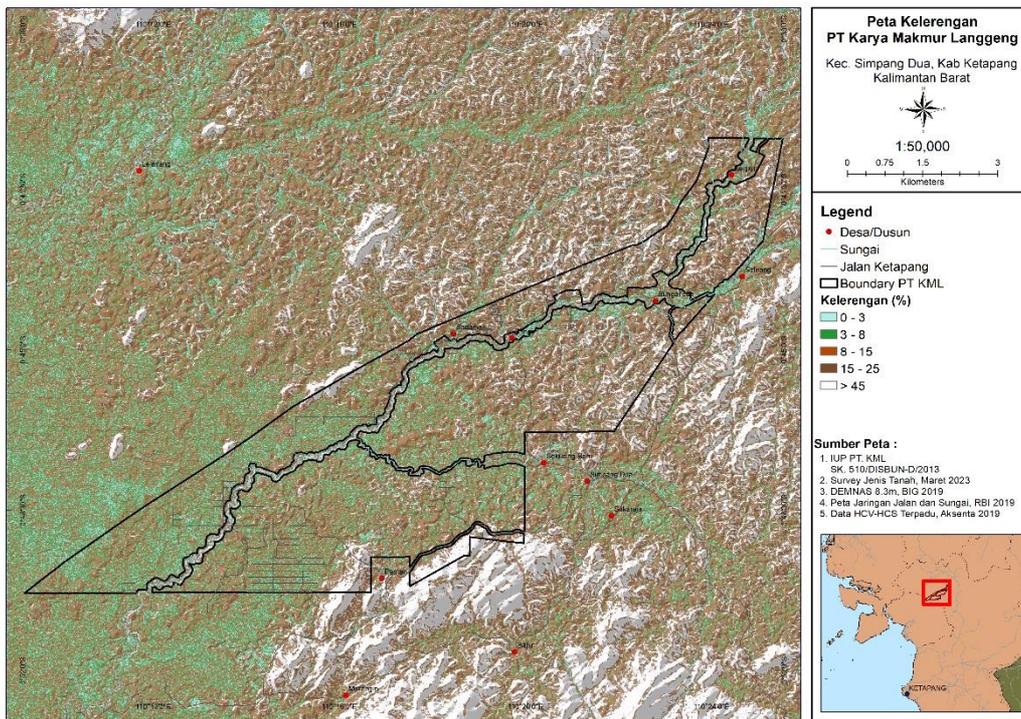
Map 28b: Map of Slope

Hydrologi

PT KML is in a wet tropical climate area. This climatic condition is influenced by the movement of the tropical convergence belt zone (Inter Tropical Convergency Zone), so that the rain pattern that occurs in this region is of the equatorial type with two peaks

of rain a year in February-March and October-November. This condition results in high rainfall erosivity so that the processes of leaching and weathering of the clay rock parent material located in the Southeast take place with high intensity and produce soil types in the ultisol order. Rainfall data at the nearest BMKG station (Ketapang) shows that annual rainfall in this area is 2,000-2,500 mm/year, and the air temperature ranges from 21-35°C with an average of 27.4°C.

In the context of the river basin, the entire PT KML is located in the Pawan watershed, specifically in the Semandang sub-watershed, central part. This sub-watershed directly borders the Kualan sub-watershed to the north, the Mata-Mata sub-watershed to the West, and the Sei Laur sub-watershed to the east. The Kualan sub-watershed itself is part of the Kapuas watershed. The Semandang River flows from North to South, thus separating the PT KML area into two parts (West and East). In both parts flow tributaries of the Semandang River. In the western part there are rivers such as the Baung River, Gemuruh River, Kenipe River and Malake River. In the eastern part, tributaries such as the Banjur River, Sei Penyawan River, Luyau River, Sebuluh River and Pelanduk Jirak River flow. In the eastern part there is also an important area for water catchment in the context of a watershed, namely the Seriung Hills area. This hill is the upstream of the tributaries of the Banjur River and the Penyawan River. Each tributary of the Semandang River also has tributaries. Almost all of these tributaries have toponymy. This is an indication that there is interaction in the use of land or water resources by local communities.
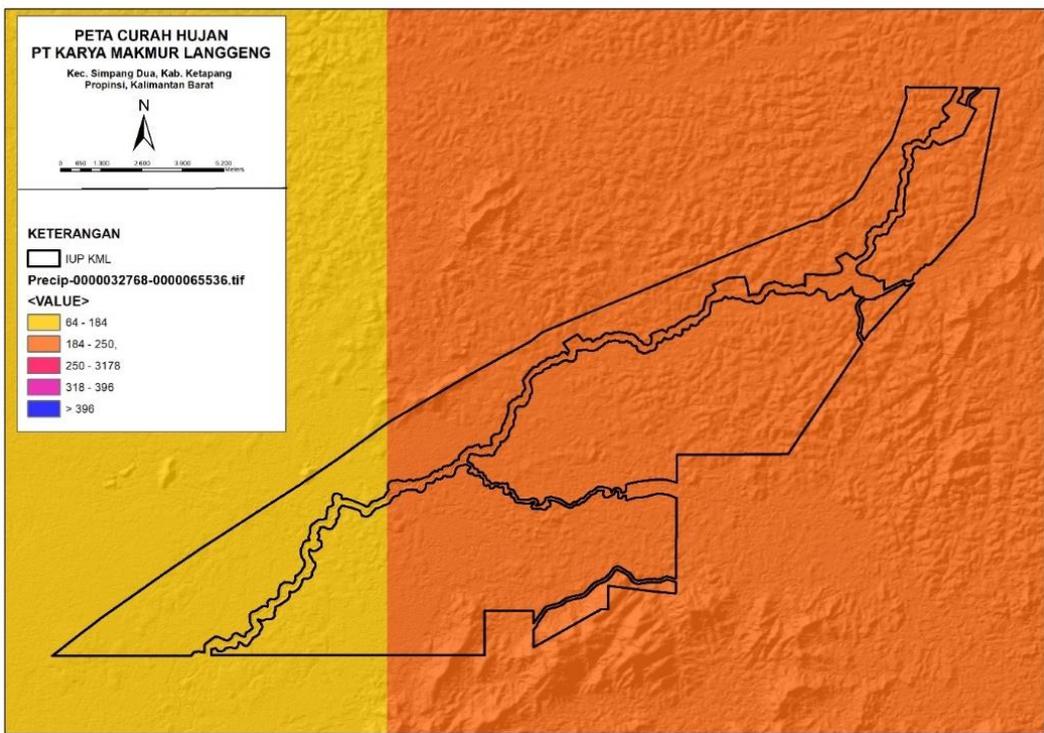
Map 29: Map of Rainfall in the area of PT KML

Land Suitability Class for Oil Palm

The land suitability at PT KML shows that analysis result from the assessment shows that there are 3 land suitability classes, as follows:

Table 42: Land Suitability Classes

Plantation	Land Suitability	Limiting Factor	Total (ha)
KML	S2	Territory shape/ Slope (5)	13,143.53

	S3-d	Availability of Nutrients, Rooting Media	3,394.89	
	N	% slope	170.53	
		Total Area	16,708.95	
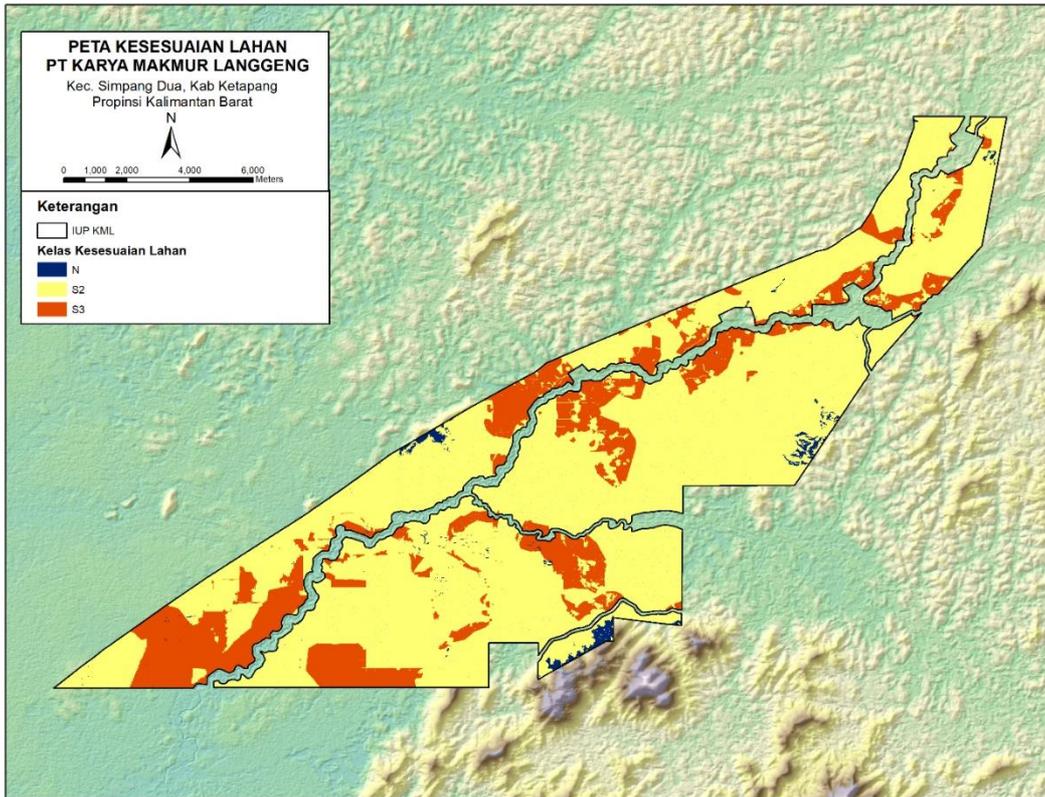
Map 30: Map of Land Suitability in the area of PT KML

Section 7: Greenhouse Gas (GHG)

Greenhouse gas emissions on the development plans area are calculated using the RSPO PalmGHG Calculator Version 4.0, as of July 2021, for New Development. This assessment carried out by Saeshaputi R.P and M. Vikky Arindi (internal Bumitama) on July - August 2023. PT KML has submitted its GHG Report for New Planting, which includes plans on how to mitigate its emission to the Greenhouse Gas Unit at RSPO and has been approved to proceed to the next step of NPP process on 04 September 2022.

1. **Data used**

The development and new planting for PT Karya Makmur Langgeng will be based on the plantation permit (IUP), an area of 16,700 ha, with a land use description as follows:

Table 43: Land covers conditions and land use of PT Karya Makmur Langgeng

Description of Landuse		Area (ha)
A Develop Area		**4,847.34**
Planted Area	3,279.92	
Community Land	1,422.27	

	Infrastructure	145.14	
B	Conservation		**2,771.36**
	HCV - HCS Integrated	2,771.36	
C	**Plan for Development 2024 - 2026**		**9,090.26**
	Proposed for New Planting	2,071.54	
	01Secondary Forest	349.09	
	02Open Land	149.82	
	03Shrubs	1,572.47	
	05Bushes	0.16	
	Proposed New Planting for Community	7,018.73	
	02Open Land	157.94	
	03Shrubs	1.93	
	04Rubber (Smallholder Land)	6,850.96	
	05Bushes	7.90	
	Total Area (A+B+C)		**16,708.96**

Table 44. Summary of Land Cover Class and Carbon Value

HCS Land Cover Classification	Area (ha)	Number of Plots	Average Carbon Stock (ton-C/ha)	Total Carbon Stock (kilo Ton-C)
Potential HCS Land Cover Class				
High Density Forest	-	-	-	-
Moderate Density Forest	-	-	-	-
Low Desnity Forest	636.50	20.00	102.50	65.20
Young Regenerating Forest	1,377.30	38.00	56.20	77.40
Non-potential HCS Land Cover Class				
Young Shrubs	1,988.10	52.00	26.50	103.40
Oil Palm	3,952.90	-	-	-
SH (Rubber, Community Land)	8,275.80	49.00	48.00	405.50
Bareland	85.10	26.00	6.70	2.20
Others	363.20	-	-	-

Secondary data from company; trend of use of and sources of fertilizer, trend of FFB production, trend of mill extraction rate, trend of empty bunch and shells usage, trend of management of POME.

2. **Planting Cycles   : 25 years of planting cycles.**

3. **Dosage of fertilisers**
   a) TSP 2 kg/year/plant from Egypt
   b) MOP 2 kg/year/plant from Canada
   c) Urea 1.5 kg/year/plant from Bontang, East Kalimantan
   d) Kieserit 1.5 kg/ year/plant from Germany

4. **Yield**
   FFB per year: 25 tonnes (average of Bumitama)

5. **Processing**
   a) Extraction CPO 22% (average of Bumitama's Mill)
   b) Extraction Kernel 5 % (average of Bumitama's Mill)
   c) Extraction Shell 4 % (2% to be used and 2% for sale)

6. **Conservation Area**

Conservation Area (integrated HCV- HCS) determined by the company are 2,771.36 ha. This area includes the peat land and there will be no land clearance in the Conservation Area.

7. **Processing Maps**
   ▪ Overlay between maps displaying permit boundaries, conservation area, land cover and soil types to get the potential area for planting.
   ▪ Cut and overlay maps based on block characteristics.

8. **Alternatives of land clearing**
   ▪ Preparation of the alternatives of land clearing based on cut and overlay maps by block characteristic.
   ▪ The alternatives of land clearing are based on Sustainability Policy and regulations, good agricultural practices, good management of mills, considering the carbon stock rate of the area.

Table 45. Description of Development Scenarios

	Protected to Conservation Area	Soil Type	Mill	Methane Capture (Flare)	Landcover					Total Planted	
					YRF	Open Land	Shrubs	Rubber	Bushes	Company	Partnership with the Community
Scenario 1	Y	Mineral Land	Y	Y	Y	Y	Y	Y	Y	2,071.54	7,018.73
Scenario 2	Y	Mineral Land	Y	Y	N	Y	Y	Y	Y	1,722.45	7,018.73
Scenario 3	Y	Mineral Land	Y	Y	N	Y	N	Y	Y	155.50	6,232.57

Table 46. Resume of Development Scenarios

	Description of Landuse			Scenario of Development		
				Alt 01	Alt 02	Alt 03
A	Develop Area		4,847.34	4,847.34	4,847.34	4,847.34
B	Conservation		2,771.36		-	
	HCV - HCS Integrated	2,771.36		2,771.36	2,771.36	2,771.36
	Other Conservation Area	-		-	349.09	2,702.18
C	Plan for Development 2024 - 2026					
	Proposed for New Planting		2,071.54	2,071.54	1,722.45	155.50
	01Secondary Forest	349.09		349.09	-	-
	02Open Land	149.82		149.82	149.82	39.73
	03Shrubs	1,572.47		1,572.47	1,572.47	115.77
	05Bushes	0.16		0.16	0.16	-
	Proposed New Planting for Community		7,018.73	7,018.73	7,018.73	6,232.57
	02Open Land	157.94		157.94	157.94	157.94
	03Shrubs	1.93		1.93	1.93	0.02
	04Rubber (Smallholder Land)	6,850.96		6,850.96	6,850.96	6,066.71
	05Bushes	7.90		7.90	7.90	7.90
	Total Area Propsed for New Planting		9,090.26	9,090.26	8,741.17	6,388.08
	Plan for Methane Capture (Flares)			Y	Y	Y
	Total Area (A+B+C)		16,708.96	16,708.96	16,708.96	16,708.96

Map 31. Scenarios on Development Plan of PT KML

(All the Conservation Area are avoided to land clearance)

Alternative_01

Legend
- Sungai
- Jalan
- PT_KML

Alternatif 01
- Community Landuse
- Existing Plantation
- Indicative Conservation
- Infrastruktur
- Potential Development
- Potential Development(Community)

Alternative_02

Alternative_03

Legend
- Sungai
- Jalan
- PT_KML

Alternatif 03
- Community Landuse
- Existing Plantation
- Indicative Conservation
- Infrastruktur
- Konservasi - Alt 03
- Potential Development
- Potential Development(Community)

9. Greenhouse Gas Emission Calculation

1) Entering the data from each of the alternatives into the Palm GHG Calculator, obtain the results of the carbon emissions per ton of CPO production

2) Choose an alternative plan for land clearance and GHG management which may not necessary be with the lowest carbon emission but rather an option which balances the goals of the company, the community, in line with the company's Sustainability Policy, meets with RSPO P&C also the Indonesian law and regulation and as well as for the general good for the environment.

Table 47. Summary of GHG calculations based on land clearing alternatives (in tCO$_2$e)

Land Clearing Scenario	Emission (tCO2 e)						
	Land Clearing	Corp. Squest	Fertiliser	N2O	Fuel	Peat	Conservation
Alt 1	64,107.96	(74,920.42)	129.78	8,616.36	3,091.55	-	(6,245.52)
Alt 2	57,193.97	(77,566.39)	124.80	8,285.47	2,972.83	-	(7,118.24)
Alt 3	45,271.78	(56,685.74)	91.20	6,055.05	2,172.55	-	(13,000.97)

Table 48. Total Emission per ton of product based on the land clearing alternatives

Alt.	Total Field Emission tCO2e	t CO2e/ha	tCO2e/t FFB	tCO2e/t CPO	tCO2e/t PK
1	(5,220.29)	(0.61)	(0.03)	(0.09)	(0.09)
2	(16,107.57)	(1.94)	(0.10)	0.08	0.08
3	(16,096.14)	(2.66)	(0.13)	(0.20)	(0.20)

Graphic 1. GHG Calculation based on land clearing alternatives
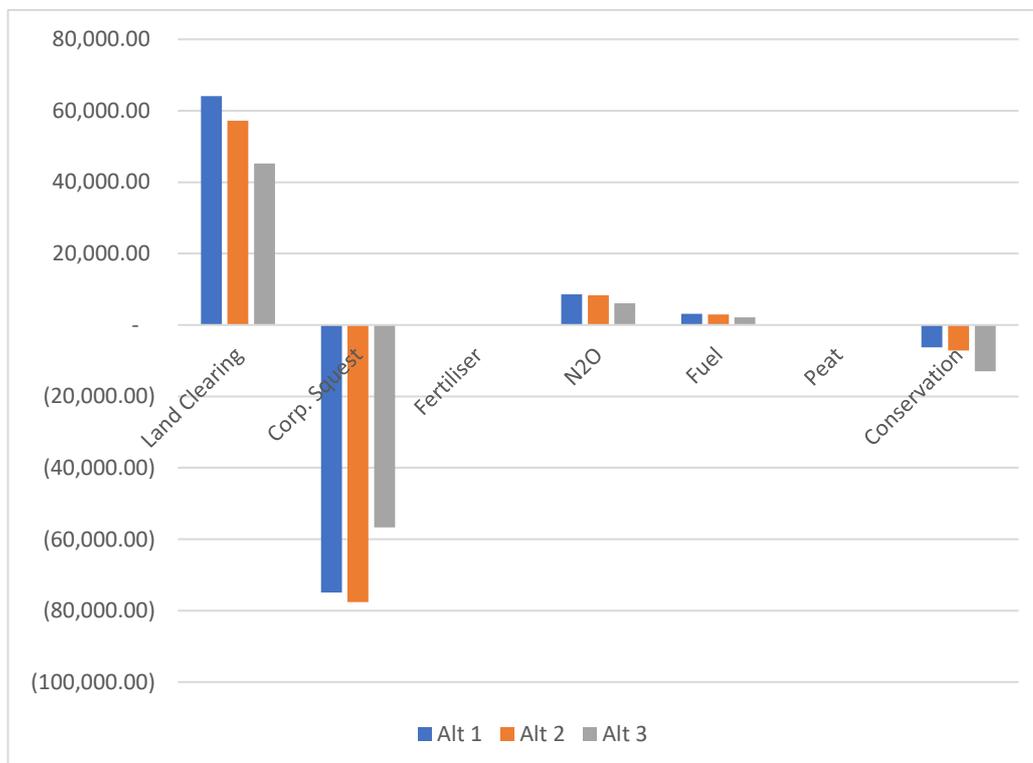
10. **Choosing the Optimal Scenario for Land Clearance**

Based on the GHG calculation, PT KML will follow land clearance in accordance with the first alternative, with total emission produced from estate (plantation) – 5,220.29 tones CO_2e. While the emissions per ton of product (FFB) is – 0.03 tons CO_2e, with – 0.61 tones CO_2e/ha. This option was chosen by considering the wishes of the community during the FPIC process, to not include their rubber plantation land/ fields into the Conservation Area. They wish the community land can be more beneficial economically, for example to be converted into oil palm plantations.

The details are following:

1) No land clearance on planned conservation areas;
2) Land clearance of all mineral land in any land cover;
3) Plan both for mill and methane capture facilities;
4) Total planting plan = **9,090.26** ha, and will be divided into 3 years of development

Table 49. Three Years Planting Projection of Proposed New Planting Area at PT KML

Description of Landuse		Area	
		(ha)	**%**
A Develop Area		**4,847.34**	**29%**
Planted Area	3,279.92		
Community Oil Palm	1,422.27		
Infrastructure	145.14		
B Conservation		**2,771.36**	**17%**
HCV - HCS Integrated	2,771.36		
C Plan for Development		**9,090.26**	
Proposed for New Planting	2,071.54		**12%**
2024	984.24		
2025	937.07		
2026	150.22		
Proposed New Planting for Community	7,018.73		**42%**
2024	3,123.75		
2025	2,270.05		
2026	1,624.92		
Total Area (A+B+C)		**16,708.96**	

Table 50. Carbon Value Summary of the Development Area

Potential Development Area		Area (ha)	tC/ha	tCO2e/ha	Total tCO2e
2024		**4,108.00**			
01Secondary Forest	187.12		56.20	469.33	87,820.58
02Open Land	121.85		6.70	24.57	2,993.47
03Shrubs	717.98		26.50	90.05	64,656.74
04Rubber	3,030.70		48.00	176.00	533,403.63
05Bushes	50.35		6.70	24.57	1,236.81
2025		**3,207.12**			
01Secondary Forest	147.42		56.20	469.33	69,189.89
02Open Land	31.14		6.70	24.57	765.07
03Shrubs	749.60		26.50	90.05	67,504.19
04Rubber	2,232.05		48.00	176.00	392,840.80
05Bushes	46.91		6.70	24.57	1,152.37
2026		**1,775.14**			
01Secondary Forest	14.55		56.20	469.33	6,828.24
02Open Land	38.48		6.70	24.57	945.31
03Shrubs	106.51		26.50	90.05	9,591.97
04Rubber	1,588.37		48.00	176.00	279,552.61
05Bushes	27.23		6.70	24.57	668.93
Total Area		**9,090.26**			
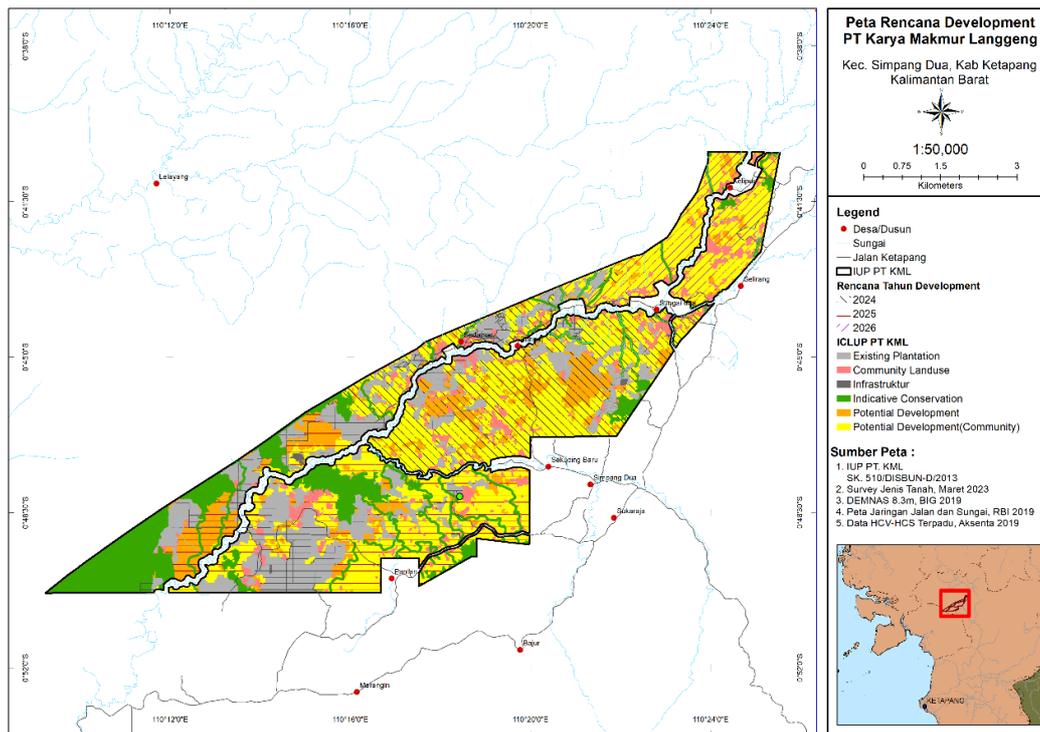
Map 32. Development Plan Area on PT KML

Section 8: Land Use Change Analysis (LUCA)

PT KML has conducted and reported a Land Use Change Analysis to the RSPO, and it was declared a Pass on 05 August 2014. The analysis is based on the HCV assessment conducted by PT KML for the first time in July 2012 – March 2013. This LUC analysis was carried out by the Bumitama Internal Team. These analysis shows that there was no land clearing and development carried out before the HCV assessment was completed. Thus, it was concluded that PT KML had zero compensation and zero remediation.

Table 8.1: Team Involved during the Land Use Change Analysis

Name	Expertise
M. Vikky Arindi	GIS, Remote Sensing, Geospatial modelling & analysis
Putra Wibowo Malau	GIS, Remote Sensing, Geospatial modelling & analysis, Carbon Value analysis
Aldi Apriandi	GIS, Remote Sensing

Assessment Methodology

The methodology adopted to analyse the LUC analysis conducted by the company was by visually and statistically assessing the remote sensing images and other spatial data submitted by the company to RSPO. The first step of the assessment process was checking all the data submitted by the company for their completeness according to the LUC Reporting Checklist. When all required data are complete, the next step was visual inspection of the satellite imageries for their qualities i.e., cloud coverage, stripes in Landsat 7 images etc. Subsequently, the images were overlaid onto the geo-referenced boundary of the management unit, and visually verified if the satellite image/s cover the entire management unit and detecting for any irregularities.

The next step was verification of the area of the management unit. This was done by geometrical calculation on the boundary shapefile and cross checking it with the reporting template provided by the company. The land cover classes provided by the company were assessed by overlaying the land cover classes onto the pre-processed satellite imageries and visually inspect for their correctness. Geometrical calculation was also conducted to verify the area (ha) of the land cover classes and compared to the calculation conducted by the company. The verification of the vegetation coefficient was also conducted by crosschecking the vegetation coefficient classification with the land cover classes and vegetation coefficient definitions. The LUC analysis methodology was verified by visually inspecting the classification results and checking whether any irregularities is present in the data.
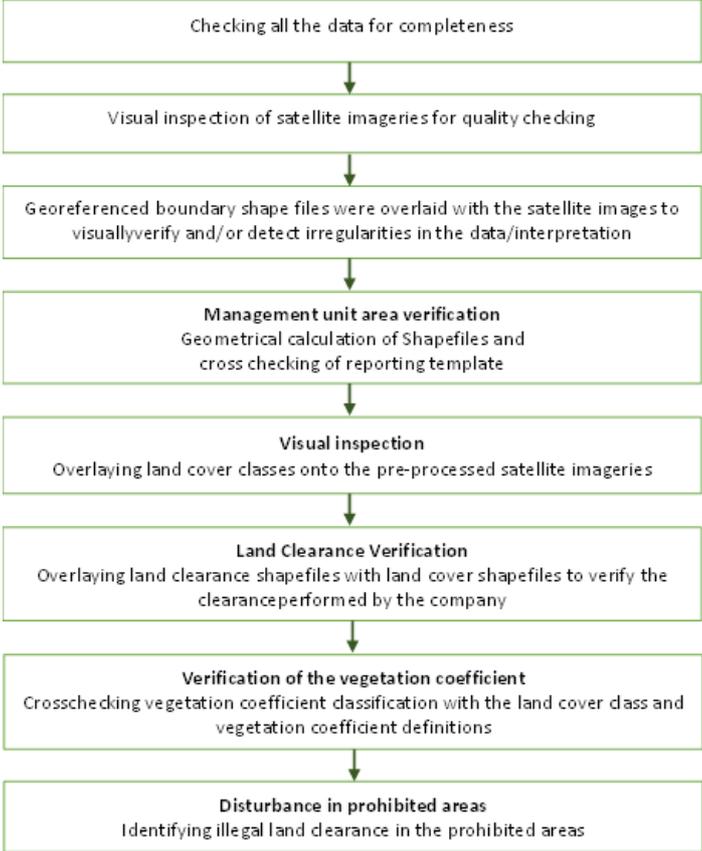
Flow Chart 1. The methods used to assess the LUC report submitted by the company

Data Used

Table 51. Time Series of Satellite Imagery used for LUCA

No	Periode	Satellite Imagery	Acquisition Date	Analysis
1	Nov 2005 - Nov 2007	Landsat 5	Aug-05	Land Cover
2	Dec 2007 - Dec 2009	Landsat 7	Jun-07	Land Cover
3	Jan 2010 - May 2013	Landsat 7	May-10	Land Cover
4	May 2013 - Nov 2016 (first NPP of PT KML	Landsat 8	Aug-13	Land Cover
5	May 2016 - Nov 2019	Landsat 8	Sep-16	Land Cover
6	May 2019 - Nov 2023	Sentinel 2B	Sep-19	Land Cover
7	Latest Condition, when NPP Verification Carried Out	Sentinel 2A	Sep-23	Land Cover

Land Use Change Calculation

Corporate land clearance is defined as land clearing for the purpose of oil palm plantation development and all facilities that support the sustainability of oil palm plantation activities. Whereas Non-corporate land clearance is defined as land clearing outside the

company's objectives, including government projects that involve the community or to build public facilities, or by community members who act individually to support their livelihoods and without funding by any funding institution or organization even.

On satellite imagery, land clearing for corporate purposes can be clearly identified since the pre-assessment in the LUCA study was conducted. Corporate clearance has different land clearing characteristics than community clearing or causes of natural disasters. Land clearing is usually relatively broad, with a fast process, land clearing patterns and land cover depicted on satellite imagery are usually systematic / regular (one or more planting blocks can be seen on satellite images, not sporadic), and land clearing forms are usually square with a straight border. An additional feature that can indicate land clearing or degradation caused by clearing by corporations is the existence of block roads.

Table 52. Historical Land Use Change in each cut-off date (in hectares), based on IUP

Land Cover Class	2005	2007	2010	2013	2016	2019	2023
01Hutan Sekunder	7,266.94	5,418.72	5,410.37	2,276.11	2,252.24	2,031.32	1,980.45
02Lahan Terbuka	268.32	31.93	45.26	861.75	590.68	129.17	1,154.95
03Semak Belukar	3,358.45	1,560.67	1,560.67	8,009.29	11,343.46	2,020.70	1,911.06
04Rubber (SH)	-	-	-	-	-	8,352.16	7,428.86
05Semak	-	-	-	-	-	83.44	157.02
06Ladang	-	-	-	-	-	307.30	251.83
07Sawah	-	-	-	-	-	24.61	8.92
Belukar	5,814.29	9,696.69	9,691.70	5,560.85	230.52	-	-
09Oil Palm	-	-	-	-	2,291.10	3,759.30	3,814.90
10Badan Air	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Grand Total	**16,708.96**	**16,708.96**	**16,708.96**	**16,708.96**	**16,708.96**	**16,708.96**	**16,708.96**

Table 53. Raw land covers data per period on the potential development area

Period November 2005 - November 2007- *in hectares*

Non-Corporate

Land cover class	Jun-07										Grand Total
	01Hutan Sekunder	02Lahan Terbuka	03Semak Belukar	04Rubber (SH)	05Semak	06Ladang	07Sawah	Belukar	09Oil Palm	10Badan Air	
01Hutan Sekunder	5,418.45	16.85	379.23	-	-	-	-	1,452.40	-	-	7,266.94
02Lahan Terbuka	-	0.18	44.64	-	-	-	-	223.50	-	-	268.32
03Semak Belukar	-	3.66	435.86	-	-	-	-	2,918.93	-	-	3,358.45
04Rubber (SH)	-	-	-	-	-	-	-	-	-	-	-
05Semak	-	-	-	-	-	-	-	-	-	-	-
06Ladang	-	-	-	-	-	-	-	-	-	-	-
07Sawah	-	-	-	-	-	-	-	-	-	-	-
Belukar	0.27	11.23	700.94	-	-	-	-	5,101.85	-	-	5,814.29
09Oil Palm	-	-	-	-	-	-	-	-	-	-	-
10Badan Air	-	-	-	-	-	-	-	-	-	0.96	0.96
Grand Total	**5,418.72**	**31.93**	**1,560.67**	**-**	**-**	**-**	**-**	**9,696.69**	**-**	**0.96**	**16,708.96**

(Rows labeled Aug-05)

Non-Corporate

Land cover class	May-09										Grand Total
	01Hutan Sekunder	02Lahan Terbuka	03Semak Belukar	04Rubber (SH)	05Semak	06Ladang	07Sawah	Belukar	09Oil Palm	10Badan Air	
01Hutan Sekunder	5,410.37	8.36	-	-	-	-	-	-	-	-	5,418.72
02Lahan Terbuka	-	31.93	-	-	-	-	-	-	-	-	31.93
03Semak Belukar	-	-	1,560.67	-	-	-	-	-	-	-	1,560.67
04Rubber (SH)	-	-	-	-	-	-	-	-	-	-	-
05Semak	-	-	-	-	-	-	-	-	-	-	-
06Ladang	-	-	-	-	-	-	-	-	-	-	-
07Sawah	-	-	-	-	-	-	-	-	-	-	-
Belukar	-	4.98	-	-	-	-	-	9,691.70	-	-	9,696.69
09Oil Palm	-	-	-	-	-	-	-	-	-	-	-
10Badan Air	-	-	-	-	-	-	-	-	-	0.96	0.96
Grand Total	**5,410.37**	**45.26**	**1,560.67**	**-**	**-**	**-**	**-**	**9,691.70**	**-**	**0.96**	**16,708.96**

(Rows labeled Jun-07)

Period January 2010-May 2013- *in hectares*

Corporate

Land cover class	Aug-13										Grand Total
	01Hutan Sekunder	02Lahan Terbuka	03Semak Belukar	04Rubber (SH)	05Semak	06Ladang	07Sawah	Belukar	09Oil Palm	10Badan Air	
01Hutan Sekunder	-	191.47	-	-	-	-	-	-	-	-	191.47
02Lahan Terbuka	-	2.24	-	-	-	-	-	-	-	-	2.24
03Semak Belukar	-	8.27	-	-	-	-	-	-	-	-	8.27
04Rubber (SH)	-	-	-	-	-	-	-	-	-	-	-
05Semak	-	-	-	-	-	-	-	-	-	-	-
06Ladang	-	-	-	-	-	-	-	-	-	-	-
07Sawah	-	-	-	-	-	-	-	-	-	-	-
Belukar	-	65.30	-	-	-	-	-	-	-	-	65.30
09Oil Palm	-	-	-	-	-	-	-	-	-	-	-
10Badan Air	-	-	-	-	-	-	-	-	-	-	-
Grand Total	**-**	**267.27**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**267.27**

(Rows labeled May-09)

Non-Corporate

Land cover class	Aug-13										Grand Total
	01Hutan Sekunder	02Lahan Terbuka	03Semak Belukar	04Rubber (SH)	05Semak	06Ladang	07Sawah	Belukar	09Oil Palm	10Badan Air	
01Hutan Sekunder	2,276.11	205.44	919.31	-	-	-	-	1,818.04	-	-	5,218.89
02Lahan Terbuka	-	4.01	25.91	-	-	-	-	13.11	-	-	43.03
03Semak Belukar	-	160.13	711.95	-	-	-	-	680.32	-	-	1,552.40
04Rubber (SH)	-	-	-	-	-	-	-	-	-	-	-
05Semak	-	-	-	-	-	-	-	-	-	-	-
06Ladang	-	-	-	-	-	-	-	-	-	-	-
07Sawah	-	-	-	-	-	-	-	-	-	-	-
Belukar	-	224.91	6,352.12	-	-	-	-	3,049.37	-	-	9,626.41
09Oil Palm	-	-	-	-	-	-	-	-	-	-	-
10Badan Air	-	-	-	-	-	-	-	-	-	0.96	0.96
Grand Total	**2,276.11**	**594.48**	**8,009.29**	**-**	**-**	**-**	**-**	**5,560.85**	**-**	**0.96**	**16,441.69**

(Rows labeled May-09)

Period May 2013-November 2016 (Period NPP PT KML) - *in hectares*

Corporate

Land cover class		Sep-16										
		01Hutan Sekunder	02Lahan Terbuka	03Semak Belukar	04Rubber (SH)	05Semak	06Ladang	07Sawah	Belukar	09Oil Palm	10Badan Air	Grand Total
Aug-13	01Hutan Sekunder	-	-	-	-	-	-	-	-	-	-	-
	02Lahan Terbuka	-	1.15	-	-	-	-	-	-	265.87	-	**267.02**
	03Semak Belukar	-	15.93	-	-	-	-	-	-	480.15	-	**496.08**
	04Rubber (SH)	-	-	-	-	-	-	-	-	-	-	-
	05Semak	-	-	-	-	-	-	-	-	-	-	-
	06Ladang	-	-	-	-	-	-	-	-	-	-	-
	07Sawah	-	-	-	-	-	-	-	-	-	-	-
	Belukar	-	22.12	-	-	-	-	-	-	1,545.08	-	**1,567.20**
	09Oil Palm	-	-	-	-	-	-	-	-	-	-	-
	10Badan Air	-	-	-	-	-	-	-	-	-	-	-
	Grand Total	**-**	**39.19**	**-**	**-**	**-**	**-**	**-**	**-**	**2,291.10**	**-**	**2,330.30**

Non-Corporate

Land cover class		Sep-16										
		01Hutan Sekunder	02Lahan Terbuka	03Semak Belukar	04Rubber (SH)	05Semak	06Ladang	07Sawah	Belukar	09Oil Palm	10Badan Air	Grand Total
Juni 2013	01Hutan Sekunder	2,252.23	-	-	-	-	-	-	23.87	-	-	**2,276.11**
	02Lahan Terbuka	-	53.46	36.29	-	503.41	-	-	1.58	-	-	**594.73**
	03Semak Belukar	0.01	27.33	6,760.51	-	698.13	-	-	27.24	-	-	**7,513.21**
	04Rubber (SH)	-	-	-	-	-	-	-	-	-	-	-
	05Semak	-	-	-	-	-	-	-	-	-	-	-
	06Ladang	-	-	-	-	-	-	-	-	-	-	-
	07Sawah	-	-	-	-	-	-	-	-	-	-	-
	Belukar	-	470.70	3,324.17	-	20.96	-	-	177.82	-	-	**3,993.65**
	09Oil Palm	-	-	-	-	-	-	-	-	-	-	-
	10Badan Air	-	-	-	-	-	-	-	-	-	0.96	**0.96**
	Grand Total	**2,252.24**	**551.49**	**10,120.96**	**-**	**1,222.50**	**-**	**-**	**230.52**	**-**	**0.96**	**14,378.66**

Period May 2016-November 2019 (Period NPP PT KML) - *in hectares*

Corporate

Land cover class		Sep-19										
		01Hutan Sekunder	02Lahan Terbuka	03Semak Belukar	04Rubber (SH)	05Semak	06Ladang	07Sawah	Belukar	09Oil Palm	10Badan Air	Grand Total
Sep-16	01Hutan Sekunder	-	-	-	-	-	-	-	-	-	-	-
	02Lahan Terbuka	-	-	-	-	-	-	-	-	35.09	-	**35.09**
	03Semak Belukar	-	-	-	-	-	-	-	-	-	-	-
	04Rubber (SH)	-	-	-	-	-	-	-	-	-	-	-
	05Semak	-	-	-	-	-	-	-	-	-	-	-
	06Ladang	-	-	-	-	-	-	-	-	-	-	-
	07Sawah	-	-	-	-	-	-	-	-	-	-	-
	Belukar	-	-	-	-	-	-	-	-	-	-	-
	09Oil Palm	-	-	-	-	-	-	-	-	2,242.29	-	**2,242.29**
	10Badan Air	-	-	-	-	-	-	-	-	-	-	-
	Grand Total	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2,277.38**	**-**	**2,277.38**

Non-Corporate

Land cover class		Sep-19										
		01Hutan Sekunder	02Lahan Terbuka	03Semak Belukar	04Rubber (SH)	05Semak	06Ladang	07Sawah	Belukar	09Oil Palm	10Badan Air	Grand Total
Sep-16	01Hutan Sekunder	2,031.32	1.19	122.84	86.14	3.80	7.84	-	-	1.60	-	**2,254.73**
	02Lahan Terbuka	-	65.19	52.07	238.61	0.38	16.53	-	-	182.12	-	**554.91**
	03Semak Belukar	-	47.74	1,583.03	7,277.74	40.03	254.79	16.54	-	912.37	-	**10,132.24**
	04Rubber (SH)	-	-	-	-	-	-	-	-	-	-	-
	05Semak	-	15.04	168.89	734.01	39.23	21.22	8.07	-	235.59	-	**1,222.05**
	06Ladang	-	-	-	-	-	-	-	-	-	-	-
	07Sawah	-	-	-	-	-	-	-	-	-	-	-
	Belukar	-	-	93.87	15.69	-	6.92	-	-	114.02	-	**230.50**
	09Oil Palm	-	-	-	-	-	-	-	-	36.20	-	**36.20**
	10Badan Air	-	-	-	-	-	-	-	-	-	0.96	**0.96**
	Grand Total	**2,031.32**	**129.16**	**2,020.70**	**8,352.19**	**83.44**	**307.30**	**24.61**	**-**	**1,481.90**	**0.96**	**14,431.58**

Period May 2019-November 2023 (Period NPP PT KML) - *in hectares*

Corporate

Land cover class		Sep-23										
		01Hutan Sekunder	02Lahan Terbuka	03Semak Belukar	04Rubber (SH)	05Semak	06Ladang	07Sawah	Belukar	09Oil Palm	10Badan Air	Grand Total
Sep-19	01Hutan Sekunder	1,980.45	21.13	24.69	-	0.78	-	-	-	4.27	-	**2,031.32**
	02Lahan Terbuka	-	113.49	-	-	15.30	-	-	-	0.38	-	**129.17**
	03Semak Belukar	-	85.72	1,831.73	-	100.29	-	-	-	2.95	-	**2,020.70**
	04Rubber (SH)	-	862.99	1.16	7,428.89	11.20	-	-	-	47.92	-	**8,352.17**
	05Semak	-	4.05	50.78	-	28.53	-	-	-	0.08	-	**83.44**
	06Ladang	-	51.88	2.70	-	0.92	251.80	-	-	-	-	**307.30**
	07Sawah	-	15.68	-	-	-	-	8.92	-	-	-	**24.60**
	Belukar	-	-	-	-	-	-	-	-	-	-	-
	09Oil Palm	-	0.01	-	-	-	-	-	-	3,759.29	-	**3,759.30**
	10Badan Air	-	-	-	-	-	-	-	-	-	0.96	**0.96**
	Grand Total	**1,980.45**	**1,154.95**	**1,911.06**	**7,428.89**	**157.02**	**251.80**	**8.92**	**-**	**3,814.90**	**0.96**	**16,708.96**

Map 33. Time Series LUC Analysis on the potential development area

Aug 2005

Jun 2007

May 2010

Sept 2019

Sept 2016

Aug 2013

Aug 2023

Hutan Sekunder
Perkebunan Karet
Semak
Ladang
Sawah
Lahan Terbuka
Perkebunan Kelapa Sawit
Badan Air
Belukar
Semak Belukar
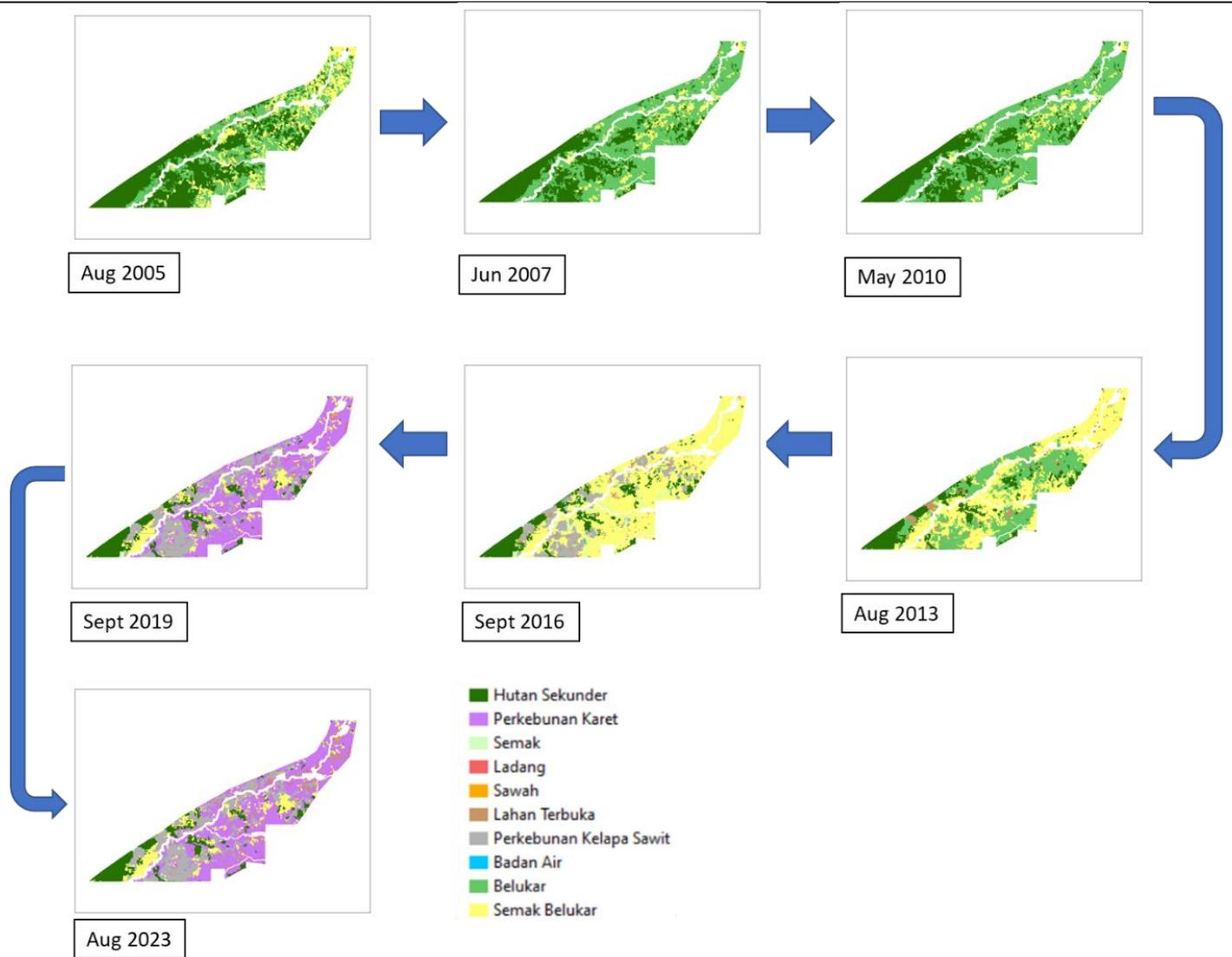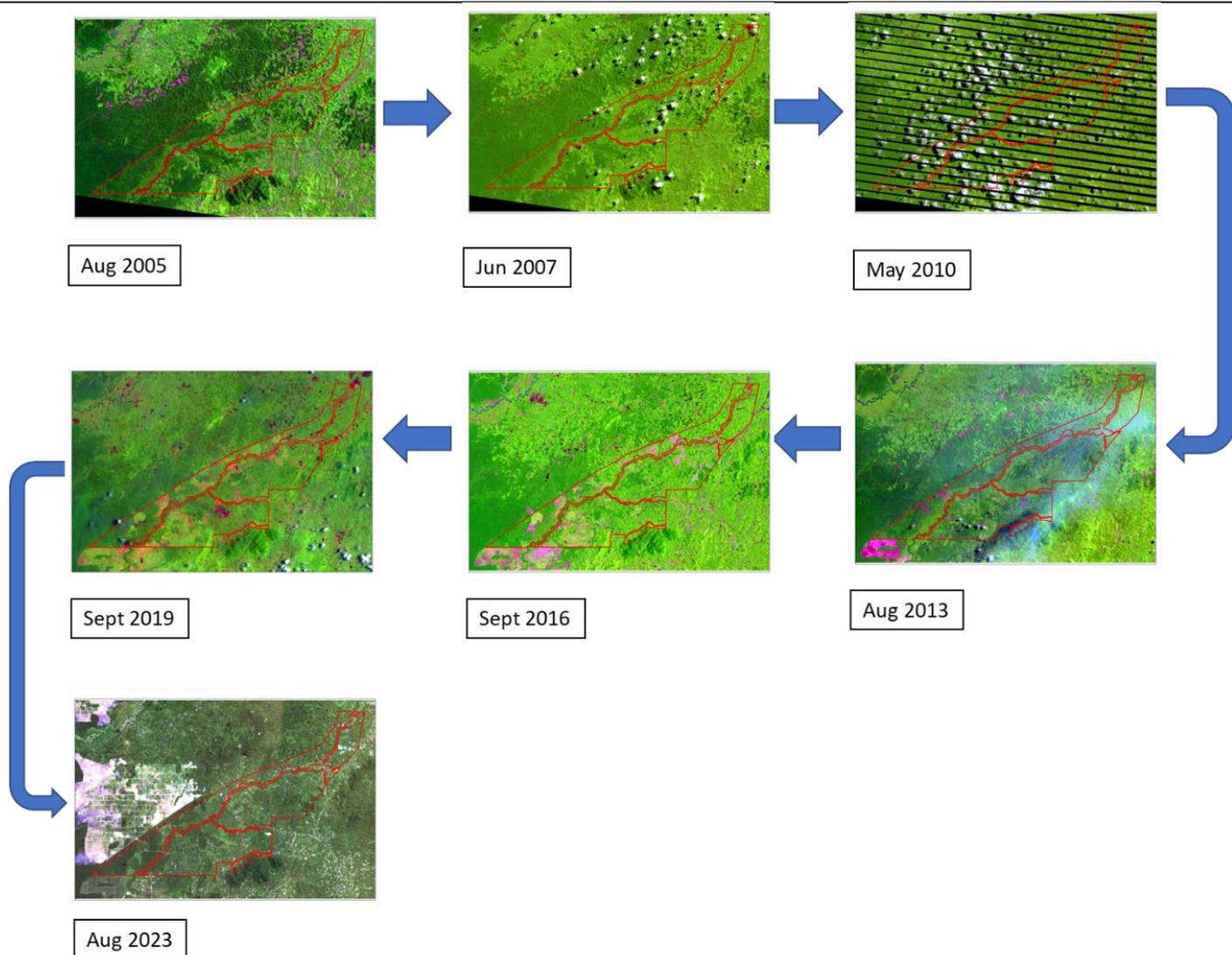
Map 34. Time Series LUC Analysis on the potential development area

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Section 9: Conclusions

PT Karya Makmur Langgeng as a subsidiary of Bumitama Agri Ltd., which is a member of the RSPO, conducts plantation operations with a commitment to the Bumitama Sustainability Policy and adheres to the required sustainability principles.

This study and assessment in the context of PT KML's plantation operations has been carried out based on the prevailing laws and regulations in Indonesia, as well as international regulations that have been ratified. The study was conducted using a standard toolkit that has been recognised/endorsed by global institutions and the RSPO.

Issue(s) to be prioritized:

-   Land tenure by the community is still high. This requires more concern to be able to achieve company targets, both in developing plantation, other land management and partnering with the community.
    For this reason, most of people who owned the land had converted their land into oil palm, both in open areas (potential development area for PT TTL) and areas designated as conservation areas by PT KML, especially during the HCV-HCS review period by HVRN until the NPP filed verification carried out. The community sees new and more promising opportunities in developing oil palm plantations, with increasing FFB prices and opportunities for plasma partnerships with companies. Even

if they are not part of the company's plasma partnership, the community will have a higher bargaining if they sell their land in the form of oil palm plantations.

Along with that, PT KML has endeavored to realize its commitments and policies in managing HCV areas, conducting socialization, demarcation, and monitoring of conservation areas, as well as conveying its intention to compensate for the land as a form of HCV management. However, by prioritizing the principle of FPIC, PT TTL continues to respect the community's decision not to relinquish their area and cultivate their land according to their wishes.

Going forward, as a form of implementation of our NDPE policy, Bumitama' Mill(s) will not receive and process external FFB(s) originating from new land clearings in HCV areas.

The complete HCV management programs refers to Template 3 of this NPP document.

- The quality of local community resources in terms of developing potential alternative livelihoods and meeting the needs of local workers.

Management and Monitoring of recommendations for integrated HCV-HCS assessment, Social Impact, Land Management, and emissions, in detail, including achievement targets and timelines are written in the Summary of Integrated Management Plan document.

Section 10: Confirmation of Report	
This document is the summary of assessment result on Environment Impact Assessment (EIA), Social Impact Assessment (SIA), Integrated High Conservation Value (HCV) – High Carbon Stock HCS), Soil and Topography Survey and Land Use Change Analysis (LUCA) in PT Karya Makmur Langgeng – District of Ketapang, West Kalimantan Province and has been approved by the Management. This Assessment result will be applied as one of the guidelines in managing oil palm plantation.	
Date of Completion	12 October 2023
Signature	
Name	**Martin Mach**
Position	**Deputy Head of Environmental Protection and Governance**
Signature	
Name	**Wedy Sulistyo**
Position	**Director**