Roundtable on Sustainable Palm Oil
New Planting Procedure
Summary of Assessment Report and Management Plan

PT AGRO ABADI CEMERLANG

Toba and Meliau Sub District, Sanggau District,
West Kalimantan
Indonesia

Prepared by :
PT Agro Abadi Cemerlang

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CHAPTER 1. OVERVIEW AND BACKGROUND

1.1. Area of New Planting and Development Plan

PT. Agro Abadi Cemerlang (PT. AAC) is one of the national oil palm plantations which is administratively located in Toba and Meliau District, Sanggau Regency, West Kalimantan Province. In its operation, the company has obtained a license based on the Sanggau Regent Decree No : 400 – 44 / IL – 41 - 2008 concerning the Provision of an Extension of Location Permit to PT. Agro Abadi Cemerlang for the Needs of Oil Palm Plantations in Meliau and Toba Subdistricts, Sanggau District, West Kalimantan with an area of 8,100 ha, then in 2011 get Extension of Location Permit based on the Sanggau Regent Decree No : 266 Tahun 2011 an area of 8.095,58 Ha.

In its NPP scope, PT AAC used an cadastral area based on the submission of Regional Office BPN No. 1499 / P-16 / X / 2015 and BPN Submission Letter Number 1500 / P-16 / X / 2015 with an area of 6,612.09 ha, which included nucleus and plasma. Geographically PT. AAC is located at position 110° 9' 0.74" - 110° 16' 24.12" BT and 0° 15' 39.47" - 0° 22' 39.70" LS (**Figure 1** and **Figure 2**).

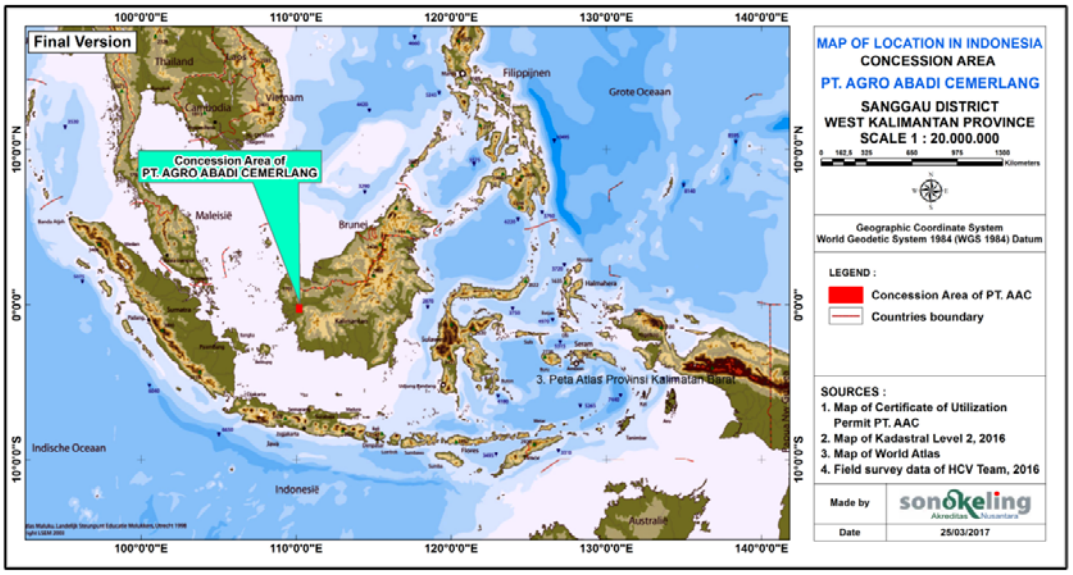


Figure 1. Map of Location permit area of PT AAC in Indonesia

Based on the Map of Forest and Waters Region of West Kalimantan Province Scale 1 : 250,000 (SK.733 / Menhut-II / 2014, September 29, 2014), the area permitted by PT. AAC including Other Use Areas (APL) (**Figure 3**); while according to the Plan Spatial Pattern of West Kalimantan Province In 2007, the permit area of PT. AAC included Dryland Agriculture (**Figure 4**). From this information shows that the existence of the permit area of PT. AAC which is in the Other Use Area (APL) or Dryland agriculture guarantees regional certainty and is included in it safe category in the long run.

The company has carried out operational activities in the field on an area of 5,151.12 Ha with details: 603.46 ha of land that has been acquired and not yet cultivated, land has been cleared and has not been planted with oil palm with an area of 202.30 ha,

and land already planted covering 4,345.36 ha. The planting of oil palm in the area was first carried out in 2005 covering 53.39 ha, while the remainder was carried out in 2006 to 2016. Production activities in the area began in 2008 on an area of 53.39 ha. Based on land ownership, ownership of land in the permit area of PT. AAC consists of two types, main plant (5,177.46 ha) and plasma (1,434.63 ha).

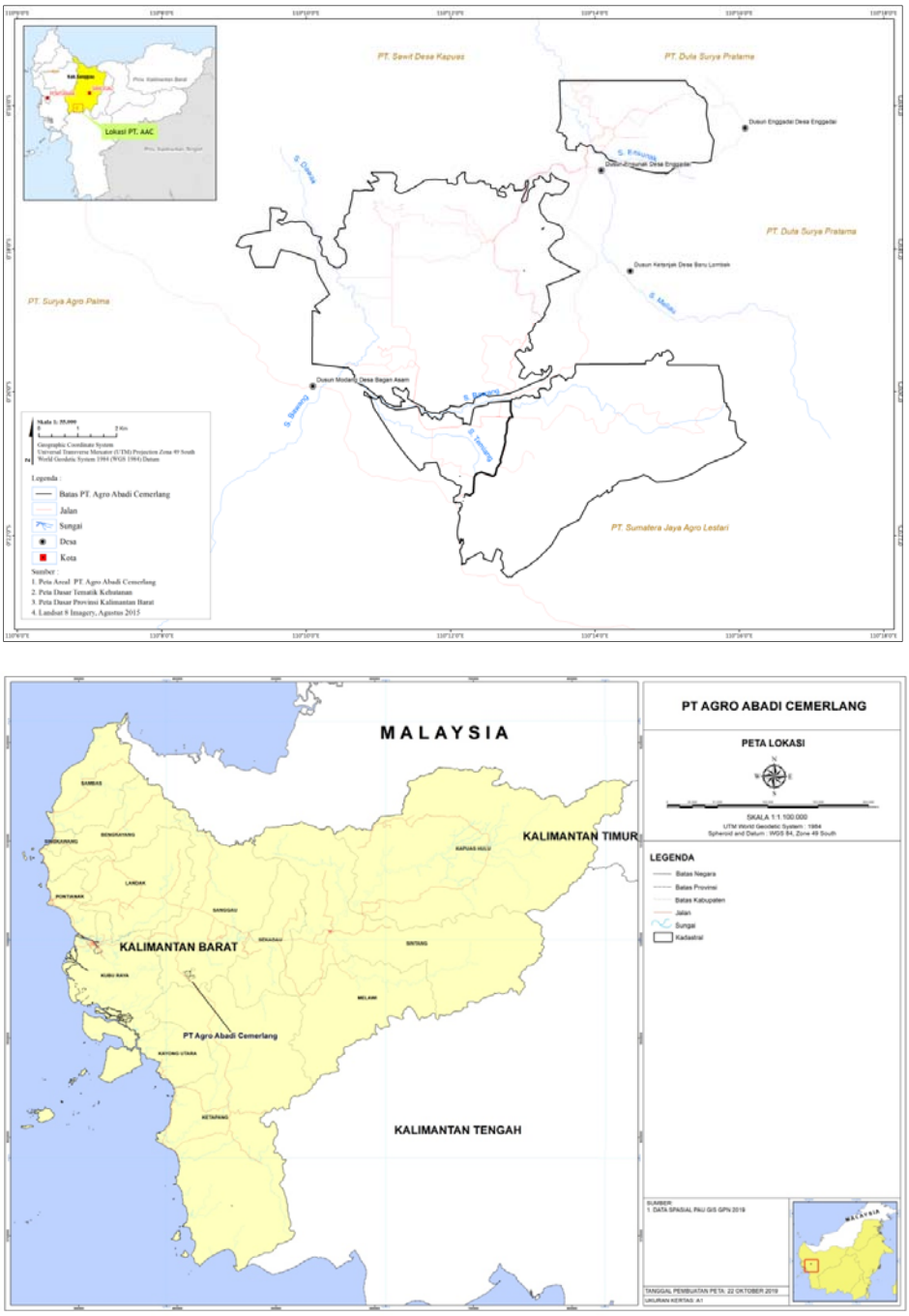


Figure 2. Map of Permit Area PT. AAC

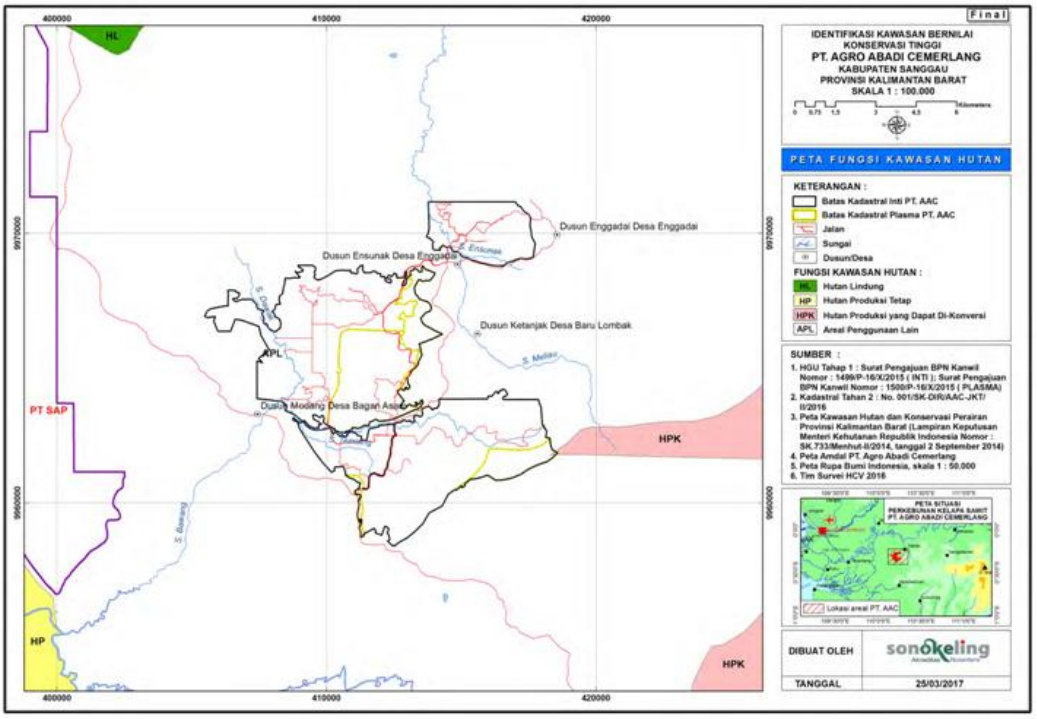


Figure 3. Final Map of the Area Function in the PT. AAC

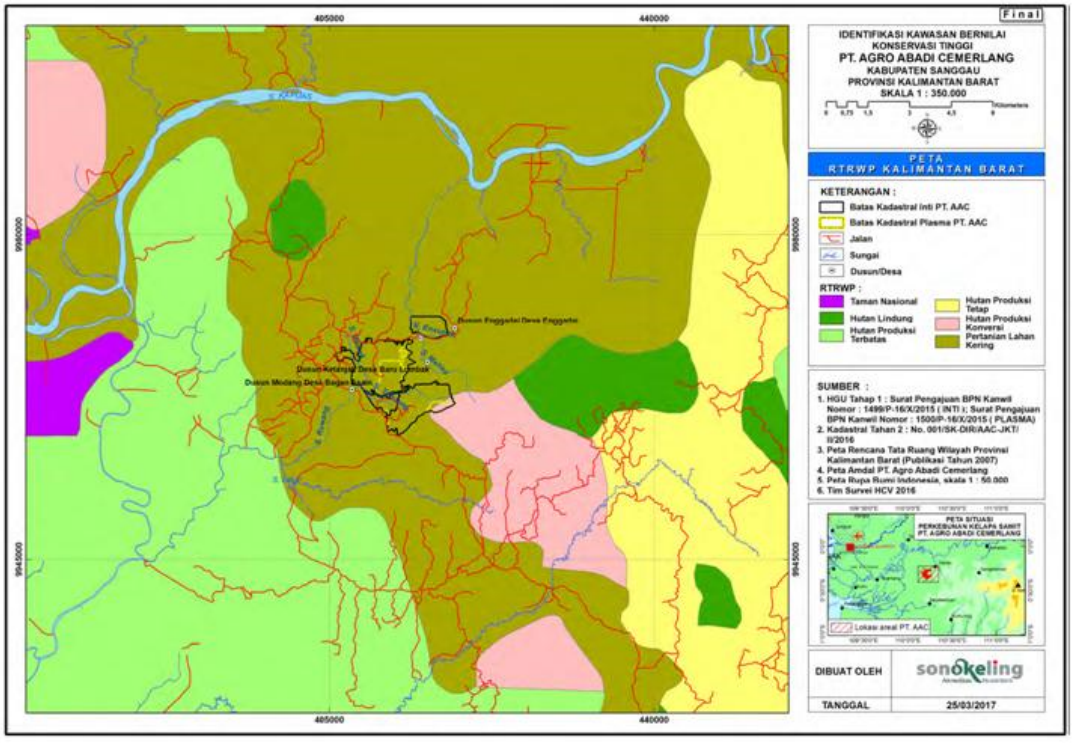


Figure 4. Final Map of PT. AAC Based on the Regional Kalimantan Spatial Planning (RTRW) of 2007

1.2. Land cover

Based on Landsat 8 satellite imagery analysis results 2016, land cover in the landscape of the study are four main land cover types: (1) secondary dryland forest, (2) dryland farms with shrubs, (3) oil palm plantation, and (4) mining. Meanwhile, land cover within the concession area of PT. AAC can be divided into nine (9) types, namely secondary dryland forest, rubber plantation, mixed plantation, scrub, field, bare land, settlements, and water body, where the dominant land cover in the study area is oil palm plantation. Around the concession area of PT. AAC contains primary dryland forest and secondary dryland forest in the northwest (Protected forest of G. Belungai) and in the east (Protected forest of G. Pering Melawi Condong). In concession areas of PT. AAC was found the existence of forested area of 96.20 hectares, while the forested area around the study area is located not directly adjacent to the concession area. Therefore, in the study landscape there is no forest connectivity.

1.3. Landsystem and Soil

Based on the landsystem map of RePPProT (1988) it can be seen that at permit area of PT. AAC consists of 3 (three) land systems, namely (1) HJA (Honja) covering an area of 6,158.39 Ha (93.14%), (2) TBA (Tambera) covering an area of 84.08 Ha (1.27%) and (3) PLN (Pakalunai) covering an area of 369.61 ha (5.598%), as shown in **Figure 5**.

type of soil found in the permit area of PT. AAC can be divided into 3 (three) soil type associations, namely (1) Tropudults, Paleudults, Tropohumults covering an area of 6,158.39 Ha (93.13%), (2) Tropudults, Tropohumults, Dystropepts covering 84.08 Ha (1.27%) and (3) Dystropepts; Tropudults; Haplorthox is 369.61 Ha (5.59%), as shown in **Figure 6**.

1.4. Slope

PT. AAC is at altitude ranging from 24 - 204 m above sea level. Based on the slope class, the slope class in the permit area of PT. AAC consists of 4 (four) kinds, namely (1) 8-15% slope class covering an area of 3,623.18 Ha (54.80%), (2) Slope class 15-25% covering 2,755.13 Ha (41.67%), (3) Slope classes 25-40% covering an area of 191.29 Ha (2.89%), and (4) Slope classes> 40% covering an area of 42.50 Ha (0.64%), as presented in **Figure 7**.

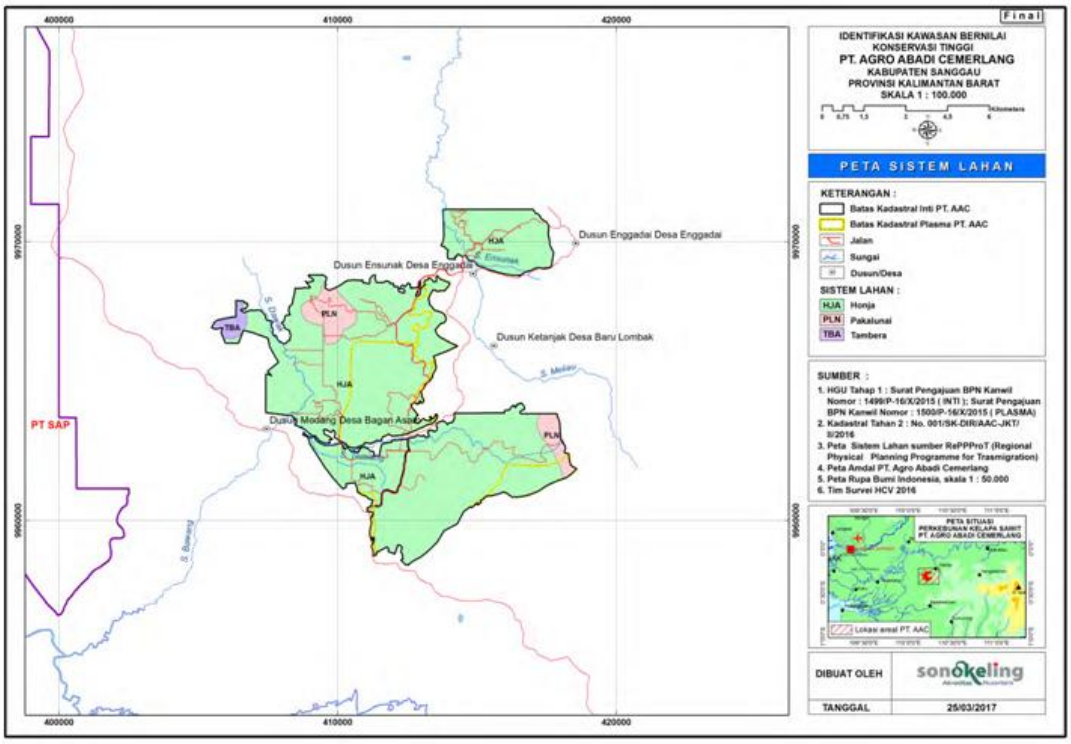


Figure 5. Land System that Arranges Boundary Landscape Areas for HCV Assessments and PT AAC Location Permits.

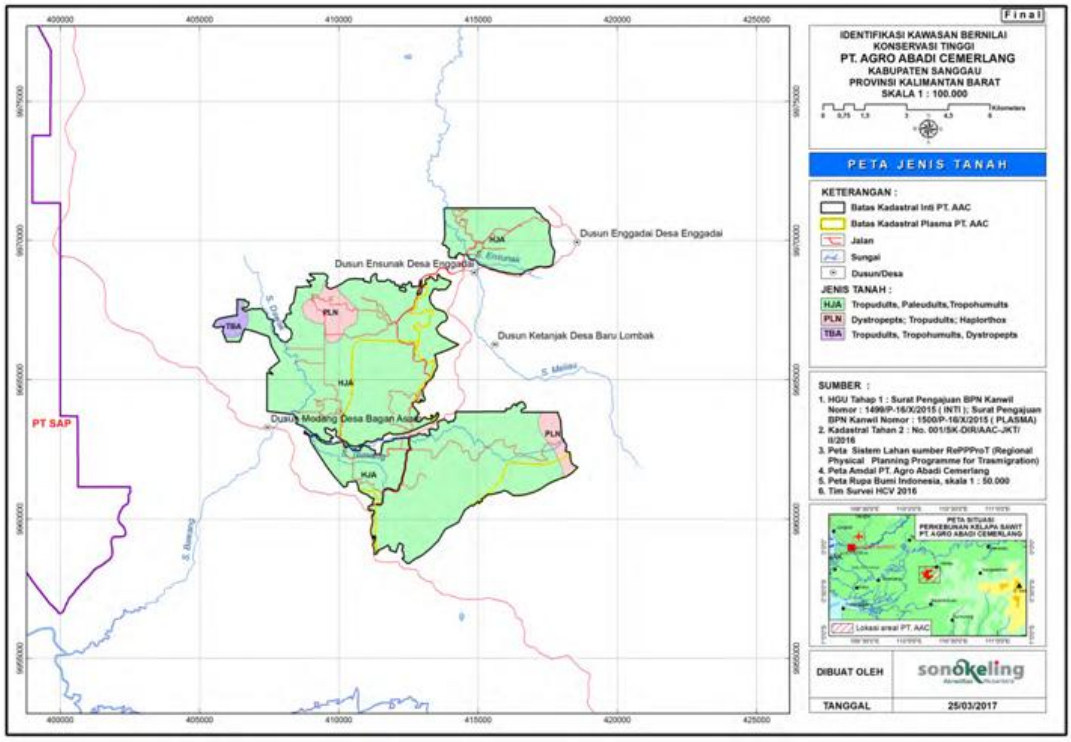


Figure 6. Types of Land that Compose Landscape Limits HCV assessments and PT AAC's Location Permit Areas

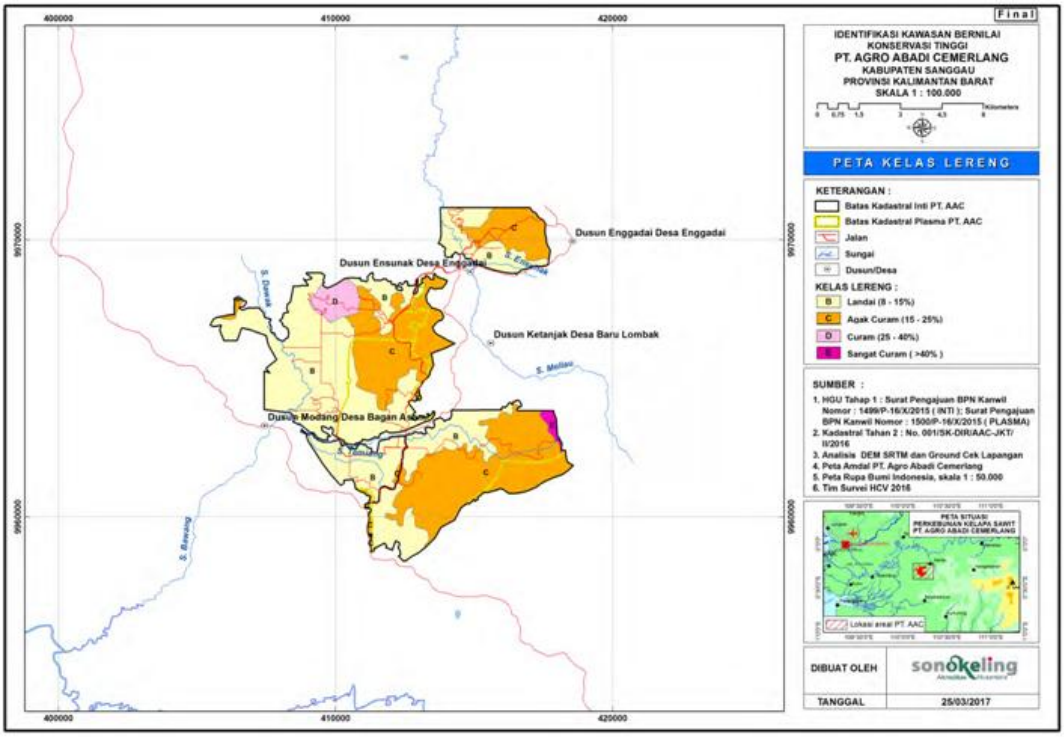


Figure 7. Slope classes with Landscape Limits for HCV Assessments and PT AAC Location Permit Areas

1.5. Social, economic and cultural

In around the concession area of PT. AAC identified as many as three (3) villages that could potentially be affected by the development project: Bagan Asam, Baru Lombak, and Enggadai Villages. The level of community education around PT. AAC is low with average of elementary and junior high school graduates. The livelihood of community living around the study area was less varying. The main livelihood of almost all community member around the concession area of PT. AAC was oil palm company employee. Other livelihood included hunting and fishing. Usually, the local community depended their need for water, including drinking water and sanitation, on river network and water springs located on catchment area.

Religion adopted by residents in the vicinity of concession area of PT. AAC are majority Kristen Katholik. People in the villages around the concession area of PT. AAC almost all are Ethnic / tribe of Dayak (sub-etnic of Dayak Desa). The Dayak Desa tribe meets the needs of their daily lives by focusing on farming in the fields. Although they live by the river, they are more likely to focus their activities by cultivating their fields (farming).

1.6. HCV outcomes and justification

Based on the results of HCV assessments in concession area of PT. AAC, it was found five (5) categories of HCV, i.e., HCV 1 category (subcategory: HCV 1, HCV 1.2, HCV1.3 and HCV 1.4), HCV 3 category, HCV 4 category (subcategory: HCV 4.1 and HCV 4.2), HCV 5 and HCV 6 categories

CHAPTER 2. ASSESSMENT PROCESS AND METHODS

2.1. SEIA Assessment

a. Assessor Credentials

1) ANDAL (Environtment Impact Assesment) conducted by : PT. Ersarindo Persada (July 2009)

   Addres : Jl. Prof. M. Yamin Gg. Ekadaya No. 31, Pontianak, West Kalimantan.

   Composition team :

Leader	: Derry Yulianto, S.Hut (AMDAL A and B)
Member	: Riyandi, M.Si. and Endang Mulyadi, M.Si.
Physical and Chemistry	: Herlin Suryanti, ST.
Biology	: Sukma Indratanti, S.Hut., MP
	: Rodiman, S.Hut.
Social, Economic and Cultural	: Ava Aprilia, SE..
Public Health	: Dr. Agus Sikwan, M.Hum
	: Dodik Permana, SKM

2) SIA (Social Impact Assessment) conducted by : Iyat Sudrajat, S.Hut., MSi., Sigit Pamungkas, SP., MSi., and Ir. Kresno Dwi Santosa, MSi.

b. Methods

b.1. Location and Times

PT AAC ANDAL was prepared and agreed on July 12, 2009. While SIA Study was conducted in July 2019 with field data collection activities carried out on June 17-21, 2019. SIA Document was conducted 2019 is a update SIA document conducted December 2016.

Village Assessment including : Enggadai and Baru Lombak Village on Meliau Sub District, and Bagan Asam Village on Toba Sub District - Sintang District, West Kalimantan Province.

b.2. Rationale and Stages of Assessment

SIA assessment is an assessment activity that includes survey and data collection on the social environment conditions of the community, which resides in and around the plantation permit area managed by PT. AAC. This assessment activity is carried out to see the extent to which the social impacts that occur on the community around the plantation area, due to the presence and operation of the company PT. AAC covers three villages covered in two sub-districts, namely Meliau District and Toba District.

The stages carried out in the SIA study of oil palm plantations at PT. AAC consists of 4 stages, namely the preparation stage, field research, analysis and preparation of reports.

b.3. Focus of Social Studies

This activity uses a combination of qualitative and quantitative approaches and utilizes primary and secondary data available to support analysis. The impacts on the social, economic, cultural and public health aspects identified include the current impacts at the operational stage, but do not rule out the possibility of extracting historical data from the impacts that occurred in the previous stages

b.4. Sampling Technique

The selection of respondents to the SIA assessment conducted by involving key person interviews is more appropriate to be carried out with purposive sampling. The number of respondents per village varies according to needs. In addition, SIA assessments are also conducted on other related sources who are considered to understand the key issues or social issues, economic issues, and cultural issues of local communities related to the development and plans for developing oil palm plantations of PT. AAC.

b.5. Data Collections

Literature studies

Literature studies are carried out by collecting and studying related documents. Documents are obtained from villages, sub-districts, regencies, and / or other sources, including development planning documents that have been prepared in advance by regional governments and planning documents of PT. AAC. This study was carried out mainly to look at various social issues that could potentially arise now and in the future.

Observation

Observations or direct observations in the field are conducted to see the conditions and factual situations in the field, related to the object of study or the issue under study. Observation is also carried out as a verification of the compatibility between the interview data and the actual situation and ensuring visually the extent to which the expected impact will appear, can or cannot be overcome.

Deep interview

Interviews were conducted to explore the opinions and views of the community regarding social impacts that are expected to emerge now and in the future. Interviews were carried out on community members (Village Heads, Customary Heads, Village Heads, leaders of local institutions, community leaders, religious leaders and local community members) who were considered to have the necessary information related to the object of study. In addition, interviews were also conducted with other related sources who were considered to understand the key issues or social issues.

Focus Group Discussion (FGD)

FGDs or focus group discussions are carried out by involving local leaders and local government officials and other parties who are considered competent with social issues, economic issues, cultural issues, such as village heads, adat leaders, hamlet heads, village officials, local institution leaders , community leaders, religious leaders, and other community members.

Questionnaire

The technique of collecting data using a questionnaire to obtain data and information from sources from internal parties of the company PT. AAC is a company employee. The researcher used a random sampling method by determining the number of 20 employees to be able to fill out the questionnaire. The topic of discussion asked in the questionnaire is the characteristics of respondents, assessment of various aspects of work such as the recruitment system of workers, Protection and improvement of labor welfare, industrial relations, competency development systems, career paths, and other aspects.

b.6. Data Analysis and Synthesis

To facilitate the SIA assessment team in analyzing the data that has been collected, an analytical framework was created to describe the process of analyzing the data on the social environment impact assessment of the components of oil palm plantation activities on the social environment component of the community living around the plantation area permit PT. AAC. Components of activities that influence the components of the social environment can have positive and negative impacts. From the impacts that arise, then a management model is formulated to get the desired results

At the level of analysis, thematic analysis is used in accordance with what was suggested by Miles and Huberman (1994). The basic themes used are the issues found in the preliminary study and those obtained in the field. The more informants / stakeholders that confirm an issue, the more important the position of the theme will be. Besides thematic, descriptive analysis is also carried out to strengthen the analysis argument. In addition, an analysis of secondary data and primary data was also collected. Data is analyzed by a combination of quantitative and qualitative methods. Quantitative analysis places more emphasis on counts and numbers such as demographics (population, population density, population growth, etc.). The qualitative analysis emphasizes the description or description of various facts found during direct observation in the field.

2.2. HCV Assessment

a. Assessor Credentials

HCV Assessment was conducted by : PT Sonokeling Akreditas Nusantara

Address: Komplek Sari Inten No 44, Ciomas, Bogor, Jawa Barat – Indonesia 16610 Telephone: 0251-7521685

The HCV assessment team consists of eight (8) people, including: biodiversity team leader / expert, environmental services expert, socio-economic and cultural expert, and mapping expert and GIS (presented in Table 1).

Table 1. List of HCV assessment team in concession area of PT. AAC, Regency of Sanggau – West Kalimantan

Name	ALS License	Institution	Role	Expertise
Ir. Siswoyo, MSi Siswoyo65@yahoo.com	Provisionally (ALS15010S)	PT. SAN	Team Leader/ Biodiversity expert	Biodiversity, botany, forest ecology, ethnobotany, and conservation.
Dr. Ir. Harnios Arief, MScF harnios@ipb.ac.id harniosarief@yahoo.co.id	N/A	PT. SAN	Biodiversity expert	Biodiversity, ecology of wild animal, and conservation.
Dr. Ir. Rachmad Hermawan MSc.F Racher67@gmail.com	N/A	PT. SAN	Environmental services expert	Hydrology, soil conservation and water
Ir. Wahyu Wardaya wahyu_aday@yahoo.com	N/A	PT. SAN	Environmental services expert	Hydrology, soil conservation and water
Sigit Pamungkas, MSi sigitp4mungk4s@gmail.com sigit_p4mungk4s@yahoo.com	N/A	PT. SAN	Social, economic and cultural expert	Social science community forestry
Hendi Kusnadi kusnadi.bgr@gmail.com	N/A	PT. SAN	Mapping and GIS Expert	GIS science, Spatial
Iyat Sudrajat, A.Md sudrajatiyat@gmail.com	N/A	PT. SAN	Social, economic and cultural expert	Social science community forestry
Siti Nurjanah,S.Hut sitinurjannah48@gmail.com	N/A	PT. SAN	Flora inventory expert	Flora inventory

b. Methods and timeline

b.1. Timeline of HCV assessment

HCV assessment in concession area of PT. AAC was implemented for nine (9) months from July 2016 to March 2017, as presented in **Table 2**. The field survey was conducted for 10 days from August 5 to 11, 2016.

Table 2. Timeline of HCV assessment in concessin area of PT. AAC

No.	Activities	Time
A.	**Pre-assessment phase**	
1	Information exchange	4 – 6 July 2016
2	Tier rating	7 – 8 July 2016

No.	Activities	Time
3	Information gathering	11 - 15 July 2016
4	Analysis preparation and initial mapping	18 – 22 July 2016
5	Scoping study*)	25 – 29 July 2016
6	Preparation and planning	1 - 4 August 2016
B.	**Assessment phase**	
1	Data collection in the field	
a.	Opening meeting	6 August 2016
b.	Data collection:	
	• Data collection for flora	6 – 9 August 2016
	• Data colection for fauna (mammals, bird and herpetofauna)	6 – 9 August 2016
	• Data collection for environmental services	6 – 9 August 2016
	• Data collection of socio-economic and cultural aspects and participative mapping	6 – 9 August 2016
	• Validation of mapping and landscape	6 – 9 August 2016
c.	Data processing and analysis, and mapping	9 - 10 August 2016
d.	Closing meeting	10 August 2016
2	Public Consultation	August - October 2016
3	Reporting	2 November 2016
4	Peer Review	30 January 2017
5	Completion of the final report	February - March 2017
6	Submission to quality panel review of HCVRN	February 2018

*Notes : *) The examination study was not conducted through field visits; But it was done by communicating with the company via phone and email. Field visits were not conducted because three of the HCV assessment team were Dr. Ir. Harnios Arief, MScF, Dr. Ir. Rachmad Hermawan MSc.F, and Iyat Sudrajat, S.Hut has conducted HCV assessment in the concession area of PT. Surya Agro Palma which is adjacent to the concession area of PT. AAC in October 2014. Similarities of biophysical conditions between PT. AAC and PT. Surya Agro Palma are as the following, both companies under the Kapuas watershed (DAS); dominated by the HJA land system (Honja); soil Tropudults, Paleudults, Tropohumults; geological formations Tropudults, Paleudults, Tropohumults; moderate slope (8-15%); altitude <500 mdpl; bio-physiography Southern Plains and Mountains; structural plain of Meratus complex and structural hills of Meratus Complex; oil palm plantation land cover; existence of two similar rivers namely Bawang and Dawak. The socio-economic conditions of both company are also similar with low population density, livelihood depends on rubber smallholder plantation, Ethnicity is from Dayak Desa, Dayak Tobak, Dayak Mali, Datak Ahe and Dayak Melayu.*

b.2. Methods of HCV assessment

b.2.1. Secondary data collection

1) Sources of data and information

Secondary data and information collected during HCV assessment in the concession area of PT. AAC, as presented in **Table 3**.

Table 3. Secondary data and information collected during HCV Assessment in the concession area of PT. AAC

HCV	Sources of data and information	Year
HCV1	Map of Certificate of Utilization Permit PT. Agro Abadi Cemerlang	2016
	Map of Cadastral 2 PT. Agro Abadi Cemerlang.	2016
	Map of Forest and Water Areas of West Kalimantan Province Scale 1: 250,000 (Ministry of Forestry Decree Number: 866 / Menhut-II / 2014, September 29, 2014).	2014

HCV	Sources of data and information	Year
	Regional Spatial Plan of West Kalimantan Province	2007
	Indicative Map Delays on Permitting New Utilization of Forest, Use of Forest Areas and Changes of Allocation of Forest Areas and Other Use Areas Revision XI.	2016
	Document of Environmental Impact Assessment (ANDAL) Plantation and Palm Oil Processing Factory PT. Agro Abadi Cemerlang, Sanggau Regency, West Kalimantan Province.	2009
	Government Regulation No. 7 of 1999	1999
	IUCN Red List of Threatened Species (www.iucnredlist.org).	2016
	Appendix I and II, August 2016 version (CITES, 2016)	2016
	Land Cover: Landsat Imagery 8 OLI Band Path / Row 121/60 ETM Satellite images coverage July 9, 2016	2016
	Vegetation – Tantra, *et al.*	1990
	Plants: Report of HCV Identification in Oil Palm Plantation of PT. Surya Agro Palma, Sanggau Regency, West Kalimantan Province (PT. Sonokeling Akreditas Nusantara, 2014)	2014
	Mammals : Payne, *et al.*	2000
	Mammals : Report of HCV Identification in Oil Palm Plantation of PT. Surya Agro Palma, Sanggau Regency, West Kalimantan Province (PT. Sonokeling Akreditas Nusantara, 2014)	2014
	Birds : MacKinnon *et al.*	1992, 2010
	Birds : Report of HCV Identification in Oil Palm Plantation of PT. Surya Agro Palma, Sanggau Regency, West Kalimantan Province (PT. Sonokeling Akreditas Nusantara, 2014)	2014
	Herpetofauna : Sardi *et al.*	2013
	Map of the Distribution of Orangutan, Forum Orang Utan Indonesia (http://forina.or.id)	2014
	Map of the Distribution of Orangutan, IUCN (Sange *et al*. 2016).	2016
	Map of Important Bird Area (IBA), Birdlife International	2004
	Map of Endemic Bird Area (EBA), Birdlife International	2004
HCV2	Map of Certificate of Utilization Permit PT. Agro Abadi Cemerlang	2016
	Map of Cadastral 2 PT. Agro Abadi Cemerlang.	2016
	Map of Forest and Water Areas of West Kalimantan Province Scale 1: 250,000 (Ministry of Forestry Decree Number: 866 / Menhut-II / 2014, September 29, 2014).	2014
	Regional Spatial Plan of West Kalimantan Province	2007
	Indicative Map Delays on Permitting New Utilization of Forest, Use of Forest Areas and Changes of Allocation of Forest Areas and Other Use Areas Revision XI.	2016
	Land Cover: Landsat Imagery 8 OLI Band Path / Row 121/60 ETM Satellite images coverage July 9, 2016	2016
	Ecosystem: RePProt	1987
	Map of Eco-Region of Kalimantan Island (Ministry of Environment, 2013)	2013
	Map of *Intact Forest Landscapes* (IFLs) (www.intactforests.org).	2013
	Map of the Distribution of Orangutan, Forum Orang Utan Indonesia (http://forina.or.id)	2014
	Map of the Distribution of Orangutan, IUCN (Sange *et al*. 2016).	2016
	Map of Important Bird Area (IBA), Birdlife International	2004
	Map of Endemic Bird Area (EBA), Birdlife International	2004
HCV 3	Map of Certificate of Utilization Permit PT. Agro Abadi Cemerlang	2016
	Map of Cadastral 2 PT. Agro Abadi Cemerlang.	2016
	Ecosystem: RePProt	1987
	Land Cover: Landsat Imagery 8 OLI Band Path / Row 121/60 ETM Satellite images coverage July 9, 2016	2016
	Land System: RePProt	1987
	Biophysiographical Map of Kalimantan	1997
	Map of Eco-Region of Kalimantan Island (Ministry of Environment, 2013)	2013
	Regional Spatial Plan of West Kalimantan Province	2007
HCV 4	Map of Certificate of Utilization Permit PT. Agro Abadi Cemerlang	2016
	Map of Cadastral 2 PT. Agro Abadi Cemerlang.	2016
	Document of Environmental Impact Assessment (ANDAL) Plantation and Palm Oil Processing Factory PT. Agro Abadi Cemerlang, Sanggau Regency, West Kalimantan Province.	2009

HCV	Sources of data and information	Year
	Land System: RePProt	1987
	Map of Watershed (DAS) West Kalimantan Province	-
	Land Cover: Landsat Imagery 8 OLI Band Path / Row 121/60 ETM Satellite images coverage July 9, 2016	2016
	River Network: DEM SRTM 90 m USGS NASA	2014
	Slope: DEM SRTM 90 m USGS NASA	2014
	Topography: Topographic Map of Indonesia, Geospatial Information Agency	1998
	Land: Land Resource Map of Palembang Sheet Exploration (MA48), Soil and Agro-climate Research Center	2000
	Rainfall : Rain Station of PT. Agro Abadi Cemerlang.	2007-2015
	Temperature : Meteorology Station of Supadio Airport, Pontianak.	2014-2016
HCV5	Map of Certificate of Utilization Permit PT. Agro Abadi Cemerlang	2016
	Map of Cadastral 2 PT. Agro Abadi Cemerlang.	2016
	Document of Environmental Impact Assessment (ANDAL) Plantation and Palm Oil Processing Factory PT. Agro Abadi Cemerlang, Sanggau Regency, West Kalimantan Province.	2009
	Regency of Sanggau in Numbers 2015, BPS of Sanggau Regency	2015
	District of Toba in Numbers 2015, BPS of Sanggau Regency	2015
	District of Meliau in Numbers 2015, BPS of Sanggau Regency	2015
	Map of the Distribution of Kalimantan Ethnic (http://www.ethnologue.com/)	2016
HCV6	Map of Certificate of Utilization Permit PT. Agro Abadi Cemerlang	2016
	Map of Cadastral 2 PT. Agro Abadi Cemerlang.	2016
	Document of Environmental Impact Assessment (ANDAL) Plantation and Palm Oil Processing Factory PT. Agro Abadi Cemerlang, Sanggau Regency, West Kalimantan Province.	2009
	Regency of Sanggau in Numbers 2015, BPS of Sanggau Regency	2015
	District of Toba in Numbers 2015, BPS of Sanggau Regency	2015
	District of Meliau in Numbers 2015, BPS of Sanggau Regency	2015
	Map of the Distribution of Kalimantan Ethnic (http://www.ethnologue.com/)	2016

Secondary data and information collected from various literatures are obtained from IPB Library, Company of PT. AAC, and other internet websites.

2) Secondary data analysis

Species data

The species data are required for HCV 1 and 2 assessments. Potential species data are found in concession area of PT. AAC where they are extracted from various sources (Vegetation - Tantra, *et al.* (1990) and PT. SAN (2014); Mammals - Payne, et al. (2000) and PT. SAN (2014); Birds - MacKinnon et al. (1992, 2010) and PT. SAN (2014); and Herpetofauna - Sardi et al., 2013) and made in tabular form. The species data are then checked for conservation status based on Government Regulation No. 7 of 1999, IUCN Red List of Threatened Species (www.iucnredlist.org 2016), and Appendices I and II, valid from August 2016 (CITES, 2016). The data of species that have been arranged in the form of the table is then verified to the community around the concession area of PT. AAC and field observations to ensure its existence.

Land cover

Land cover is required in HCV assessments 1 to 4. The main data used for land cover classification in concession area of PT. AAC is the current land cover and land cover in 2016. The satellite imagery data used is the Landsat-8 OLI Band Path / Row 121/60 2016 Satellite Imagery obtained from the USGS website obtained from the USGS website. The latest satellite images of 2016 are further analyzed

and verified with satellite imagery in previous years, then classified land cover by digitizing the screen on a scale of 1: 50,000. Classification of land cover in the early stages of image interpretation activities using the classification of The Southeast Asia 2005 Land Cover data set (Gunarso et al., 2013) and National Standardization Board (2010).

Ecosystems

In assessing HCV 3, ecosystem mapping in a bio-physiographic unit where concession area of PT. AAC is using a proxy for the RePPProT classification in Kalimantan. The ecosystem map in one bio-physiographic unit is then overlaid with a 2016 land cover map and subsequently analyzed to determine whether the ecosystem is rare or threatened.

Environmental services

In the assessment of HCV 4, the mapping of the river network of the presence of water springs is conducted by overlaying between the concession area map of PT AAC with Map of Watershed Zones of West Kalimantan Province and Digital Elevation Model (DEM) SRTM 90 m USGS NASA (2014). River network maps that have been prepared subsequently used as a material verification to the community around the concession area of PT. AAC and field observations to ascertain its existence and name. Determination of topography and slope in concession area of PT. AAC is conducted by overlaying between maps of concession area of PT. AAC with Digital Elevation Model (DEM) SRTM 90 m USGS NASA (2014). Determination of land in concession area of PT. AAC is conducted by overlaying between map of concession area of PT. AAC with landsystem Map from RePPProT (1987). Furthermore, the slope and soil class data plus the rainfall and soil data are used as the material for calculating and preparing the Erosion Hazard Map (TBE). Map of river / spring network, and TBE in concession area of PT. AAC is then overlaid with a land cover map, then used as a reference for field checks, as well as to see if it is possible to find areas that can function as natural / fire break barriers or not.

Social culture data

In the assessments of HCV 5 and 6, the determination of the distribution of villages is conducted by overlaying the map of concession area of PT. AAC with Indonesian Topographic Map (Geospatial Information Agency); While for the distribution of the tribe is conducted by overlaying the map of concession area of PT. AAC with Tribal Distribution Map on the Island of Kalimantan. Other secondary data used in the assessments of HCV 5 and 6 are sourced from Sanggau Regency in Numbers 2015, Toba District in Numbers 2015, Meliau District in Numbers 2015, and Document of Environmental Impact Assessment (ANDAL) Plantation and Palm Oil Processing Factory PT. Agro Abadi Cemerlang, Sanggau Regency, West Kalimantan Province.

Other activities undertaken in the preparation of secondary data analysis and early mapping are (1) Identify potential and indications of the presence of HCV attributes

or elements; (2) Understanding the landscape context; and (3) Identify conservation issues and potential threats to HCVs.

b.2.2. Primary data collection

1) Flora/plants and Fauna/wild animal

Observation of flora / plants and fauna / wild animals (mammals, birds and reptiles) in the concession area of PT. AAC was conducted on four (4) observation routes and 19 observation points, including: secondary dryland forest (7 observation point), mixed tree crops (3 observation points), Rubber plantations (3 observation points), scrub (3 observation point), oil palm plantations (2 point observation), and field (1 point of observation). For observation amphibians are focused on river areas. The method of data collection of flora and fauna, and parameters observed in the concession area of PT. AAC, presented in **Table 4**.

Table 4. Method of data collection of flora and fauna, and parameters observed in the concession area of PT. AAC

Aspect	Method of data collection	Parameters observed
Flora/plants	Encounter method was conducted by working on checklist (Checklist of plant species for use in the field was obtained from document of PT. SAN (2014)) and recording flora species found along the observation strip, where in each observation point, the length was 200-500 meters. Determination of length of vegetation observation strip referred to Bismark (2011) and Kartono (2008).	• Presence of flora species in sample units • Quality of habitats
Fauna/wild animal		
• Mammals • Birds • Herpeto-fauna (reptiles and amphibians)	• Rapid assessment technique, combining four (4) ways: (1) Interviews with communities, especially hunters (3 villages) and company staff; (2) Checklist of list of wild anima species (mammal, bird, and herpetofauna) obtained from document of PT. SAN (2014), (3) Direct, visual or indirect encounters (mammal : footprint, sound, scratch and faeces; bird : sounds, fallen body parts, and faeces; and herpetofauna : voice), and (4) Observation of the quality of wild animal species (mammal, bird, and herpetofauna) habitat was conducted in collaboration with the flora team. • Wild animal (mammals, birds, and herpetofauna) observation using the checklist technique and encounter were carried out on each observation site, in which each observation site had the length of 200 – 500 meter. Determination of length of wild animal observation strip referred to Bismark (2011) and Kartono (2008). • Mammalian, bird, and reptile observations were conducted at 07.30 - 17.00, but night time observations were also made on the way home from the field to the accommodation due to occasionally returning at night and passing the concession area; while amphibian observations were made at night.	• Presence of mammal, bird, reptile and amphibian species in sample units • Quality of habitats

Interview with people, especially hunters and company staffs, to learn the presence of wild animal species in each observation location, was conducted by inquiring the name of wild animal species being found, together with time of encounter, by referring to pictures of wild animal species depicted in field guide book (Payne et al., 2000; MacKinnon et al., 1992; MacKinnon et al., 2010; and Sardi et al., 2013).

Status of flora and fauna were obtained from Website IUCN (2016) and CITES (2016), as well as document of Indonesian Government Policy (Government Regulation Number 7 year 1999).

2) Environmental services

Data collection of environmental services in concession area of PT. AAC was carried out on 15 sample unit, i.e., the river borders (5 locations) i.e., Ensunak (1 observation point), Bawang (4 observation point), Temiang (2 observation point), Meliau (2 observation point), and Dawak (2 observation point); spring (2 observation point), slope (7 observation point), water bodies (1 observation point). Data and information taken for the purpose of verification of physical aspect is the existence and condition of river network, road network, territorial boundary, type of soil, topographic area, and conducting overview of the assessed area as a whole. With regard to environmental services, verifiable data and information are the conditions of land cover in the river border and the catchment area; condition of river water quality and spring; river flow, river utilization and reservoir / catchment area; flood events and the presence of puddles; landslide-prone areas and areas that have a serious potential-very heavy Erosion Hazard level; checking area with slope> 40%; and checking community habits in land preparation, with burning or not.

3) Social and culture

Data and information collection to identify HCV 5 and HCV 6 areas were conducted through 4 steps, including (1) Participatory mapping to obtain information directly from community and local community leaders by mapping together HCVs 5 and 6 potential areas; (2) In-depth interview and field observation by using purposive sampling method in determining target respondent that we have collected earlier during the participatory mapping; (3) Focus group discussions (FGDs) was done in each village; and (4) HCV 5 and HCV 6 area mapping (GPS marking/tagging). According to Setiawan (2005), purposive sampling or judgment sampling is sampling based on a particular consideration with objective of obtaining sampling units which possess the desired characteristics.

Steps of activities being adopted in participative mapping, comprise the following : (1) Compilation of plan for participative mapping; (2) Preparing socialization material (HCV and FPIC) to be conveyed to the people; (3) Establishment of village level team for participative mapping by involving community figures, by requesting one of the community figure to make village map sketch based on map of oil palm planation concession; (4) Determination of location land utilization by residents; (5) If there is information uncertainty on land use, there will be consultation being conducted with local community figures; (6) Processing of data obtained from sketch based mapping results was then followed by overlaying process with GIS map as draft of participative mapping; and (7) Finalization of participative map with GIS based mapping collaboration.

FGDs, interviews and participatory mapping were executed in 3 villages around PT. AAC work area in Bagan Asam Village, New Lombak and Enggadai, with total

respondents of 64 people. Sample of respondent was selected based on the representation of community leaders with sufficient knowledge and information on concession area and also can be useful resources person/ informant in the HCV assessment. Based on Indonesia HCV toolkit (2008), number of respondents which should be interviewed in each sub-group (ethnicity, religion or livelihood) was minimally 10%. However, due to time constraint, the minimal number of respondents being interviewed in each subgroup, could not be fulfilled, and discussion with stakeholders could not be conducted. However, respondents being interviewed and involved in FGD activities had been representative from various interest groups, namely: village appartaus (village chief, hamlet chief, and chief of specific affairs) , chief of traditional and custom affairs, BPD, and people represntatives. Besides that, the number of respondents being interviewed and involved in FGD has been considered as representative of groups of ethnicity, religion and gender (male and female :1 : 10), and livelihood.

Socio-cultural data and information to identify HCV 5 area include: (1) Factors of the sub-group that we considered important (ethnic, religion or types of forest use); (2) dependency level of the sub-groups on forests (food, water, materials, medicines, animal feed, and cash income to meet subsistence needs, (3) alternative sources to fulfil basic needs of the community , and (4) forest utilization status of the community. The social and cultural data that we collected to identify HCV 6 area include: (1) zoning that was made under certain cultural rules, (2) distribution of archaeological sites, (3) distribution of ritual activities of local communities, and (4) distribution of biological natural resources to fulfil the cultural need.

4) Validation of mapping and landscape

Mapping and landscape validation was conducted to assess the accuracy of concession area boundaries of PT. AAC, village / settlement location, topographical conditions, land cover, river network, water catchment area, and ecosystem. Field checks were carried out at several concession areas boundaries, type of land cover, rivers, water catchment areas, and springs.

Location of data collection of biodiversity (flora and fauna), environmental services, and social and culture in concession area of PT. AAC is presented in **Figure 8**.

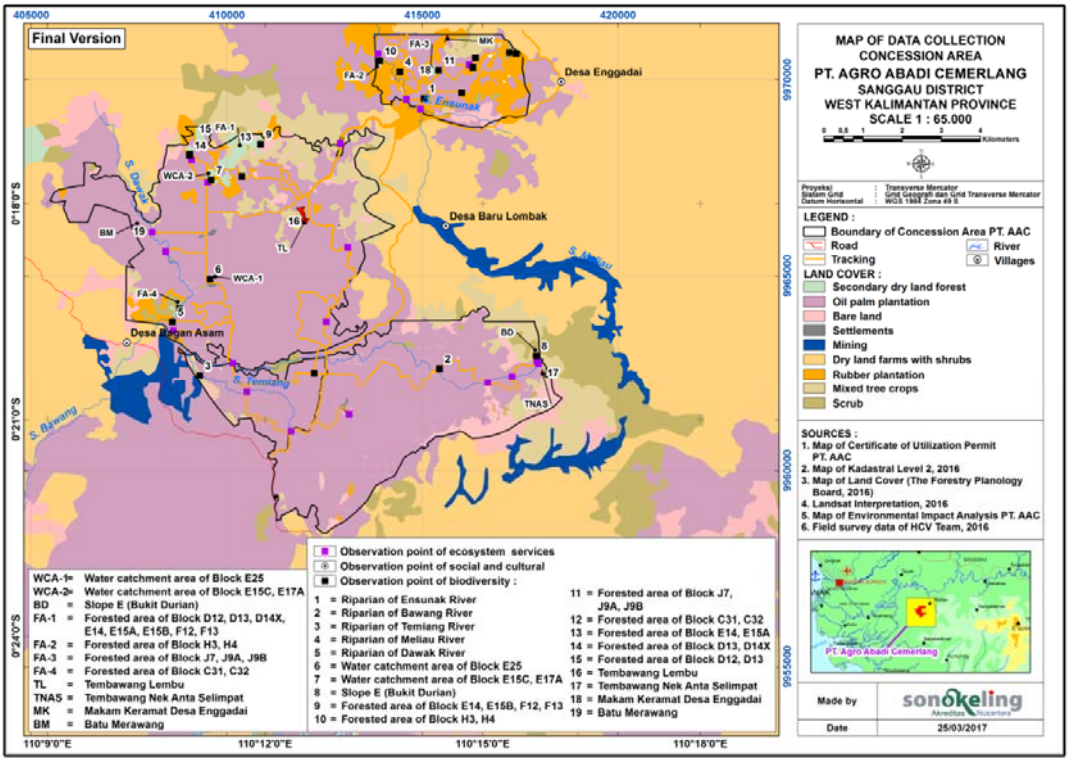


Figure 8. Location map of biodiversity data collection (flora and fauna), environmental services, and social and culture in concession areas of PT. AAC

2.3. Land Semidetails and Land Suitability Assessment

a. Times and Assessor Credentials

The activity of Semi-Detailed and Land Suitability Land Survey in the PT Agro Abadi Cemerlang oil palm plantation area was carried out for 3 (three) months from November 2016 - January 2017 and carried out by the implementing consultant PT. Sonokeling Akreditas Nusantara.

Address: Komplek Sari Inten No 44, Ciomas, Bogor, Jawa Barat – Indonesia 16610 Telpon : 0251-7521685

Table 5. Composition Team

No	Name	Role
1	Ir. Kresno Dwi Santosa, M.Si	Responsible for Activities
2	Bukhari, SP M.Si	Team Leader/ Soil Expert and Land
3	Dandun Sutaryo, S.Si	Field Coordinator/ Soil Expert
4	Tatis Markis	Soil Surveyor
5	Dedi, SP	Soil Surveyor
6.	Muhamad Majid, SP	Soil Surveyor
7	Gilang Sukma Putra, SP	Soil Surveyor
8	Yudhi Castio, SP	Soil Surveyor

b. Methods

b.1. Preparation

1) Collection and analysis of secondary data

Secondary data used in this survey activity, among others:

- Landsytem maps
- Land map review
- Satellite imagery
- Topography or DEM Map

The secondary data analysis above aims to get an overview of the survey area as a whole through gathering information from available and relevant data and maps, so that it can help analyze landforms / land units and smooth implementation of surveys in the field.

2) Survey Equipment Preparation

In the preparation stage, preparations are also made for the provision of survey equipment in the form of :

- Belgian type mineral drill (1.2 m long);
- Drill Eijkelkamp type peat soil (stem length> 4 m);
- The Munsell Soil Color Chart book;
- Revised edition of the National Soil Classification Book (BBSDLP, 2014) and the 2010 edition of Keys to Soil Taxonomy
- GPS (geographical positioning system) tool for determining the coordinates of observation positions
- Measuring soil pH in the field (litmus);

- Clinometer
- Abney level to measure slope slope;
- Steel meter or band meter;
- Ground profile digging tools (hoes, shovels, crowbars, etc.).
- Laptop computers for data entry and spatial analysis, which is equipped with the ArcGIS program, Global Mapper.

b.2. Field Survey Phase

1) Pre survey stage

A pre-survey or preliminary survey also aims to consult with the employer and obtain an overview of the condition of the survey area. Field observations include checking several land units related to landform distribution, lithology / parent material, soil composition and characteristics as well as preparation of basecamp, local transportation and field workforce. Information obtained from the survey results is used for planning the implementation of the main survey.

2) Main Field Survey

Soil observation and soil fertility sampling.

Soil observation is carried out through a transect approach (topo-lithosene) in the representative land unit that has been planned prior to the field and a 500 x 1000 m grid system. Soil observation is carried out by paying attention to the appearance of changes in micro-surface relief on flat areas, while for sloping areas taking into account the slope, position and shape of the slope. If there is a representative land unit that is difficult to visit because of low accessibility, then extrapolation of data can be done based on the similarity of land unit characteristics. The observation density is 1/50 Ha, taking into account the area of the Block. Map of drill observation, soil profile, location of soil fertility samples

Land observation is carried out by: (a) Drilling of land, (b) Minipit hole digging, and (c) Complete soil profile. The drilling of land was carried out as deep as 120 cm, while the manufacture of minipit was 50 cm deep with a length and a width of 50 x 50 cm. Observation of land on the minipit is continued with drilling as deep as 120 cm Making complete soil profiles with sizes: length x width x inside: 100 x 100 x 150 cm or up to the parent material layer, if the soil depth is less than 150 cm

Ways of making profiles, observing the properties of soil morphology and physical environment in the field refer to the Land Observation Guidelines (Balittanah, 2004) or Guideline for soil profile description (FAO, 1990). The coordinates of the observation point are determined by GPS (UTM or geographical) and plotted on a map of land units on a scale of 1: 50,000. The representative soil profile is fully described and represents each land unit (group / subgroup of land). All data on the results of drilling, mining and soil profiles in the field are recorded in the database entry form.

Soil samples are taken from each horizon from the representative profile or minipit or drilling which represents the land unit of each land unit, then coded according to the ground observation code, to be further analyzed in the laboratory.

Field observation maps are prepared using land unit maps as a result of interpretation / analysis. All ground observation points in the field are plotted in each sheet of the land

unit map. Data from field observations, namely soil morphology and physical environment.

Field maps are arranged based on observations of land units and land units from the results of observations of drilling, minipit and profiles. During the field observations, corrections to land units were carried out, both for delineation and naming (symbols) of land units in accordance with ground truth conditions.

Maps of land need to be completed with map legends. The legend of the field map is arranged in the following order: sequence number of land map units (SPT), land units at the level of land / subgroup of land and their properties, and proportions, landform units, parent material units and relief units / slopes and area of each SPT (in ha and%). The land units found in each SPT can be more than one type of land and the spread is expressed in proportions, namely: very dominant (P> 75%), dominant (D = 50-75%), moderate (F = 25-49%), little (M = 10-24%) and very little (T = <10%) (CSR / FAO, 1983). The proportion of land units is suspected from the distribution of land on the slope / facet position of the land unit at the time of soil observation in the field.

SPT (unit of land map) consists of elements of land units, landform units, parent material units and relief units / slopes. Land units consist of: Kinds of soil, depth of soil, drainage, texture, soil reaction (pH), cation exchange capacity (CEC) of soil and base saturation (KB).

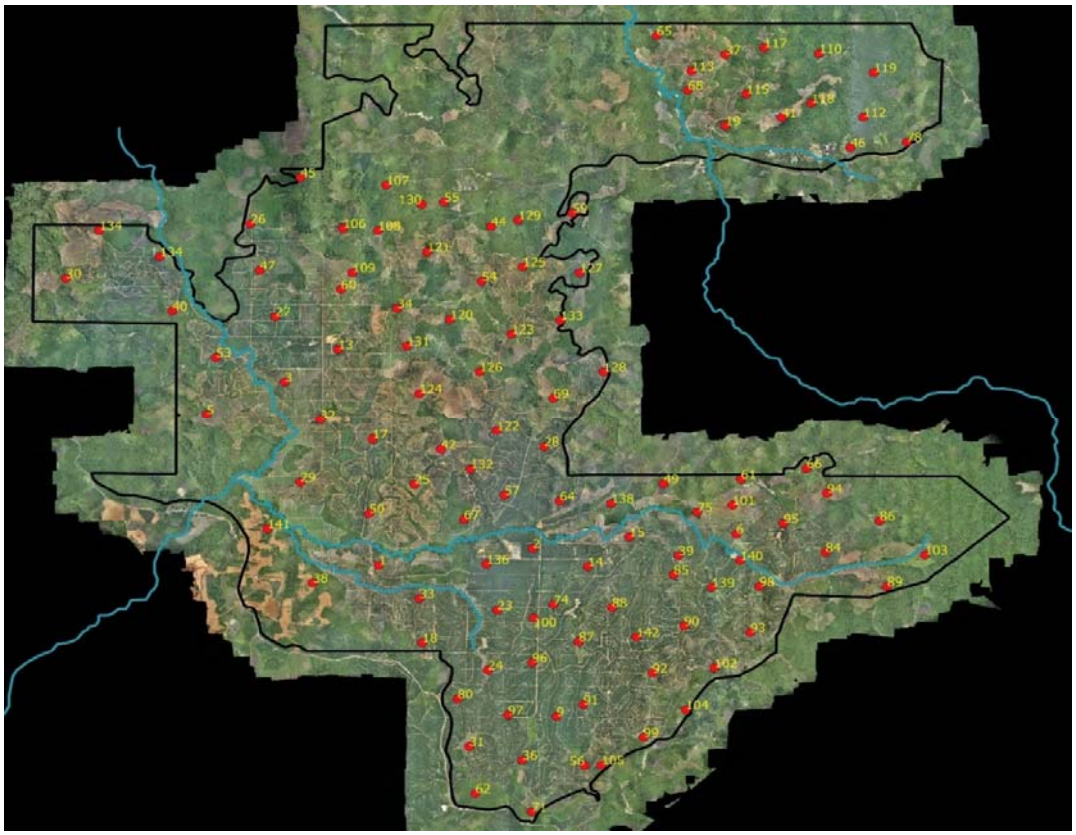


Figure 9. Distribution Map of Land Observation Points in PT. Agro Abadi Cemerlang

b.3. Field and Laboratory data analysis

Laboratory analysis was carried out on soil samples. The soil samples analyzed included fertility samples. Based on the variation and distribution of the Land Map Unit (SPT) temporarily from the results of field observations a sample profile and examples of soil fertility are selected for each SPT. Examples of soil around 0.5-1.0 kg were taken from each horizon from drilling (wet soil), minipit and representative soil profiles to be analyzed in laboratories that had received accreditation. The type of analysis of soil samples consists of standard and special / additional chemical analysis and analysis of minerals (sand fraction and or clay fraction), which are tailored to the needs.

b.4. Land Units Analysis

Evaluation of land suitability is done by comparing the compatibility between the quality and properties of the land as a parameter with the criteria for land suitability classes based on the requirements for plant growth evaluated, namely the land suitability class is determined by the smallest value, that is the parameter as the heaviest limiter or the most difficult to overcome compared to other limiting factors.

Evaluation of land suitability for oil palm plants in the area was carried out by referring to the criteria of the Land and Agro-Climate Research and Development Center, Bogor Soil Research Center, Ministry of Agriculture and PPKS criteria (2005) for oil palm plants. This PPKS criterion assumes that the problem of soil fertility is not a problem that is taken into consideration because it can be improved by the provision of fertilizers and generally in oil palm cultivation fertilizer is always applied as an addition to nutrients for the plant. The potential for soil fertility is approached by criteria for soil acidity (soil pH) which can generally indicate the level of nutrient availability in the soil. The quality of land evaluated includes climate, physiography, soil, topography, land use and flood hazards.

Class quality of land suitability shows the level of suitability relative to certain uses. At the class level, land suitability assessment is differentiated according to its level, namely: land classified as very suitable (S1), quite suitable (S2) according to marginal (S3), not appropriate (N)

2.4. Carbon Stock Assessment and GHG Emissions

a. Assessor Credentials

Composition Team	Expertise
Kasuma Wijaya, MSi.	- Land covers image analysis and GIS experts - Registered HCS Approach Practitioners

b. Methods

CSA and GHG Activities in PT. AAC is conducted in July 2019. CSA and GHG activities in the Palm Oil Area of PT. Agro Abadi Cemerlang follows the RSPO GHG assessment procedure guidelines for new plantings. The RSPO GHG assessment procedure for new plantings has four key stages, namely (1) Carbon Stock Assessment, (2) GHG Emission Assessment for new plantings, (3) GHG Emission Management and Mitigation Plans and (4) GHG Assessment Reporting for New Plantings. The key steps in the RSPO GHG Assessment Procedure are presented in **Figure 10**.

The CSA methodology has a process stage which consists of two key steps. The first step is the preparation of a map of land cover from satellite imagery and the second step is estimating carbon stocks in the new development area. The carbon stock estimation using these two key steps can then be used to estimate RSPO GHG emissions resulting from changes in land use for new development areas

The estimated carbon stock required must include carbon stored in: (1) Above-ground biomass, (2) underground (root) biomass and (3) peat soil - if any. The total amount of carbon stock at the assessment site is the sum of carbon stocks in the above and below ground biomass estimates with peat soil carbon stock estimates. The key steps for carbon stock assessment are presented in **Figure 11.**

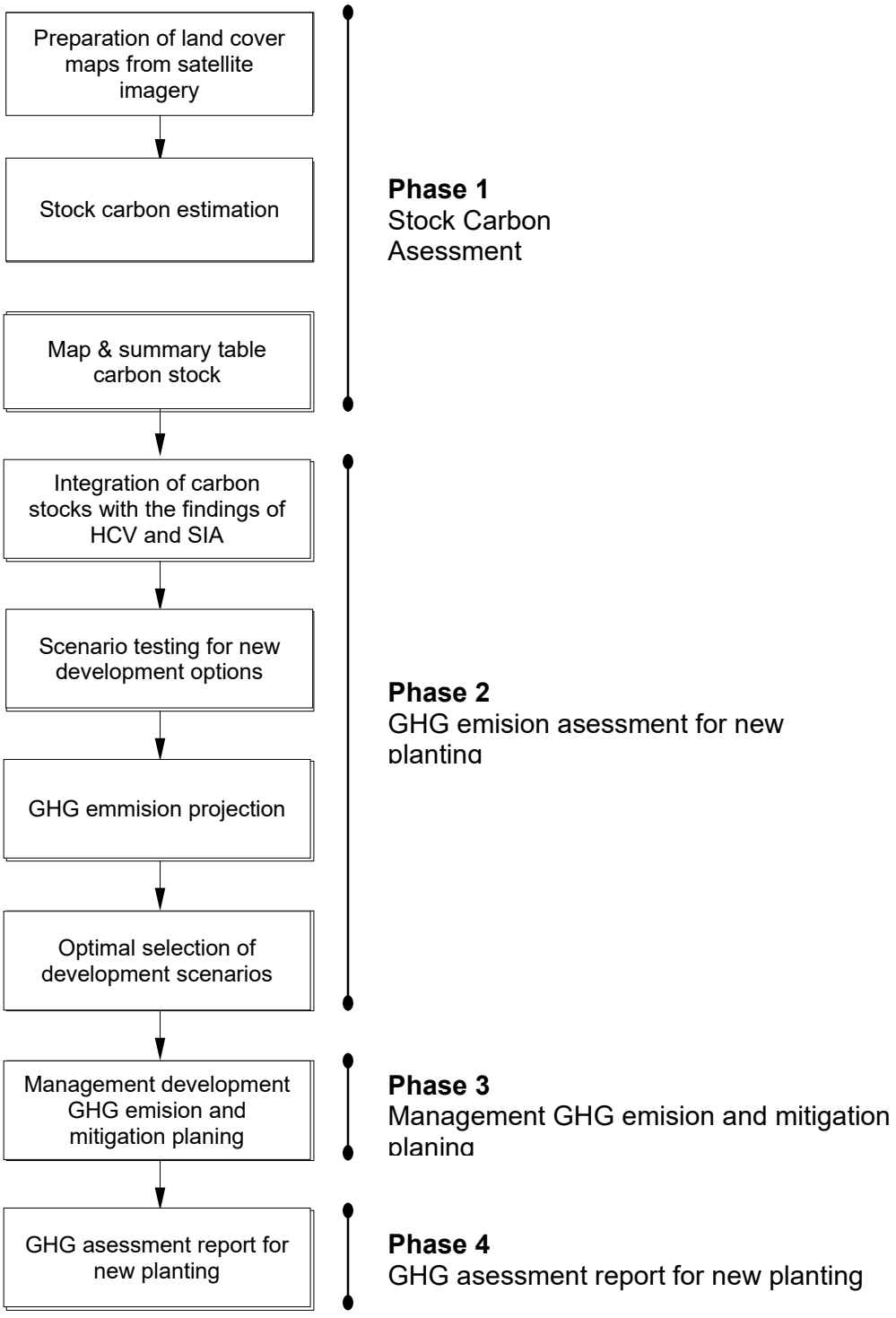


Figure 10. Stage of RSPO GHG Assessment Procedure for new planting

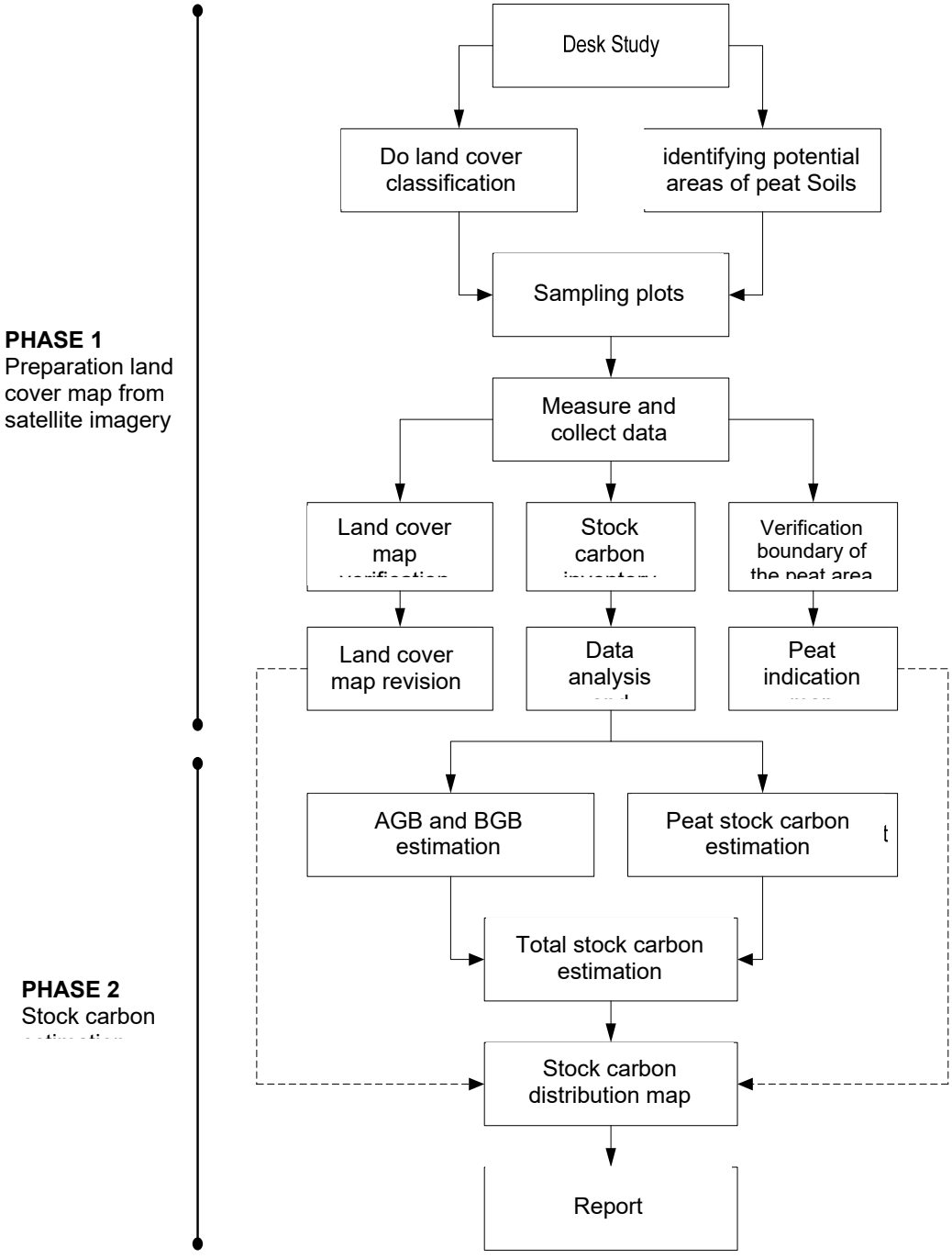


Figure 11. Key Step Diagram for Carbon Stock Assessment

Sampling Plots

The minimum number of plot needs is calculated by Winrock Calculator which uses a confidence level of 90% and a sampling error of 20%. This condition is possible because in SNI 7724: 2011 concerning Carbon Measurement in the Field states that the maximum permissible sampling error is 20%. Many natural factors in the field that cannot be controlled by humans such as topography, climate and weather, so the maximum sampling error of 20% is still allowed

In the Winrock Calculator, the calculation template uses a formula built by Walker et al. (2007) based on the CDM - Executive Board 2006 namely AR-AM0001, AR-AM0003, AR-AM 0004, AR-AM0005, AR-AM0006 & AR-AM0007. The formula is as follows:

$$n = \frac{\left[\sum_{i=1}^{m_{sp}} N_i \cdot st_i - \sqrt{C_i}\right] \cdot \left[\sum_{i=1}^{m_{sp}} N_i \cdot st_i \cdot \frac{1}{\sqrt{C_i}} \cdot\right]}{\left(N \cdot \frac{E}{z_{\alpha/2}}\right)^2 + \sum_{i=1}^{m_{sp}} N_i \cdot (st_i)^2}$$

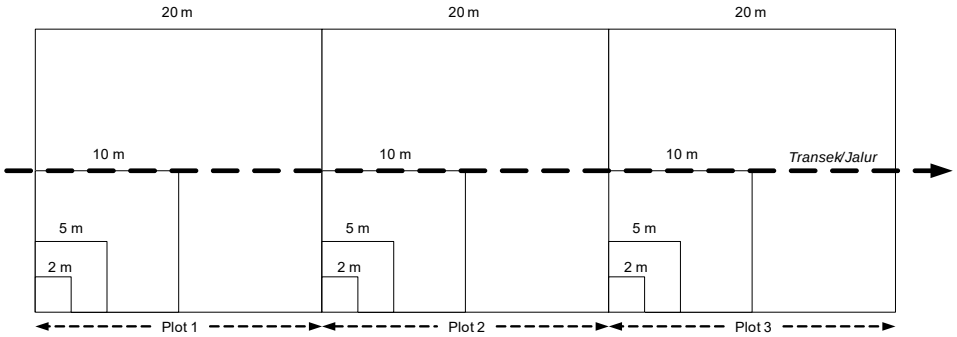
$$n_i = \frac{\sum_{i=1}^{m_{sp}} N_i \cdot st_i - \sqrt{C_i}}{\left(N \cdot \frac{E}{z_{\alpha/2}}\right)^2 + \sum_{i=1}^{m_{sp}} N_i \cdot (st_i)^2} \cdot \frac{N_i \cdot st_i}{\sqrt{C_i}}$$

$$N = \frac{A}{AP} \quad N_i = \frac{A_i}{AP} \quad E = Q \cdot p$$

Information:

A = *Total size of all strata, eg total project area; ha*
Ai = *Size of each stratum; ha*
AP = *Sample plot size; ha*
Sti = *Standard deviation for each stratum i; dimensionless*
Ci = *Cost of establishment of a sample plot for each stratum i; e.g. US$*
Q = *Approximate average value of estimate quantity Q (eg tree biomass; m3/ha)*
p = *desired level of precision (e.g. 10%); dimensionless*
N = *Maximum possible number of plots in the project area*
Ni = *Maximum possible number of plot in stratum i*
E = *Allowable error (20%)*
N = *Sample size – total number of sample plots required in the project area*
ni = *Sample size for stratum i*
Z = *Value of the statistic z (normal probability density function), for* *= 0.05 (implying a 95% confidence level)*

The design of the sample plots used in the inventory of carbon stocks for above-ground biomass (Above Ground Giomass / AGB) are nesting and square shapes. A maximum of 5 sample plots are placed in each transect / lane. The sample plot design in the carbon stock inventory activity is presented in Figure 12.



Information:

- Seeding and understorey level (2 x 2 meter)
- Stake level (5 x 5 meter), DBH (2 – 10 cm)
- Pole level (10 x 10 meter), DBH (10 – 20 cm)
- Tree level (20 x 20 meter), DBH (>20 cm)

Figure 12. Design plot of carbon stock measurement samples

Carbon Stock Inventory

The activity of inventorying carbon stocks for above-ground biomass (AGB) in the Pile, Tree and Tree classes in the form of DBH measurements of trees using tape diameter, identification and recording of species and numbers of species and taking examples of wood representing each species (Figure 13).

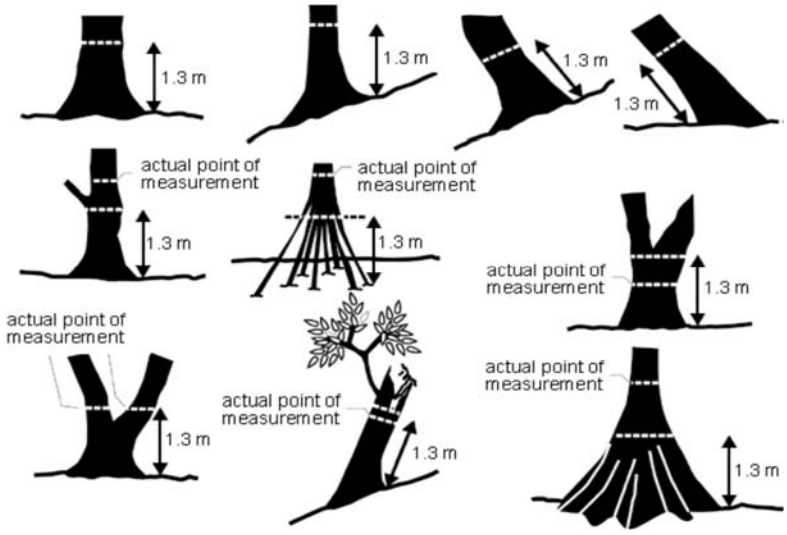


Figure 13. Measurement of Chest Height in Various Tree Conditions

Each sample of the wood is weighed in the wet field and then taken to the laboratory for drying and weighing the dry weight, so that the specific gravity (BJ) will be known.

Whereas for the measurement of biomass in seedlings and understorey classes is carried out as follows (SNI 7724: 2011):

a) cut all seedlings and understorey on the ground using cuttings scissors;
b) weigh the total wet seedling and understorey wet weight in the measurement plot area;
c) take and weigh the wet weight of the sample as much as ± 300 grams;
d) do the drying by using an oven in a laboratory with a temperature range of 70 ° C to 85 ° C until it reaches a constant weight;
e) weigh the dry weight of seedlings and understorey;
f) analyze organic carbon in the laboratory to see the carbon content

Measuring carbon stocks on peat soil is done by measuring the depth of peat soil using a soil drill at every distance of 200 - 300 meters on the stub path to the plot and taking at least 3 soil samples. The soil samples were analyzed at the laboratory to determine the weight of the contents and Organic Carbon Content.

Carbon Stock Estimation

The estimated carbon stock is the second step of the carbon stock assessment carried out to find out (a) carbon stocks from above and below biomass, and (b) peat carbon stocks.

The amount of carbon stock in the valuation is expressed in tons of carbon per hectare (tC / ha). As defined by IPCC (2006), there are five carbon pools, namely soil biomass, underground biomass, dead wood, litter, and soil organic matter. In assessing carbon stocks in RSPO GHG procedures, this assessment only needs to take into account above-ground biomass (AGB), underground biomass (BGB) and soil organic matter. Soil organic matter only needs to be estimated if peat soil

Above Ground Biomass **(AGB)**

The general equation used in estimating carbon stocks for above ground biomass is:

$$\textit{Massa Karbon (ton)} = \textit{Biomassa} \times (\textit{Faktor Konversi Karbon})$$

The carbon conversion factor estimates the carbon component of vegetation biomass. This factor can be produced for a particular forest type, or using a standard value from the IPCC of 0.47 (IPCC, 2006).

Allometric equations for estimating biomass use the equation Ketterings et al (2001), namely:

$$TDW = 0{,}11 \times \rho \times (DBH)^{2.62}$$

Information:
TDW = biomassa (kg); ρ = wood density (gr/cm^3), DBH = diameter setinggi dada (cm)

In accordance with the sample plot design above, there are several formulas to determine the value of biomass and carbon stocks for the stake class, pole, tree, seedling and understorey, namely:

a) Calculation of Biomass and carbon per Ha for stake level (5 x 5 meters)
    - The value of biomass is calculated using the formula for using BJ and DBH from wood tree samples from the plot location

- Temporary carbon stock values (Cs) for stake are calculated with 0.47 x biomass value (Kg)
- The carbon stock value for the stake (ton C / ha) is ((Cs) / 1000) x (10000/25)

b) Calculation of Biomass and carbon per Ha for pole level (10 x 10 meters)

- The value of biomass is calculated using the formula for using BJ and DBH from wood tree samples from the plot location
- Temporary carbon stock values (Cs) for poles are calculated with 0.47 x biomass value (Kg)
- Carbon stock values for poles (tons C / ha) are; ((Cs) / 1000) x (10000/100)

c) Calculation of Biomass and carbon per Ha for Tree level (20 x 20 meters)

- The value of biomass is calculated using the formula for using BJ and DBH from wood tree samples from the plot location
- Temporary carbon stock values (Cs) for trees are calculated with 0.47 x biomass value (Kg)
- Carbon stock values for trees (tons C / ha) are ((Cs) / 1000) x (10000/400)

d) Calculation of Biomass and carbon per Ha for seedling and understorey levels (2x2 meters)

- The value of biomass is obtained from laboratory analysis using the formula:
  Bo = (Bx x Bbt) / Bbs, where Bo = weight of organic matter (kg), Bks = sample dry weight (kg), Bbt = total wet weight (kg), Bbs = sample wet weight (kg).
- Temporary carbon stock values (Cs) for seedlings and understorey are calculated with 0.47 x biomass or organic matter value (Kg)
- Carbon stock values for trees (tons C / ha) are ((Cs) / 1000) x (10000/400)

Below Ground Biomass (BGB)

In assessing carbon stocks in the RSPO GHG procedure it is explained that it is not possible to measure BGB (root biomass) directly and the preferred approach is to use the standard BGB AGB ratio (commonly referred to as the shoot root ratio).

The ratio of shoot roots varies depending on the type of vegetation and local situation, and for the purposes of the RSPO GHG Assessment Procedure it is recommended that a value of 0.18 be used for Southeast Asian tropical

The general equation used in estimating carbon stocks for subsurface biomass (BGB) is:

$$\mathbf{B_{bp} = RAP \times B_{ap}}$$

Information:

B_{bp} = biomassa di bawah permukaan tanah (kg); RAP = Nilai Rasio akar: pucuk atau sebesar 0,18; B_{ap} = biomassa di atas permukaan tanah (kg)

Peat Carbon Stock

Some parameters needed to calculate soil carbon stocks on peatland are as follows:

1) Content weight (g / cm3 or kg / dm3 or t / m3)
2) Organic carbon content (% based on weight or g / g or kg / kg)
3) Depth or thickness of peat (cm or m)
4) Land area where carbon stock will be estimated (ha or km2)

The total amount of peat carbon stock in assessing carbon stocks in the RSPO GHG procedure is calculated

$$\mathbf{C_{gambut}\ (ton\ C) = A\ (ha)\ x\ 10.000\ m^2/ha\ x\ D\ (m)\ x\ BD\ (ton/m^3)\ x\ C\ (\%)}$$

Information:
A = total area of peat in hectares; D = average peat depth (meter); BD = peat content weight (ton/m^3); C = peat carbon content in the percentage of dry weight

Total Carbon Stock

a. Carbon Stock The total in sample plots for above-ground biomass (AGB) and below ground biomass (BGB) are calculated with the following

$$\mathbf{C_{plot} = C_{AGB} + C_{BGB}}$$

Information:
C_{plot} = Total Carbon Stock in the plot (Ton C/ha)
C_{AGB} = Stock Total carbon above ground (Ton C/ha), which is the summation of Carbon Stock for poles, stakes, trees and seedlings.
C_{BGB} = Stock of Total Carbon below ground biomass (Ton C/ha)

b. The Total Carbon Stock in the land / class cover class is calculated by the following equation:

$$\mathbf{C_{stratum} = (C_{Plot} / n_{stratum})\ x\ Luas\ stratum}$$

Information:
$C_{stratum}$ = Stratum Total Carbon Stock (Ton C)
C_{plot} = Total Carbon Stock in the plot in the strata (Ton C/ha)
$n_{stratum}$ = Number of Plots in the stratum

c. Total Carbon Stock in the RSPO GHG procedure in the study area is calculated using the following equation:

$$\mathbf{C_{Total} = C_{Total\ Stratum} + (C_{Gambut}\ x\ A_{Gambut})}$$

Keterangan:
C_{Total} = Total Carbon Stock in the study area (Ton C)
$\mathbf{C_{Total\ Stratum}}$ = Carbon Stock Total all land cover / stratum classes (Ton C)
C_{Gambut} = Stok Karbon Tanah Gambut (Ton C/ha)
A_{Gambut} = Luas total gambut (ha)

Assessment of the amount of GHG emissions from the planned new planting in oil palm plantations in RSPO GHG procedures using the GHG Calculator for new developments issued by RSPO.

2.5. LUC Assessment

a. Assessor Credentials

Land Use Change conducted by Kasuma Wijaya, S.Hut., MSi (Land covers image analysis and GIS experts), July 2019

b. Methods

Relevant time of clearance period	
⊠ November 1, 2005 – November 31, 2007	⊠ December 1, 2007 – December 31, 2009
⊠ January 1, 2010 – May 9, 2014	⊠ After May 9, 2014

Date of satellite image acquisition for each time of clearance period		
Period	**Date of acquisition**	**Cloud cover (%)**
Before November 1, 2005 (baseline)	14 August 2005	< 5%
November 1, 2005 – November 31, 2007	7 September 2007	< 5%
December 1, 2007 – December 31, 2009	7 August 2009	< 5%
January 1, 2010 – May 9, 2014	15 June 2013	< 5%
After HCV area identified	8 August 2015	< 5%
After becoming RSPO member (if relevant)	Not relevant	-
After the management unit acquired (if relevant)	Not relevant	-
Latest satellite image used for ground truthing	14 September 2018	< 5%

Satellite images used in the LUC Analysis	
Satellite Name	Landsat TM 5, Landsat 8 , and Sentinel 2
Resolution	30 meter (Landsat), 10 meter (Sentinel 2)

List of data and document used in the LUC Analysis		
1. Land clearance progress map (monthly)	☐ Available/used	⊠ Not available
2. Land clearance progress data (monthly)	☐ Available/used	⊠ Not available
3. Planting year map	☐ Available/used	⊠ Not available
4. Planting year data	☐ Available/used	⊠ Not available
5. Land compensation progress map (if applicable)	☐ Available/used	⊠ Not available

6. Land compensation progress data/document (if applicable)	☐ Available/used	☒ Not available
7. Soil map	☒ Available/used	☐ Not available
8. Slope map	☒ Available/used	☐ Not available
9. Watershed-hydrology map	☒ Available/used	☐ Not available
10. HCV assessment report	☒ Available/used	☐ Not available

Image processing		
Radiometric correction	☒ Conducted	☐ Not conducted
Geometric correction	☐ Conducted	☒ Not conducted

Image analysis		
☐ Supervised classification	☐ Unsupervised classification	☒ Object based visual interpretation

Survey design	
Number of sample	The minimum amount of sample needs is Taro Yamono Formula (1967)
Sampling method	Terrestrial Sampling
Reference for sampling method	RSPO Guidance for Land Use Change Analysis (Revised version March 2017)

Field verification	
Validating the land cover data	Data verification and ground truthing
Compiling information related to historical land use in the study area	Compilation of historical information on land use by combining information from (1) ground truthing, (2) document review, and (3) interview
Identification the loss of social HCVs	Conducted by review of HCV documents and in-depth interviews with key respondent
Identifying the loss of areas where planting is prohibited by RSPO P&C or by country's specific legislation (e.g. riparian zones, steep slope, deep peat)	Analysis of the data resulting from the overlay between data on land cover changes in each period of liability with the distribution of areas not allowed by P & C for oil palm planting

Image validation	
Method used for LUCA accuracy assessment	the Kappa Accuracy method

Change detection analysis
In LUC analysis activities, change detection analysis is based on review of company documents and in-depth interviews. Review of company documents including acquisition documents and HCV Report. In-depth interviews with key respondents include local community leaders, and company staff who have long been in the study area, relating to the land cover baseline, history of land ownership and activities, land clearing activities and community cultivation patterns.

Vegetation coefficient
Grouping land cover classes into the vegetation coefficient category follows the guidance RSPO, which in principle consists of 4 categories, namely (1) Coefficient 1.0, for Primary Forest land cover, (2) Coefficient 0.7, for Secondary Forest land cover, (3) Coefficient of 0.4, for mixed garden or agroforestry land cover, and (4) coefficient 0.0, for non-forest cover such as fields, rubber, oil palm, rice fields, shrubs and grasslands.

2.6. FPIC process

a. Assessor Credentials

Expert Name	Position	Aspect
Sigit Pamungkas, SP, M.Si	Team Coordinator and Experts	• Communication and Community Development (KPM) • Agricultural and Rural Development Communications • FPIC, SIA and participatory mapping • General K3 Expert • HCV Criteria 5 and 6, SEIA
Iyat Sudrajat, S.Hut., M.Si	Expert	• Forestry, community social studies and participatory mapping, SEIA facilitation techniques

b. Methods

FPIC or FPIC activities are carried out through two stages, namely: Phase I on November 1 - 08, 2016, and Phase II on June 17-21, 2019

Reference and Guidelines FPIC

The references and guidelines used as references in conducting FPIC studies at PT AAC are as follows:

1) Free, Prior and Informed Consent Guide For RSPO Members, RSPO Human Right Working Group 2015. Endorsed by the RSPO Board of Governors meeting on 20 November 2015 in Kuala Lumpur.
2) United Nations Declaration on the Rights of Indigenous Peoples, relating to FPIC (article 32), Lands and Territories (articles 20 and article 26), Displacement and the right to restitution and correction / submitting compensation (article 10, article 28), Representatives (article 18 , article 19), based on customary agreements (article 3, article 4, article 5, article 33 and article 34).
3) International Law Convention, which includes:
    - International Convention on Civil and Political Rights
    - International Convention on Economic, Social and Cultural Rights
    - Convention on the Elimination of All Forms of Ethnic Discrimination
    - ILO Convention No. 169 concerning Indigenous Peoples and Tribes.

The method used in the FPIC study consists of:

1). **Secondary Data Collection** by collecting documents needed (documentation) taken from village profiles or Village Medium Term Development Plans (RPJMDes), sub-districts in numbers, districts in numbers and or other library sources.

2). **Primary Data Collection** by:

- Conditional interviews as well as in-depth interviews with community members who are considered to know the information needed (Village Head, BPD Chairperson, LPM Chairperson, RW Chairperson, RT Head, community leaders, religious leaders, local agency leaders, etc.).
- Discussions with community groups (Focus Group Discussion) and (Rapid Rural Appraisal). FGD and RRA participants consisted of Village Heads, BPD Management, LPMD, RW / RT leaders, representatives of youth leaders, representatives of religious leaders, representatives of women leaders, and representatives of other community leaders.
- Observation of physical environmental conditions, social environment, social relations, local community habits such as land use patterns and natural resources or forest resources.

3). **Triangulasi data**, integrated methods to verify each other on emerging issues, opinions and ideas such as the emergence of the latest values of norms and rules on land use, natural resource management, and SDH management that apply in the local community.

CHAPTER 3. SUMMARY OF FINDINGS

3.1. SIA

Potential Positive and Negative Developments

The interaction between the PT AAC Oil Palm Plantation Company and the communities in the surrounding villages resulted in positive and negative perceptions. In general, community perceptions in all villages about the existence of PT AAC are positive because the company has a good impact on improving people's living standards and has good communication between the company and the village government and the community.

Positive perceptions arise because of the awareness of the community and feel directly that the economic conditions of the people tend to increase due to the existence of oil palm companies operating in their area. Communities can improve their economy through several aspects such as working as employees in the company, obtaining results from plasma, opening businesses such as kiosks or stalls, and obtaining assistance programs from corporate CSR. Basically, the increasing economy of some residents has also contributed to the increase of other residents' income through a multiplier effects mechanism, so that improvements in the economic aspects are felt by the community around PT AAC..

The existence of the company facilitates people's access to mobility towards gardens or other economic facilities. Roads opened by the company can help people cut travel time to gardens, economic centers in the sub-district capitals, and the Trans Kalimantan crossing road so that it will directly impact the reduced costs needed by the community to move around.

The hope of the community with the existence of PT AAC is to be able to continue to pay attention to the local workforce so that the workforce available in the village can be absorbed by the company in accordance with its capabilities, especially with the planned opening of a Palm Oil Mill that will absorb labor. In addition, PT AAC is expected to remain consistent with fostering plasma gardens so that it can add to the community's economic resources. The presence of PT AAC is also expected to be able to consistently contribute to village development as has been done so far, namely providing physical assistance such as repairing roads and bridges, providing educational facilities and religious facilities, as well as other incidental assistance. The community also hopes that the company can provide training to local residents so that they have the opportunity to become staff at PT AAC

The hope of the community is of course accompanied by concern. As a community that deals with and feels directly the impact of the presence of oil palm companies around them is very reasonable if some things are their concern. What is a concern for residents is the occurrence of pollution and damage to water sources such as rivers. When the survey was conducted, river pollution and damage occurred due to illegal gold mining activities, especially along the Meliau River and Ensunak Rivers. These illegal mining activities are outside the PT AAC area, however, some rivers flow through the plantation area so that the company also bears the consequences of river

damage caused by illegal miners who carry out mining upstream of the river and outside the company's area. Another concern for residents is the plan to build a factory that will have an impact on river pollution, especially for the people of Bagan Asam Village who use the Dawak River for drinking and MCK needs. However, in the socialization of the ANDAL for the construction of the company's Palm Oil Mill at the beginning of 2019, it is planned to build wells in the affected community settlements so that it can be a source of clean water and MCK solutions

Socio-economic impacts to country, region and local communities

- **Positive impacts include**;

    1) Increasing the economy of the people because they work as employees at PT AAC and income from plasma plantations.
    2) PT AAC's CSR assistance and programs encourage increased access and quality of education in surrounding villages, construction of religious facilities, awareness of clean living and improving health services and assistance both programmed and incidental.
    3) Construction of plasma plantations has had a significant positive impact on improving the economy of its members.
    4) The presence of the company encourages the awareness of the community and the village government to ensure administrative boundaries between villages including the boundaries of land ownership in the village community itself.

- **Negative impacts include**;

    1) Potential negative impacts on socio-economic aspects related to the openness of access and employment opportunities by companies to immigrants and local communities from villages surrounding the company which results in jealousy from the local community about the amount of quota acceptance, capacity and capability of human resources, and position occupied by employees from immigrants.
    2) Jealousy due to the unequal distribution of CSR programs in supporting customary programs, education and health programs and facilities that not only prioritize hamlets whose areas are included in company permits but other hamlets in three villages.
    3) The community approach strategy implemented by the company following the institutional pattern and leadership at the village level can ignore participatory principles and make information from the company not shared equally among all communities and has the potential to strengthen certain elite groups at the village level.
    4) The lack of communication and information received by the community regarding the scheme and operation of the plasma estate which has led to negative perceptions, suspicion and distrust of the company and plasma plantation managers.
    5) Migration of people outside the village to get work on oil palm plantations will further accelerate changes in village cultural values and norms so that they can cause anxiety to the local community.

6) Lack of carefulness of the company in purchasing land in communities that have unclear property rights, can lead to negative perceptions of the community.
7) Potential negative environmental impacts, especially related to the availability of water for the community.

Socio-economic impacts in respect of emergent communities (workers, suppliers etc.)

PT AAC's activities have been going on since 2007/2008 so that all land has been harvested. The long-term development plan for the construction of PT AAC's oil palm plantations continues to be implemented. Thus, the analysis of the impact or potential impact carried out for internal aspects is the same as the analysis carried out on external aspects. The aspects that are the focus of the analysis are labor recruitment systems, aspects of protection, development and improvement of labor welfare, industrial relations, competency development, and career paths.

Based on the results of quantitative descriptive analysis, the questionnaire distributed to employees as respondents showed that around 75% of the supporting aspects of employees had satisfaction levels that were above average.

From a number of aspects observed, there are indications of a number of potential negative impacts that can arise in several aspects internally, namely aspects of industrial relations, aspects of competency development, and career path aspects

Issues raised by stakeholders and assessors comments

Table 6. Analysis of Stakeholders in the Development of PT AAC's Palm Oil Plantation.

No	Stakeholders	Main interests	Strength of Influence	Issues that need to be anticipated from the role of stakeholders
1.	PT AAC	Benefits of business, partnerships, relationships of the surrounding community	Having strong capital and a strong elite network at the level of local, national and global elites	Labor, environmental and CSR conflicts: Need for labor information disclosure and company CSR, as well as mitigating the potential impact of the planned construction of a palm oil mill.
2.	provincial / district government	Increasing Regional Original Income (PAD)	Policy makers and have the authority to regulate and control	Land-use spatial issues: Analysis of potential environmental impacts and labor issues in plant construction plans. Regional Government Relations with PT AAC. Formally effective.
3.	District government	Achievement of Performance, as a regional government apparatus that runs local government	Can organize strengths and interests in each village to influence PT AAC's policies.	Issues Regional boundaries in villages or sub-districts: The Management Unit can provide more space for the sub-district government to be able to help quickly resolve conflicts between residents and between villages

No	Stakeholders	Main interests	Strength of Influence	Issues that need to be anticipated from the role of stakeholders
		policies in the field		
4.	Village heads	Land consolidation and land transaction administration	Controlling the decisions of landowners, and politically can shape the opinions of citizens and institutions on it related to the activities of PT AAC	Labor, CSR and environment issues: The management unit can conduct intensive dialogue with village heads to resolve labor recruitment problems and environmental impacts in the plans to build palm oil mills and CSR programs
5.	Residents of rubber / oil palm farmers, traders, farmers, non plasma farmers	Get a positive impact and / or recovery of rubber / oil palm land	Located in the ability to gather togetherness	Management Unit: can intensify the form of cooperation in developing community potential
6.	Plasma farmers	Optimization of results from owned / controlled land	Having negotiating power over land	Plasma management issues: The PT AAC Management Unit must continue to maintain a conducive atmosphere with plasma farmers and prospective plasma farmers who have not given up their land.
7.	General public	Get a positive impact and avoid negative impacts	Located in the ability to gather togetherness	Issue of business opportunity: The Management Unit needs to intensify conducive relations with the community, especially related to labor issues and other business opportunities besides palm oil commodities that can be developed in the community
8.	Special interest groups	Get a positive impact in the form of added value of business or activities due to the operation of PT AAC	Located in the capacity of individuals and institutions to target economic opportunities in response to the presence of PT AAC.	The Management Unit needs to identify UMKM and community business opportunities in preparation for CSR programs.

List of legal documents, regulatory permits and property deeds related to the areas assessed

Table 7. List of legal documents, regulatory permits and property deeds related to the areas assessed

No	List of Document	Certificate Letter	Agency	Area (Ha)
1	Location permits	Sanggau Regent Decree No : 400 – 44 / IL – 41 - 2008	Regent Sanggau	8.100
2	Environmental Feasibility	Sanggau Regent Decree No : 273 Tahun 2009	Regent Sanggau	8.100
3	Plantation Business Permit	Sanggau Regent Decree No : 19 Tahun 2010	Regent Sanggau	7.500
4	Extension of Location Permit	Sanggau Regent Decree No : 266 Tahun 2011	Regent Sanggau	8.095,58
5	HGU	ATR Minister / Head of BPN Decree No : 89 / HGU / KEM – ATR / BPN / 2018	Indonesian Ministry of ATR / Head of BPN	3.600,58
6	Cadastral	BPN Submission Letter of Regional Office Number 1499 / P-16 / X / 2015 (Core Gardens) and BPN Submission Letter Number 1500 / P-16 / X / 2015 (Plasma).		6.612,09

3.2. HCV Assessment

3.2.1. National and or regional context

A key area of biodiversity is a nationally identified area that has global significance. Several international organizations have identified key areas for biodiversity with their respective criteria. Several key areas of internationally recognized biodiversity include ramsar sites. In Kalimantan, there are two (2) Ramsar Sites of Tanjung Puting National Park in Central Kalimantan (± 307.18 kilometers to the southeast) and Danau Sentarum National Park in West Kalimantan (± 211.08 kilometers to the northeast). Considered from their distance, the two Ramsar Sites were far from the permit concession area of PT. AAC, so that the study area does not provide any important supporting function for the Ramsar sites and the surrounding area.

The landscape of Southeast Asia consists of two kinds of landscape i.e lands and waters landscape. Based on the location of latitude and physical condition, Southeast Asia has a tropical sea monsoon with nature that is always wet and warm. The climate in Southeast Asia is influenced by the monsoon that every half year turns the opposite direction, resulting in two seasons, the rainy and dry seasons. The dry season occurs in April-October.

Plants (flora) in Indonesia are part of Indo-Malaya plant geography. Flora Indo-Malaya includes plants that live in India, Vietnam, Thailand, Malaysia, Indonesia, and the Philippines. Flora grown in Malaysia, Indonesia, and the Philippines is often referred to as the flora of *Malesiana*. Forests in the Malesiana flora area have approximately 248,000 species of high plants, dominated by trees from the *Dipterocarpaceae* family, which are trees that produce winged seeds. *Dipterocarpaceae* is the highest plant and forms a forest canopy. Plants belonging to the Dipterocarpaceae family such as *Keruing* (*Dipterocarpus sp*), *Meranti* (*Shorea sp*), *Garu* (*Gonystylus bancanus*), and *kapur* (*Drybalanops aromatica*). The forest in Indonesia is a biome of tropical rain forest or wet forest, characterized by a tight canopy and many liana plants (climbing plants), such as rattan. Typical Indonesian plants such as *durian* (*Durio zibetinus*), Mango (*Mangifera indica*), and *Sukun* (*Artocarpus sp*) in Indonesia are spread among others in Kalimantan. In Kalimantan, there are several endemic plants, among others: Raflesia (*Rafflesia boorneensis*), and rattan (*Calamus caesius*).

Concession areas of PT. AAC is located in West Kalimantan Province, Indonesia. Indonesia is one of the countries included in Southeast Asia. Seen from its zoogeography, the fauna of the Sumatran region includes the oriental type (Western Indonesia Region), where typical wildlife are Asian elephants (*Elephas maximus*), Bornean Orangutan (*Pongo pygmaeus*), and Proboscis Monkey (*Nasalis larvatus*). In relations with the above description shows that the island of Kalimantan in the regional context is one of the most important locations for the conservation of endemic flora and fauna of endemic islands of Kalimantan, Malesiana flora, and fauna that belong to oriental type (Asian elephant, Bornean Orangutan, and Proboscis Monkey). The preservation of flora and fauna on the island of Kalimantan will affect the sustainability of flora fauna in Southeast Asia.

Development of oil palm industry in West Kalimantan province increases progressively. Accoding to West Kalimantan Provincial Plantation Service (2007-2016), in the year 2007, area size of oil palm plantation in the area was as large as 451,400 ha with production of 845,100 ton/year; whereas in the year 2016, area size of oil palm plantation in the area was as large as 1,478,133 ha with production of 2,106,869 ton/year. Within a period of 10 years (2007-2016), there was increase of oil palm plantation area size in the area, by 1,026,733 ha or in average, 102,673 ha per year, and production increase of 1,261,769 ton or in average, 126,177 ton per year.

Legislation and policy support from local government in relation with conservation and High Conservation Value were among others : (1) West Kalimantan Provincial Regulation No. 10 year 2014 concerning Spatial Plan of West Kalimantan Province, year 2014-2034; (2) West Kalimantan Provincial Regulation No. 2 year 2018 concerning Integrated Management of Watershed; (3) West Kalimantan Province Guberanatorial Regulation No. 17 year 2017 concerning Guidelines for Application of Risk Management in Government Circles of West Kalimantan Province; (4) West Kalimantan Province Guberanatorial Regulation No. 8 year 2017 concerning Guidelines for Permit Granting and Supervision of Collection of Toxic and Dangerous Waste Materials; and (5) West Kalimantan Provincial Regulation No. 3 year 2014 concerning Protection and Management of Environment.

Related to that and with the identification of HCVs in concession areas of PT. AAC and its management and monitoring actions with the support of local government regulations and policies / governors of West Kalimantan Province are expected to contribute to the conservation of biodiversity, environmental services and socio-cultural values of the community in Sanggau, West Kalimantan Province in particularly and in the Republic of Indonesia in general.

3.2.2. Landscape context

Land cover

Based on Landsat 8 satellite imagery analysis results 2016, land cover in the landscape of the study are four main land cover types: (1) secondary dryland forest, (2) dryland farms with shrubs, (3) oil palm plantation, and (4) mining. Meanwhile, land cover within the concession area of PT. AAC can be divided into nine (9) types, namely secondary dryland forest, rubber plantation, mixed plantation, scrub, field, bare land, settlements, and water body, where the dominant land cover in the study area is oil palm plantation. Around the concession area of PT. AAC contains primary dryland forest and secondary dryland forest in the northwest (Protected forest of *G. Belungai*) and in the east (Protected forest of *G. Pering Melawi Condong*). There is evidence that protected forest is a haven for various biodiversity, among others: Malayan Sun Bear (*Herlactos malayanus*), Sambar deer (*Cervus unicolor*), and Antelope (*Muntiacus muntjak*). In concession areas of PT. AAC was found the existence of forested area of 96.20 hectares, while the forested area around the study area is located not directly adjacent to the concession area. Therefore, in the study landscape there is no forest connectivity.

Spatial planning at national

Based on the map of Forest and Water Areas of South Kalimantan Province Scale 1: 250,000 (Ministry of Forestry Decree Number: 866 / Menhut-II / 2014, September 29, 2014), the concession area of PT. AAC including Other Use Areas (APL); according to the Spatial Plan Pattern of West Kalimantan Province year 2007, concession area of PT. AAC includes dryland farming area; whereas according to Indicative Maps Delays on Permit for New Utilization of Forests, Use of Forest Areas and Changes of Allocation of Forest Areas and Other Use Areas Revision XI of 2016 includes Other Areas of Use.

Land history

PT AAC has started operational activities on land as large as 5,151.12 Ha with the following details: land which has been procured and has not been utilized as large as 603.46 ha, land which has been cleared and has not been planted with oil palm as large as 202.30 ha, and land which has been planted with oil palm as large as 4,345.36 ha. Permit concession area of PT. AAC, was initially in the form of mixed garden, rubber plantation, bush and cleared land, with commodity species of oil palm which will be developed. Land use in the permit area of PT. AAC undergoes change from year to year, namely in the form of increase or decrease, except for dry land secondary forest, which does not undergo chage. Land use within and around the permit concession area of PT. AAC also undergo change from year to year (increase or decrease in area size). Based on RTRWP (Provincial Spatial Arrangement) map of West Kalimantan of year 2007, area status in various land cover within and around the permit concession area of PT. AAC can be categorized into 2 kinds, namely Convertible Production Forest as large as 753.51 ha and dry land farm as large as 37,724.82 ha. Specifically for land cover in the form of dry land secondary forest, this is on the whole is categorized as dry land farming, where secondary forest as large as 96.20 occurs in the permit area of PT. AAC and dry land secondary forest as large as 747.63 ha occurs around the permit concession area of PT. AAC. Based on those figures, dry land secondary forest as large as 843.83 ha, if being projected on the basis of West Kalimantan RTRWP, in the future will change into dry land farm.

Physical environment

In landscape context, concession area of PT. AAC is located in Kapuas watershed area (Kapuas Hilir sub-watershed). With total area of 6,612.09 hectares, the study area covers 0.07% of the Kapuas watershead (10,040,646 hectares). The area was crossed by five (5) rivers, i.e. Ensunak, Bawang, Temiang, Meliau, and Dawak river that disembogues into Kapuas river.

Study area was part of the Type A climate based on Schmidt-Ferguson climate classification. During 9 years period (2007-2015), the annual rainfall and number of rainy days in the area were fluctuating, with rainfall in concession area ranging from 2,380 – 4,232 mm and number of rainy days ranging from 105 – 176 days, annual average rainfall of 3,212 mm and annual average number of rainy days of 141 days. The annual temperature was also fluctuating. The annual maximum temperature in 3 years (2014-2016) were ranging from 33,1 – 35,3^{o}C, annual minimum temperature

ranging from 22,5 – 24,5ºC and the annual average temperature ranging from 27,9 – 28,0ºC; while the annual average maximum temperature of about 34,0ºC, the minimum of about 23,8ºC and average of about 27,9ºC.

The concession area of PT. AAC is located on the altitude of 24 – 204 meters above sea level. The level of slopes that dominate this area is 8 to 15% and some have slopes of land varying from 15% to > 40%. Based on the calculation, the Erosion Hazard Level (EHL) of this area was high.

Land physiography of the area in this study area were mostly (93.14%) landform of hilly / metamorphic rock ground terrestrial land with the Honja (HJA) land system; while the rest were in the form of rock hilly landforms rather than irregular deposits with the Pakalunai (PLN) land system, and *Landform* of the area were finger-shaped steep volcano plugs in Tambera land system (TBA).

Based on soil types, association of *Tropudults, Paleudults, Tropohumults* (Podzolic) dominated most of the area (93.13%), while the remaining 1.27% were consisted of association of *Tropudults, Tropohumults, Dystropepts* (Podzolic) and 5.59% were consisted of association of *Dystropepts; Tropudults; Haplorthox* (Latosol). The podzolic soil is a mineral soil has evolved, deep solum (deep), sandy to clay texture, lumpy structure, sticky consistency, slightly acidic (pH less than 5.5), low to medium fertility, red to yellow, low alkaline saturation, sensitivity erosion. This soil is derived from quartz sandstone, volcanic tuff, acidic. Scattered in wet climates without dry months, rainfall more than 2,500 millimeters per year.

Biodiversity

In Kalimantan, it has more than 3,000 species of trees, including 267 Dipterocarp species, the most important timber tree group, of which 58% of Dipterocarp species are endemic. Also, it has more than 2,000 species of orchids and 1,000 species of ferns, as well as a distribution center of carnivores Semar Bag (*Nepenthes*). The rate of flora endemism is also quite high around 34% of all plants, but has only 59 unique genera of 1,500 genera. The existence of the study site on the island of Kalimantan allows the existence of several species of endangered flora and is protected by Indonesian legislation, mainly the trees of the *Dipterocarp* family (*Shorea spp., Dipterocarpus spp*.). In addition to the trees of the Dipterocarp family, there are several other species of flora, such as the semar bag (*Nephentes spp*.). All species of plants are protected by the Indonesian government based on the Decree of the Minister of Agriculture no. 54/Kpts/Um2/1972 and Decree of the Minister of Forestry No.261/Kpts-IV/1990. On the other hand, the tree species are widely used for commercial timber, mainly because they are the kinds of trees that serve the interests of local communities. Plant species that are spread in the area of study and are covered under Government Regulation no. 7 of 1999 are semar bag (*Nepenthes gracilis*), t*engkawang* (*Shorea pinanga*), and cerindak (*Shorea seminis*); while the critical category is *cerindak* (*S. seminis*), *keladan* (*Dryobalanops aromatica*), *merawan* (*Hopea mengarawan*), and *tengkawang layar* (*Shorea smithiana*).

The island of Kalimantan is an island that has several types of tropical habitats that are rich in biodiversity. Location of concession area of PT AAC located on the island of

Kalimantan where it cannot be separated from the wealth of the ecosystem. As an illustration, the wealth of terrestrial mammal species on the island of Borneo is 225 species and 44 species of which are endemic (Payne et al., 2000); 639 species of birds, 358 species of which are settlers and 37 species of which include endemics (MacKinnon et al. 2000), 166 species of snakes (Stuebing, 1991), amphibians as much as 140 to 150 species (Inger and Stuebing, 1997); and freshwater fish of 394 species and 149 species of which are endemic (MacKinnon et al., 1996). Some unique species of wildlife inhabit this island, namely Bornean Orangutan (*Pongo pygmaeus*), Proboscis Monkey (*Nasalis larvatus*), Malayan Sun Bear (*Helarctos malayanus*), Sunda Clouded Leopard (*Neofelis diardi*), and Wattled Pheasant (*Lophura bulweri*).

Animal species with high-level threat of extinction can be found in the study location. The animals, which are protected under the Governmental Regulation No. 7 year 1999, included Malayan porcupine (*Hystrix brachyura*), Sunda pangolin (*Manis javanica*), Sunda stink-badger (*Mydaus javanensis*), Javan chevrotain (*Tragulus javanicus*), Black-winged kite (*Elanus caeruleus*), Collared kingfisher (*Todirhamphus chloris*), and Ruby-cheeked Sunbird (*Anthreptes singalensis*); while animal included in the critical category of IUCN Red list was Sunda pangolin (*Manis javanica*).

Protected forest and conservation areas

In the concession area of PT. AAC, it is not found protection forest, conservation area, EBA regions, and IBA regions; however, the surrounding area of PT AAC concession area, it was found those four areas. The nearest protected forest lies to the northwest (protected fores *G. Belungai*), about 10.12 kilometers and most of the land cover is dryland farming with shrubs. The nearest conservation area lies to the south (Gunung Palung National Park), approximately 80.37 kilometers and the dominant land cover of primary dryland forest and secondary dryland forest. The nearest EBA regions lies to the east, about 19.77 kilometers, and the land cover is dominated by dryland farming with shrubs. The nearest IBA regions lies to the south, about 73.17 kilometers, and the land cover is dominated by primary dryland forest and secondary dryland forest. Related to that, the concession area of PT. AAC does not provide an important support function for protected forest and biodiversity areas in the landscape and development of oil palm plantations and in concession area of PT. AAC will have no impact on protected forest, conservation area, the EBA and the IBA regions.

Ecosystem

In the past (before the land conversion was occurred), the ecosystem found in the concession area of PT. AAC consists of three (3) types, namely (1) association of mixed or hill dipterocarp ecosystem on volcanic rocks, metamorphic rock, and granite, (2) association of mixed or hill dipterocarp ecosystem on metamorphic rock and granite, and (3) mixed or hill dipterocarp forest on volcanic rock. At present, there are 2 types of ecosystem which still posses land cover in the form of natural vegetation (dry land secondary forest), ie., association of mixed or hill dipterocarp ecosystem on volcanic rocks, metamorphic rock, and granite and association of mixed or hill dipterocarp ecosystem on metamorphic rock and granite.

Social, economic and cultural

In around the concession area of PT. AAC identified as many as three (3) villages that could potentially be affected by the development project: Bagan Asam, Baru Lombak, and Enggadai Villages. The level of community education around PT. AAC is low with average of elementary and junior high school graduates. The livelihood of community living around the study area was less varying. The main livelihood of almost all community member around the concession area of PT. AAC was oil palm company employee. Other livelihood included hunting and fishing. Usually, the local community depended their need for water, including drinking water and sanitation, on river network and water springs located on catchment area.

Religion adopted by residents in the vicinity of concession area of PT. AAC are majority Kristen Katholik. People in the villages around the concession area of PT. AAC almost all are Ethnic / tribe of Dayak (sub-etnic of Dayak Desa). Institutional village and social and religious organizations that exist such as Village Community Resilience Institute (LKMD), Family Fostering Organization (PKK), Youth Organization (Karangtaruna), and sports clubs. People of Dayak Desa tribe speak in Dayak language. The Dayak Desa tribe meets the needs of their daily lives by focusing on farming in the fields. Although they live by the river, they are more likely to focus their activities by cultivating their fields (farming).

3.2.3. HCV outcomes and justification

Based on the results of HCV assessments in concession area of PT. AAC, it was found five (5) categories of HCV, i.e., HCV 1 category (subcategory: HCV 1, HCV 1.2, HCV1.3 and HCV 1.4), HCV 3 category, HCV 4 category (subcategory: HCV 4.1 and HCV 4.2), HCV 5 and HCV 6 categories, as presented in **Table 8**.

Table 8. Summary of findings of HCV assessments in the concession area of PT. AAC

HCV	Definition	Present	Potential	Absent
1	Species diversity			
1.1	Areas that contain or provide biodiversity support function to protection or conservation areas			
1.2	Critically endangered species			
1.3	Areas that contain habitat for viable populations of endangered, restricted range or protected species			
1.4	Areas that contain habitat of temporary use by species or congregations of species			
2	Landscape-level ecosystems, ecosystem mosaics and Intact Forest Landscapes (IFL)			
2.1	Large natural landscapes with capacity to maintain natural ecological processes and dynamics			
2.2	Areas that contain two or more contiguous ecosystems			
2.3	Areas that contain representative populations of most naturally occurring species			
3	Ecosystems and habitats			
4	Ecosystem services			
4.1	Areas or ecosystems important for the provision of water and prevention of floods for downstream communities			
4.2	Areas important for the prevention of erosion and sedimentation			
4.3	Areas that function as natural barriers to the spread of forest or ground fire			
5	Community needs			
6	Cultural values			

3.2.4. HCV management and monitoring

The total area of HCV management and monitoring in the concession area of PT. AAC is 4,854.31 hectares that includes: (1) No-go areas covering 301.51 hectares and (2) Go areas covering 4,552.80 hectares, as presented in **Table 9**.

Table 9. The total area of HCV management and monitoring in the concession area of PT. AAC

Areas of HCV Management and Monitoring		Total Area (Ha)	No-go Areas (ha)	Go Areas (ha)
HCV 1[1)]	HCV 1.1	205.22	205.22	0.00
	HCV 1.2	4,819.51	266.71	4,552.80
	HCV 1.3	4,819.51	266.71	4,552.80
	HCV 1.4	4,786.57	233.77	4,552.80
HCV 3[1)]		157,06	157.06	0.00
HCV 4	HCV 4.1	205.22	205.22	0.00
	HCV 4.2	42.50	42.50	0.00
HCV 5[2)]		185.24	185.24	0.00
HCV 6[3)]		5.62	5.62	0.00
Total[4)]		**4,854.31**	**301.51**	**4,552.80**

Descriptions:

1) = HCV 1.1 is areas based on Presidential Decree Number 32 of 1990 include protected areas, whereas HCV 1.2, HCV 1.3, HCV 1.4 and HCV 3 which are areas of HCV management where there is still land cover in the form of secondary dryland forest; however, in the management of HCV 1.1, HCV 1.2, HCV 1.3 and HCV 3 must be thoroughly carried out both within and outside the HCV area in view of wildlife (mammal and bird) species are always mobile.

2) = HCV 5 is related to HCV 4.1.

3) = Total area of HCV 6 is 2,006 hectares is overlap with HCV 3 areas of 4.92 hectares and 0.70 hectare does not overlap with other HCV areas.

4) = Total area of HCV Management is not equal to the sum of all HCV areas as there is overlap between one HCV with other HCVs.

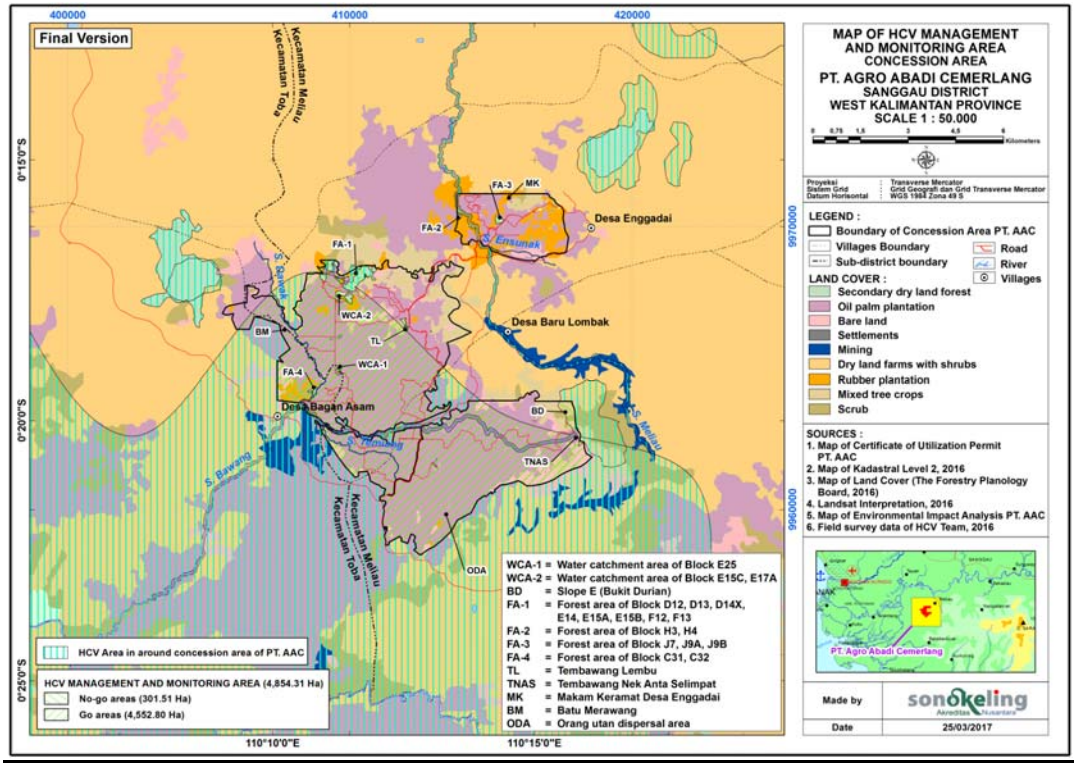


Figure 14. Map of HCV management and monitoring area in the concession area of PT. AAC

Interpretation of the findings that led to decisions on HCV presence/absence. It is key that all decisions on HCV presence/absence are adequately justified and supported by evidence

HCV 1. Species Diversity

HCV 1.1. Areas that contain or provide support functions for biodiversity protection and / or conservation areas

HCV 1.1 is the existence of areas established for the purpose of biodiversity conservation, either within or adjacent to the study area.

The study did not find any protected area, protection forest, IBA area or EBA area overlapping with or adjacent to the concession area of PT. AAC. The nearest protected area was Gunung Palung National Park with 80.37 km distance to the South. The nearest protection forest was G. Belungai protection forest to the northwest of concession area on approximately 10.12 km distance. The nearest EBA area located to the east on approximately 19.77 km distance from the concession area, while the nearest IBA area was located to the South on about 73.17 km distance from the concession area. There were riverbank and water catchment area with water spring inside the concession area of PT. AAC. Secondary dry land forest, rubber trees vegetation, oil palm plantation, shrubs, and open land covered the riverbank, while secondary dry land forest and shrubs covered the water catchment area. However, in reference to the Presidential Decree Number 32 year 1990, which stated that riverbanks and water catchment areas that contain spring are local protection areas designed to protect ecological function of the areas, the riverbank and water catchment areas inside PT. AAC were established as HCV 1.1 area of 205.22 ha. The HCV 1.1 area of PT. AAC of include river and embankments (137.89 ha) (Ensunak River (3.79 ha), Bawang River (88.67 ha), Temiang River (8.79 ha), Meliau River (24.63 ha) and Dawak River (12.01 ha)); water catchment areas (61.24 ha) (Water catchment area in Block E 25 (1.80 ha), Water catchment area in Block E15C, E17A (16.94 ha) and Slope E (Bukit Durian) (42.50 ha)), and forested area (6.09 ha) (forested area in Blocks H3, H4 (1.91 ha) and forested area in Blocks C31, C32 (4.18 ha). HCV 1.1 areas inside concession areas of PT. AAC are presented in **Figure 15**.

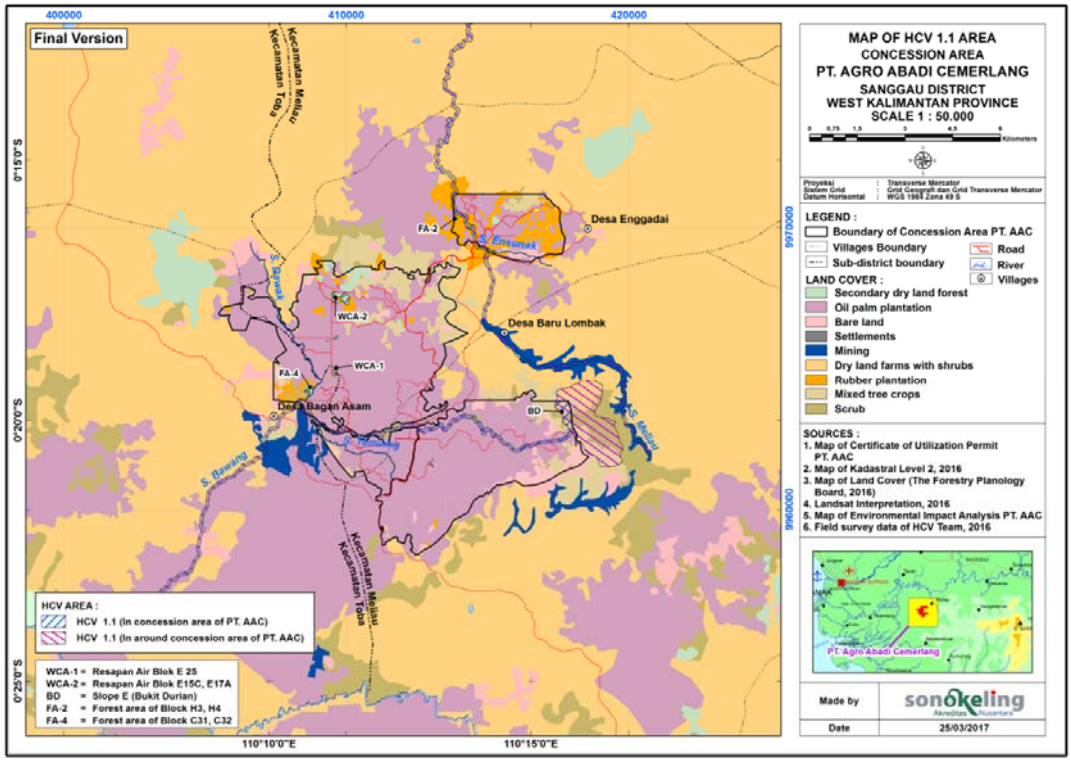


Figure 15. Map of distribution area of HCV 1.1 in and around concession area of PT. AAC

HCV 1.2. Critically Endangered Species

The existence of HCV 1.2 is characterized by the presence of endangered species of flora and fauna (CR / Critically Endangered) based on the IUCN Red List of Critically Endangered Species. This study found four plant species and one animal species categorized in Critically Endangered/CR category of IUCN Red List of Critically Endangered Species inside concession areas of PT. AAC. The plant species included Borneo camphor (*Dryobalanops aromatica* Gaertn.), Merawan (*Hopea mengarawan* Miq), Cerindak (*Shorea seminis* V. Slooten), and Light red meranti/Tengkawang layar (*Shorea smithiana* Symington), so that in the permit concession area of PT. AAC there was found HCV 1.2. Besides that, according to result of overlay with distribution map of *Manis javanica* according to IUCN (2017), the permit concession area of PT. AAC belongs to distribution area of *Manis javanica*, whereas result of overlay with orangutan distribution map, show that part of the study area belongs to distribution area of orangutan. Based on principle of carefulness (precautionary approach)sp, the area is declared to have potential to contain trenggiling (*Manis javanica*)) and orang utan (*Pongo pygmaues*). Both species are included in category CR/ *Critically Endangered* according to IUCN, so that in the permit concession area of PT. AAC there is potency to find HCV 1.2.

Establishment of HCV1.2 in relation with vegetation is based on results of field observation, where four species of plants which under category of CR/*Critically Endangered* (critical) according to IUCN was found directly in the field. Establishment of HCV1.2 in relation with Trenggiling (*Manis javaniva*) is based on the presence of

natural land cover in the form of forested area, whereas, establishment of HCV1.2 in relation with Orang utan is based on presence of area which belong to distribution area of Orang utan. Total area size of HCV1.2 in the permit area of PT. AAC is as large as 4,844.90 ha, with the following details: finding of HCV1.2 as large as 113.70 ha (water catchment of blocks E15C, E17A (16.94 ha), forested area of blocks D12, D13, D14X, E14, E15A, E15B, F12, F13 (84.27 ha), forested area of blocks H3, H4 (1.91 ha), forested area of blocks J7, J9A, J9B (6.40 ha), and forested area of blocks C31, C32 (4.18 ha)) and area which is potential to contain HCV1.2 as large as 4,731.20 ha (SS (riverside zone) Bawang (88.67 ha), SS Temiang (8.79 ha), SS Dawak (12.01 ha), SS Meliau (24.63 ha), water catchment block E25 (1.80 ha), slope E (Bukit Durian) (42.50 ha), and orangutan distribution area (4,552.80 ha)). The HCV 1.2 areas inside PT. AAC's concession area are presented in **Figure 16**.

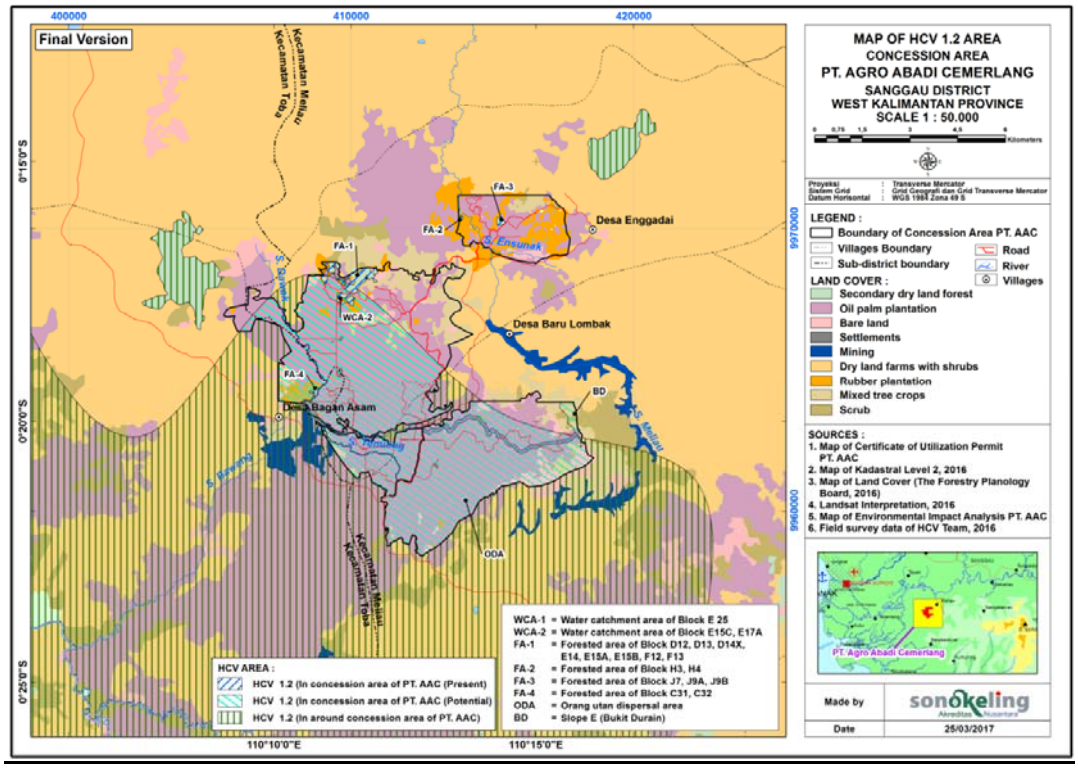


Figure 16. Map of distribution area of HCV 1.2 in and around concession area of PT. AAC

HCV 1.3. Areas that Contain Habitat for Viable Populations of Endangered, Restricted Range or Protected Species

The existence of HCV 1.3 is characterized by the presence of threatened flora and fauna species, limited (endemic), and / or protected spreading. Species to be considered in HCV 1.3 include all species identified in HCV 1.2 Nearly Extinct Species plus other species that are considered endangered, vulnerable, limited distribution (on an island or part of it) or protected by the Government of Indonesia (protected species). Kalimantan endemic mammals found in concession area of PT. AAC is Bornean Orangutan (Pongo pygmaeus). Within the concession area of PT. AAC there were

found species of wild animal and plant species which are protected according to Government Regulation Number 7 year 1999, as many as 11 species (3 plant species and 8 species of wild animal); 1 species which is included in list of CITES Appendix I and 10 species which are included in list of CITES Appendix II (5 plant species and 5 wild animal species); 6 species which are included within category CR/Critically Endangered) (critical) according to IUCN (4 plant species and 2 species of wild animal). Therefore HCV 1.3 was found in habitat which support these endemic and / or RTE (Rare, Threatened and Endangered) species, namely the area with land cover in the form of dry land secondary forest.

Of the 11 wild animal species which are categorized as endemic (have limited distribution) and / or RTE species which were found in the concession area of PT. AAC, overall species were also found at landscape level, namely in Gunung Palung National Park and / or Orangutan distribution area.

Based on observation of wild animal on transect of 200-500 meter long and 100 meter wide, and by assuming that in each observation location there was found one individual, then the abundance of wild animal species which are categorized as endemic (limited distribution) and /or RTE species and were found in the concession area of PT. AAC was between 2-20 individuals/ha. Referring to Franklin (1980), abundance of wild animals which are categorized as endemic (limited distribution) and /or RTE species do not fulfill the minimum viable population; but at landscape level, it fulfills the minimum viable population.

Total area size of HCV 1.3 in the concession area of PT. AAC is as large as 4,844.90 ha, with the following details: there was found HCV1.3 as large as 152.14 ha (SS Meliau (24.63 ha), SS Dawak (12.01 ha), water catchment Block E 25 (1.80 ha), water catchment Block E15C, E17A (16.94 ha), forested area Block D12, D13, D14X, E14, E15A, E15B, F12, F13 (84.27 ha), Forested area Block H3, H4 (1.91 ha), Forested area Block J7, J9A, J9B (6.40 ha), and forested area Block C31, C32 (4.18 ha)); and there was potency of finding of HCV1.3 as large as 4,692.76 ha (SS Bawang (88.67 ha), SS Temiang (8.79 ha), slope E (Bukit Durian) (42.50 ha), and distribution area of orang utan (4,552.80 ha).

Specifically for orang utan distribution area which overlaps with the permit area of PT. AAC, it is potentially able to function as local movement path of wild animal fom orangutan distribution area to the study area or vice versa in the orangutan's effort to search food with seasonal availability. Orangutan distribution area which overlaps with permit area of PT. AAC is as large as 4,700.95 ha, with the following details : (1) area which overlap with that area designated as HCV as large as 148.15 ha (SS Bawang (88.67 ha), SS Temiang (8.79 ha), SS Dawak (12.01 ha), water catchment Block E25 (1.80 ha), water catchment Block E15C, E17A (16.94 ha), Slope E (Bukit Durian) (2.31 ha), Forested area Block D12, D13, D14X, E14, E15A, E15B, F12, F13 (13.19 ha), Forested area Block C31, C32 (4.18 ha), Tembawang Lembu (0.06 ha), Tembawang Nek Anta Selimpat (0.20 ha), and Batu Merawang (0.002 ha)) and (2) area which do not overlap with area designated as HCV as large as 4,552.80 ha. Orang utan distribution area which do not overlap with area which has been designated as HCV area has potency to contain HCV1.3, although its habitat has been converted to oil

palm plantation, bush, open land, and human settlement. Therefore, development of oil palm plantation in the area will not have impact on orangutan distribution area which has been converted to oil palm plantation, mixed garden, bush, open land and human settlement.

Orangutan distribution area which has potential to become area of HCV 1.3 in the area, considered from its land cover, can be categorized into 4 (four) kinds, namely oil palm plantation, rubber plantation, mixed garden, bush, open land, and human settlement. Orangutan distribution area which is made as HCV 1.3 with land cover in the form of oil palm plantation, rubber plantation, mixed garden, bush, open land, and human settlement, can be converted to oil palm plantation. However, attempts to manage and monitor HCV 1.3 are needed, particularly in orangutan distribution area which overlap with the study area. Activities of HCV 1.3 management in the orangutan distribution area, are conducting further survey to ascertain the existence of orangutan in the area and consult with local / regional expert of orang utan, such as FORINA, OFI or BOSF. Monitoring activities on HCV 1.3 are focused on RTE species. The HCV 1.3 areas inside concession area of PT. AAC are presented in **Figure 17**.

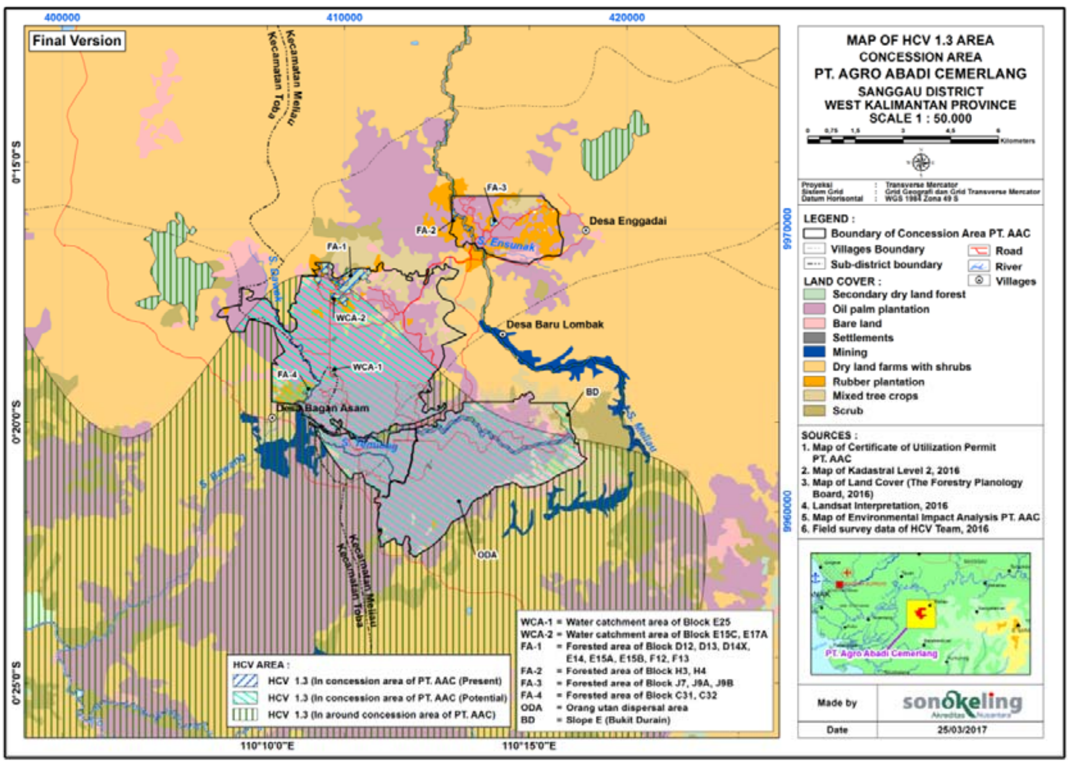


Figure 17. Map of distribution area of HCV 1.3 in and around concession area of PT. AAC

HCV 1.4. Areas that Contain Habitat of Temporary Use by Species or Congregations of Species

The existence of HCV 1.4 is characterized by areas that serve as temporary habitats, such as caves, nesting sites, feeding or resting places for migratory birds, corridors or stepping stones. Assessing the existence of rare and threatened fauna species is done not only in the concession area of PT. AAC, but it needs to be assessed on more extensive landscape . In the concession area of PT. AAC there was found dry land secondary forest, but in this area there were found no bird species which are categorized as migrant which possibly use the area temporarily as part of their habitat (perching on high crown to perch, waiting for prey or searching for food). Therefore, in the concession area of PT. AAC there is no area which is designated as HCV 1.4.

However, in the concession area of PT. AAC there is potential finding of one endemic species of Kalimantan island, namely orang utan (Pongo pygmaeus), where this species was found in the distribution area of orangutan which overlap with the study area. In relation with such information, the orang utan distribution area which overlaps with the concession area of PT. AAC, is potentially able to function as local movement path of wild animal fom orangutan distribution area to the study area, or vice versa in the orangutan's effort to search food with seasonal availability. Although most of the land cover in orangutan distribution area wich overlaps with the concession area of PT. AAC has been in the form of oil palm plantation, and the rest of the area are in the form of rubber plantation, mixed garden, bush, open land and human settlement area, but with precautionary principle, it can be said that HCV 1.4 is potentially found in the area.

As has been explained in HCV 1.3, in the concession area of PT. AAC there was found orangutan distribution area as large as 4,700.95 ha which overlap with the study area with the following details: (1) Area which overlap with the area which has been designated as HCV as large as 148.15 ha and (2) Area which do not overlap with HCV area as large as 4,552.80 ha. Area which do not overlaps with HCV area is established as potential HCV 1.4 area, although the habitat has been converted to oil palm plantation, rubber plantation, mixed tree crop, bush, bare land and settlement area.

Total area size of concession area of PT. AAC which has potential to contain HCV 1.4 is as large as 4,811.96 ha comprising : SS Bawang (88.67 ha), SS Temiang (8.79 ha), SS Dawak (12.01 ha), water catchment Block E25 (1.80 ha), water catchment Block E15C, E17A (16.94 ha), slope E (Bukit Durian) (42.50 ha), forested area Block D12, D13, D14X, E14, E15A, E15B, F12, F13 (84.27 ha), forested area Block C31, C32 (4.18 ha)) and orangutan distribution area (4,552.80 ha)).

In relation with that, activities of developing oil palm plantation in the area do not have impact on orangutan distribution area which has been converted to oil palm plantation, bush, open land, and human settlement. Orangutan distribution area which was made as potential HCV 1.4 with land cover in the form of oil palm plantation, rubber plantaion, mixed garden, bush and open land can be converted to oil palm plantation. However, efforts to manage and monitor HCV 1.4 are specifially needed in orang utan distribution area which overlap with the study area. Actitivies of HCV 1.4 management in the orangutan distribution area are conducting further survey to ascertain the existence of orangutan in the area and consult with local/regional expert on orangutan, such as

FORINA, OFI or BOSF. Monitoring of HCV 1.4 in the distribution area of orang utan which can be converted, is focused on species orang utan (Pongo pygmaeus). Area of HCV 1.4 in and around concession area of PT. AAC is presented in **Figure 18**.

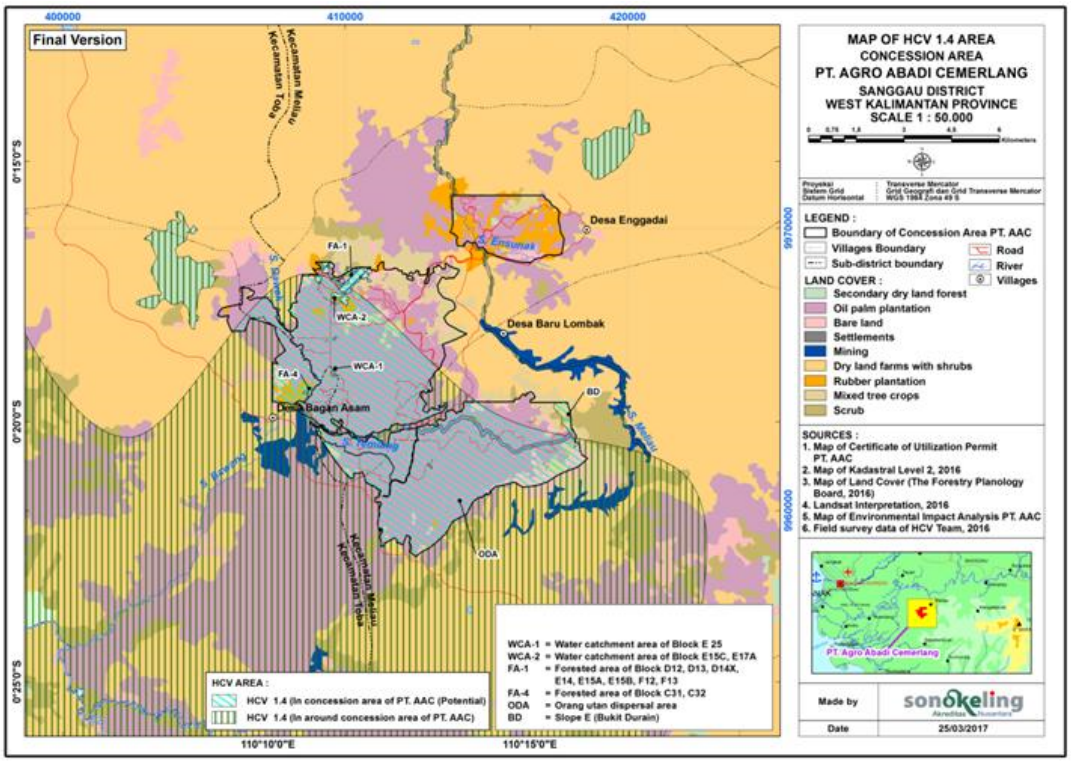


Figure 18. Map of distribution area of HCV 1.4 in and around concession area of PT. AAC

HCV 2. Intact forest landscape, landscape-level ecosystems and mosaics

HCV 2.1. Large Natural Landscapes with the Capacity to Maintain Natural Ecological Processes and Dynamics

The existence of HCV 2.1 is characterized by intact forest landscapes (> 50,000 hectares) and core areas of the landscape. The core area is defined as a reserved area to ensure that natural ecological processes can take place without interruption due to fragmentation and the influence of opening area (edge effect). The core area is determined by size (> 20,000 hectares) plus the buffer area around it i.e., at least three (3) kilometers from the opening area. Concession area of PT. AAC was located far from intact forest landscape or core areas. The nearest intact forest landscape can be found to the Southeast of the concession area on 65.90 km distance (www.intactforests.org) (**Figure 19**); while the nearest core zone was IBA area covering 107,452 ha located on 73.17 km distance to the South of the concession areas of PT. AAC. Hence, operational activities of PT. AAC would not influence the intact forest landscape and core areas around the concession area. Thus, HCV 2.1 was not found in PT. AAC's concession area.

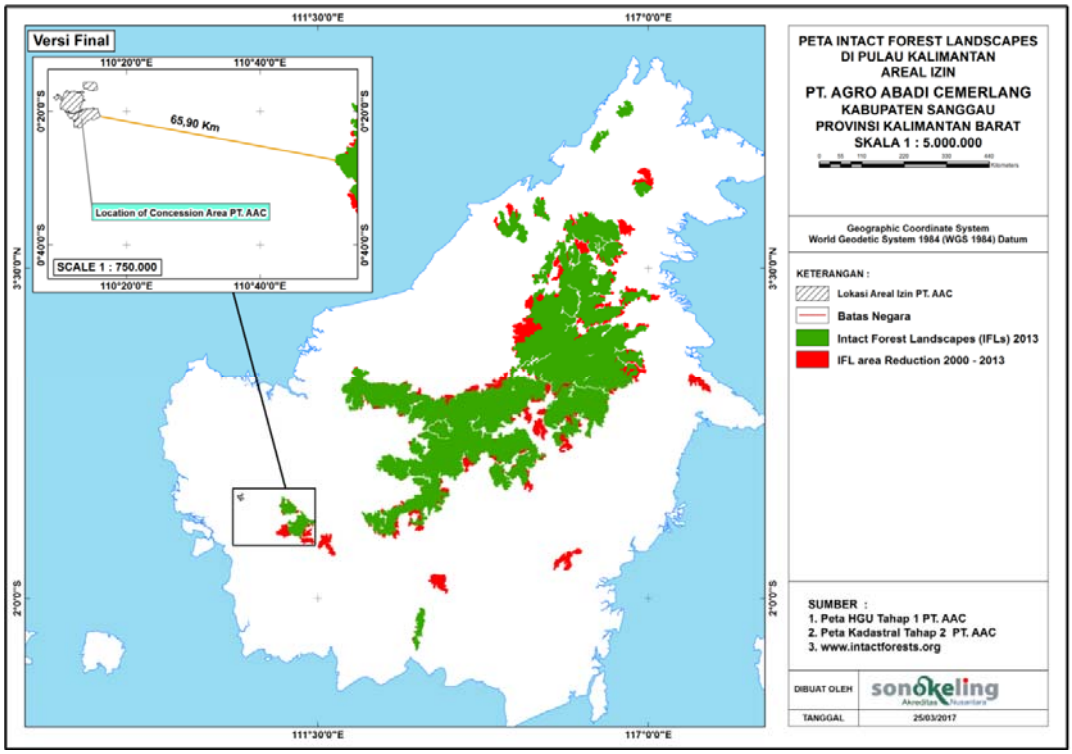


Figure 19. Intact Forest Landscape (IFLs) around concession area of PT. AAC

HCV 2.2. Natural Areas that Contain Two or More Contiguous Ecosystems

The existence of HCV 2.2 is characterized by the presence of landscapes that have various types of ecosystems to ensure that the core areas of the ecosystem and its continuity of borders are well maintained. Secondary dry land forest land cover could be found in mixed Dipterocarpaceae forest ecosystem on metamorphic rocks and mixed of hilly Dipterocarpaceae forest on old marine, but the two secondary dry land forests found on both ecosystem were not interconnected to each other. Since the study could not found ecotone or natural transition of two ecosystem (contiguous ecosystem) or area that contain natural population and species representative, HCV 2.2 was not found in the concession area of PT. AAC.

HCV 2.3. Areas that Contain Representative Populations of Most Naturally Occurring Species

The existence of HCV 2.3 is characterized by the presence of landscapes with special potential that can maintain the survival of the population representative of species. The study did not find increasing gradation from lowland to mountain ecosystem inside the concession area of PT. AAC. The area did not contain any landscape with exceptional potential that may sustain the existence of population of natural species representative. Orang utan species (*Pongo pygmaeus*) could not be found in the area. Even though one high predator bird species, i.e. Black-winged kite (*Elanus caeruleus*), could be found in the area, core area or buffer area for important landscape could not be found in the area. Therefore, HCV 2.3 was not found in the concession area of PT. AAC.

HCV 3: Ecosystem and Habitat

The existence of HCV 3 is characterized by: (1) The presence of threatened ecosystems (a) In a bio-physiographic unit, an ecosystem has already lost 50% or more of its initial extent or (b) In a bio-physiographic unit, there are ecosystems that will experience losing 75% or more of its original area based on the assumption that all conversion areas within the spatial plan can be converted; and (2) Presence of rare ecosystems: natural or human factor natural ecosystems covering less than 5% of total area of a bio-physiographic unit.

By using the principle of carefulness (*Precautionary Approach*), association of mixed dipterocarp forest or hill forest overlying volcanic rocks, metamorphic rocks, and granite rocks, and associaation of mixed dipterocarp forest or hill forest overlying metamorphic rocks and granite rocks in the permit area of PT. AAC are categorized as threatened, whereas mixed dipterocarp forest or hill areas overlying volcanic rocks are categorized as rare and threatened (**Figure 20**). Of the three ecosystems, there are two types of ecosystem which at present still possess land cover in the form of dry land secondary forest, namely association of mixed dipterocarp forest or hilly areas overlying volcanic rock, metamorphic rocks and granitic rocks, and association of mixed dipterocarp forest or hilly area overlying metamorphic rocks and granite rocks. Therefore, areas which possess land cover in the form of dry land secondary forest in ecosystem of mixed dipterocarp forest or hill areas underlying volcanic rocks, metamorphic rocks, and granitic rocks; and association of mixed dipterocarp forest or hill areas underlying metamorphic rocks and granitic rocks in the permit area of PT. AAC are established as HCV3 area.

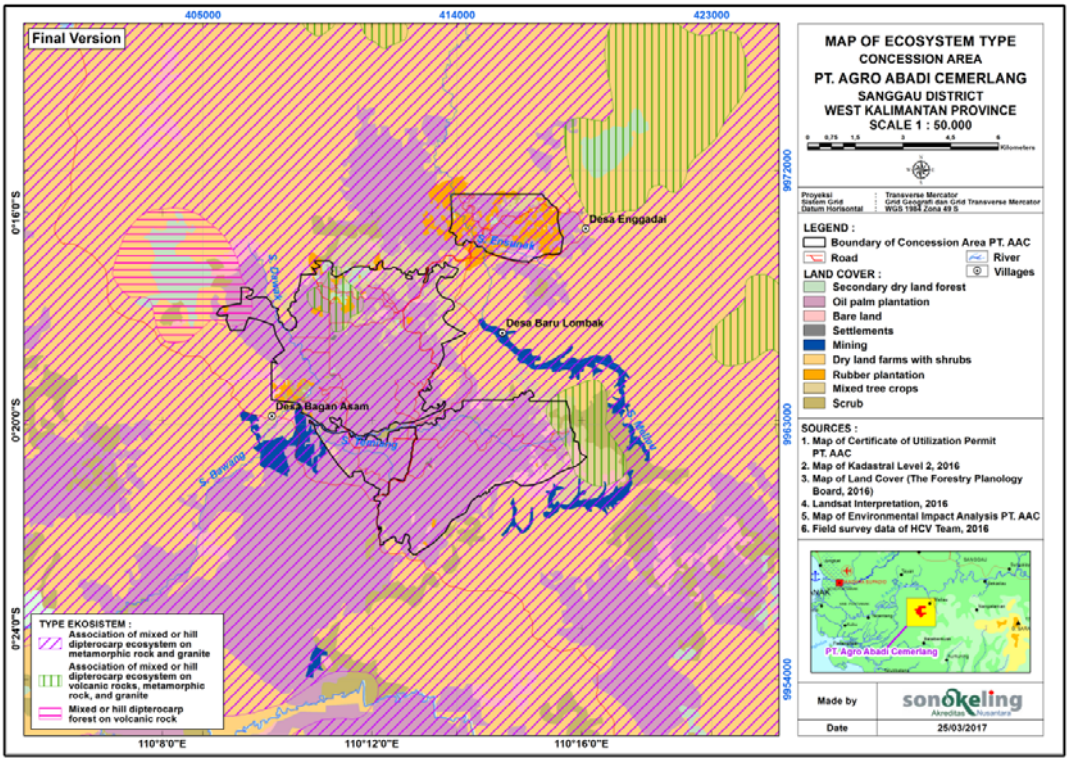


Figure 20. Ecosystems in and around the concession area of PT. AAC

Total area size of HCV3 in the permit area of PT. AAC is as large as 157.06 ha comprising : SS Dawak (12.01 ha), SS Meliau (12.01 ha), water catchment Block E25 (1.80 ha), water catchment Block E15C, E17A (16.94 ha), forested area Block D12, D13, D14X, E14, E15A, E15B, F12, F13 (84.27 ha), forested area Block H3, H4 (1.91 ha), forested area Block J7, J9A, J9B (6.40 ha), forested area Block C31, C32 (4.18 ha), and Tembawang Lembu (4.92 ha). HCV 3 area inside the concession area of PT. AAC is presented in **Figure 21**.

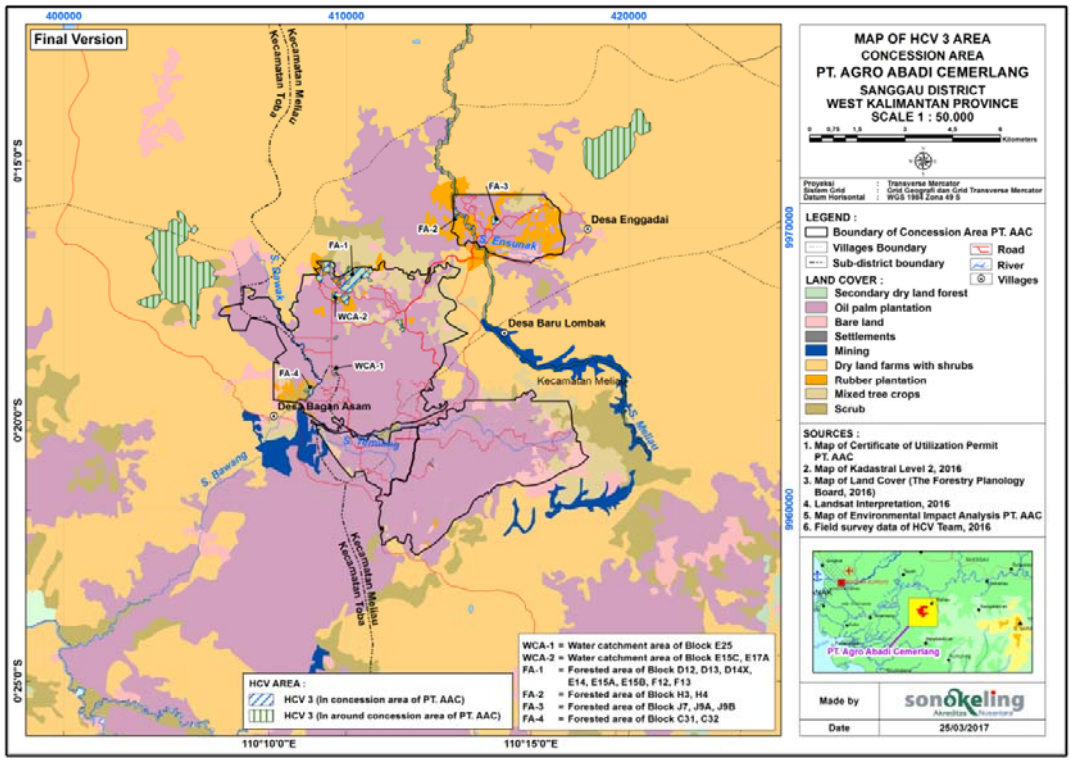


Figure 21. Map of distribution area of HCV 3 in and around concession area of PT. AAC

HCV 4 : Ecosystem Services

<u>HCV 4.1. Areas or Ecosystems Important for the Provision of Water and Prevention of Flood for Downstream Communities</u>

The existence of HCV 4.1 is characterized by an important area or ecosystem as a provider of water and flood control for downstream communities such as cloudy forests, ridge forest, riparian ecosystems, karst forests and various wetland ecosystems, including peatlands (especially forested ones), freshwater swamp forest, mangrove forests, lakes and swamps of grasslands. Areas inside the concession area of PT. AAC, which had been identified as HCV 4.1 areas included the following:

Rivers and the embankments

There were five rivers and their embankments found inside the concession area of PT. AAC, which included Meliau River, Bawang River, Dawak River, Temiang River, and Ensunak River. The main rivers in the area were Bawang River and Meliau River.

Rivers' width ranged from 2 – 10 m, the embankments' width ranged from 10 – 5 m, and the rivers' length ranged from 1.93 – 8.18 km. Rivers in the area had never dried out during dry season, and had never overflowed during rainy season. In general, land cover on the embankments of the rivers comprised five types of land cover, namely secondary dry land forest, rubber tree plantation, oil palm plantation, shrubs, and open land. Even though not all of the land cover were secondary dry land forest, the existence of rubber tree plantation and shrubs still had important value in maintaining slope stability and serving as filter of pollutant from land.

Water catchment areas

There were three water catchment areas found inside concession area of PT. AAC, i.e. water catchment area in Block E25, water catchment area in Blocks E15C, E17A, and Slope E (Bukit Durian). Land covers on the water catchment area were secondary dry land forest and shrubs that support the water catchment function of the areas and had important value as flood control area through its catchment function.

Forested areas

The study found two forested areas interconnected with Dawak riverbank, i.e. Forested Areas in Blocks H3, H4 and Forested Areas in Blocks C31, C32. Land cover of the two areas was secondary dry land forest, which had important value in maintaining slope stability and serving as filter of pollutant from land.

Based on areas found inside concession areas of PT. AAC that had the importance for the downstream community in supplying water and controlling the flood, 10 locations had been identified as HCV 4.1 areas. The areas included rivers and the embankments covering 205.22 ha (Ensunak river (3.79 ha), Bawang river (88.67 ha), Temiang river (8.79 ha), Meliau river (24.63 ha), and Dawak river (12.01 ha); water catchment areas covering 61.24 ha (water catchment areas in Block E 25 (1.80 ha), water catchment areas in Blocks E15C, E17A (16.94 ha), and slope E (Bukit Durian) (42.50 ha)); and forested areas covering 6.09 ha (Forested Areas in Blocks H3, H4 (1.91 ha) and Forested Areas in Blocks C31, C32 (4.18 ha)). The HCV 4.1 areas inside concession areas of PT. AAC are presented in **Figure 22**.

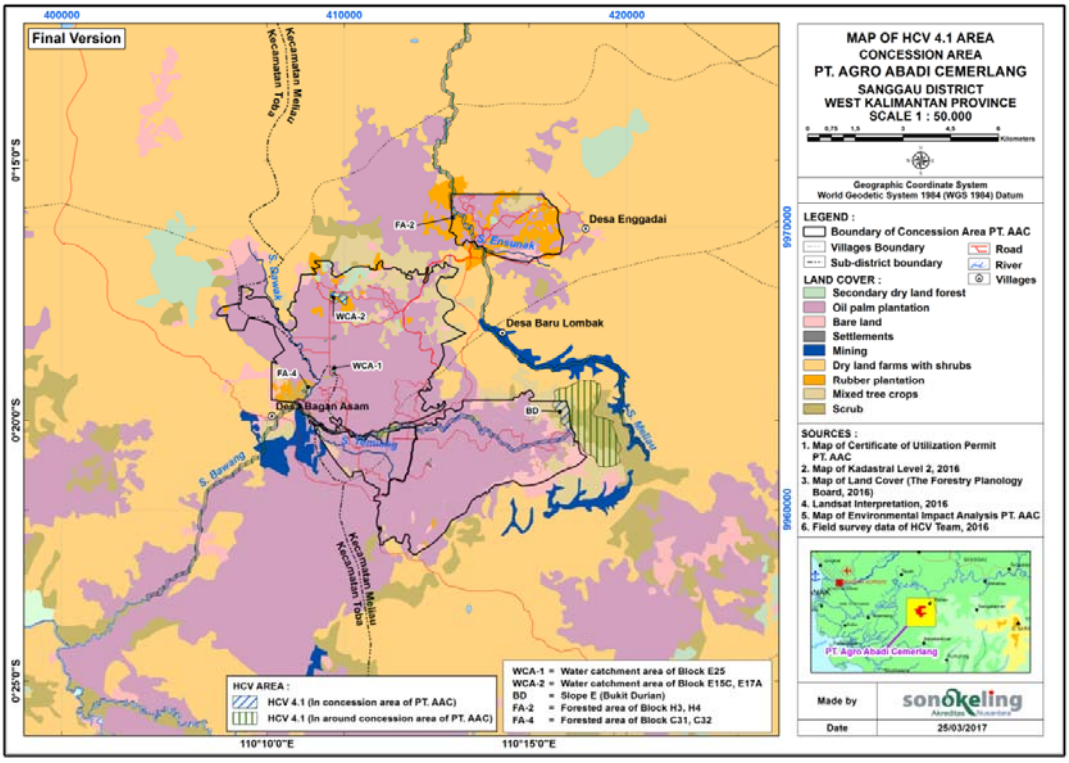


Figure 22. Map of distribution area of HCV 4.1 in and around concession area of PT. AAC

HCV 4.2. Areas Important for the Prevention of Erosion and Sedimentation

The existence of HCV 4.2 is characterized by the presence of important areas or ecosystems as erosion and sedimentation control, i.e., forested or other vegetation areas that have a very serious or very severe Erosion Hazard (TBE) potential. There was one location inside concession area of PT. AAC with high Erosion Hazard Level (EHL), i.e. Slope E area (Bukit Durian). Based on calculation, the EHL in the area ranged from 32.46 – 220.29 ton/ha/year. Land cover in the Slope E area (Bukit Durian) consisted of three types, namely mixed garden, oil palm plantation, and shrubs, which enable the inhibition of erosion occurrence. Therefore, the area had the importance value of erosion and sedimentation control. Hence, HCV 4.2 was found inside the concession area of PT. AAC, namely the Slope E (Bukit Durian) (42.50 ha). HCV 4.2 area in concession area of PT. AAC is presented in **Figure 23**.

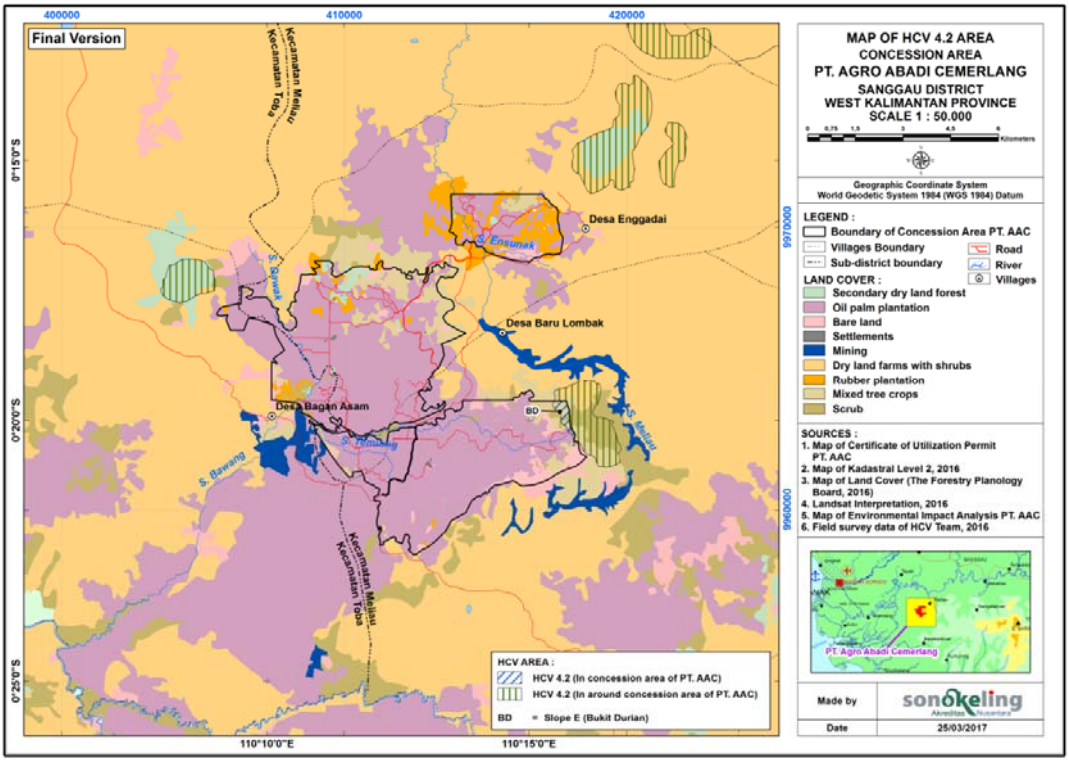


Figure 23. Map of distribution area of HCV 4.2 in and around concession area of PT. AAC

HCV 4.3: Areas that Function as a Natural Break to the Spread of Forest or Land Fire

The existence of HCV 4.3 is characterized by the presence of areas that function as natural barriers to prevent the spread of forest and land fires, such as: various types of natural forests that are still in good condition peatlands that are no longer forests but hydrological systems are still functioning properly, fresh swamps, puddle areas, other wetlands and green belts. Based on the monthly average rainfall distribution in 2007 – 2015 period, dry period was identified to occur on June to September each year. Hotspot was not found during the 2014 – 2015 period. Fire occasion potential ranged from no potential to very high potential. There was no wetland found inside the concession area of PT. AAC. Even though there were forested areas and five rivers inside the area, the areas could not function optimally as natural barrier/fire barrier to prevent the expansion of fire. Hence, HCV 4.3 was not found in the concession area of PT. AAC.

HCV 5. Sites and Resources that are Fundamental to Meet Basic Needs of Local people or indigenous peoples (eg for livelihoods, health, nutrition, water) identified by involvement with such community or indigenous peoples

In the Indonesian HCV Toolkit (2008), HCV 5 is areas that have important functions as a source of livelihood for local communities, in particular to fulfil the basic needs of the community for example food, water, clothing, materials for homes and tools, firewood, medicines, animal feed, and cash income cash for subsistence needs. Based on results of consultation with people in 3 villages and field observation, people

community inside and around the permit area of PT. AAC, namely villages of Bagan Asam, Baru Lombak and Enggadai possessed dependency > 50% on the permit area of PT. AAC to fulfill basic needs in the form of water, and possessed dependency of < 50% to fulfill basic needs in the form of food,, materials, medicine, livestock feed and cash money. Therefore, the presence of permit area of PT. AAC is categorized as fairly important for residents in the three villages to fulfill the need for water, but is categorized as fairly important for people in the three villagess, to fulfill basic needs in the form foods, fruits, medicines, livestock feed and cash money income.

Locations of forest resources (including river) which are used by people in Bagan Asam village to fulfill their need for drinking water and toilet use comprise the following : Bawang River, Temiang River, forested area Block H3, H4, slope E (Bukit Durian), water catchment Block E15C, E17A, and water catchment Block E25; whereas people in villages of Baru Lombak and Enggadai utilized Meliau River to fulfill their need for water.

Use of water by the people is conducted sustainably. The need for water by the people is fulfilled by other alternative sources, namely by purchasing in the market or shops, although with greater price. Therefore, in the permit area of PT. AAC there was found HCV 5 as large as 185.24 ha, comprising : rivers and their riparian (riverside) zone as large as 122.09 ha (Bawang River (88.67 ha), Temiang River (8.79 ha), and Meliau River (24.63 ha)); water catchment area as large as 61.24 ha (water catchment Block E25 (1.80 ha), and water catchment Block E15C, E17A (16.94 ha), and slope E (Bukit Durian) (42.50 ha)); and forested area Block H3, H4 (1.91 ha).

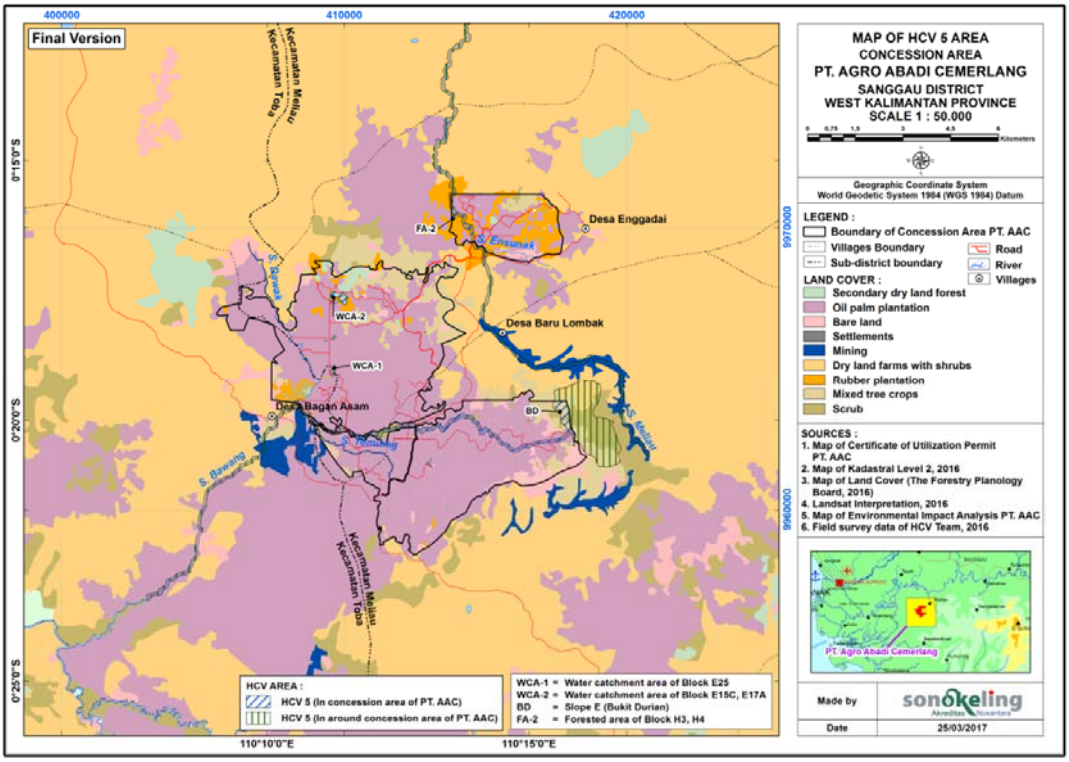


Figure 24. Map of distribution area of HCV 5 in and around concession area of PT. AAC

HCV 6. Sites, resources, habitats and landscapes with significant cultural, archeological, or historical significance globally or nationally, or cultural, economic or religious / sacred values of great importance to local or indigenous peoples, identified through engagement with the population or indigenous peoples.

In the Indonesian HCV Toolkit (2008), HCV 6 is an area that has an important function for the traditional cultural identity of the local community, where this particular area is needed to meet their cultural needs. The connection between community and the landscape is manifested by ideas, norms, values, activities and action patterns, environment and natural resources or objects that collectively guide behavior of community members and govern the relationship between communities and the landscape. Based on results of consultation with people and field observation, in the permit area of PT. AAC there is zonation which is designed on the basis of particular culture and distribution of archeological sites. Zonation which were made on the basis of cultural regulation in the permit area of PT. AAC are Tembawang Lembu and Tembawang Nek Anta Selimpat, whereas distribution of archeological sites found in the study area are Tembawang Lembu and Tembawang Nek Anta Selimpat, because in those sites there are sacred cemetery, namely sacred cemetery of villages of Enggadai, and Batu Merawang. Therefore, in the permit area of PT. AAC there was found HCV6. Total area size of HCV6 in the permit area of PT. AAC is as large as 5.62 ha comprising the following : Tembawang Lembu (4.92 ha), Tembawang Nek Anta Selimpat (0.20 ha), and sacred cemetery of village of Enggadai (0.50 ha), and Batu Merawang (0.002 ha). The HCV 6 areas inside the concession area of PT. AAC are presented in **Figure 25**.

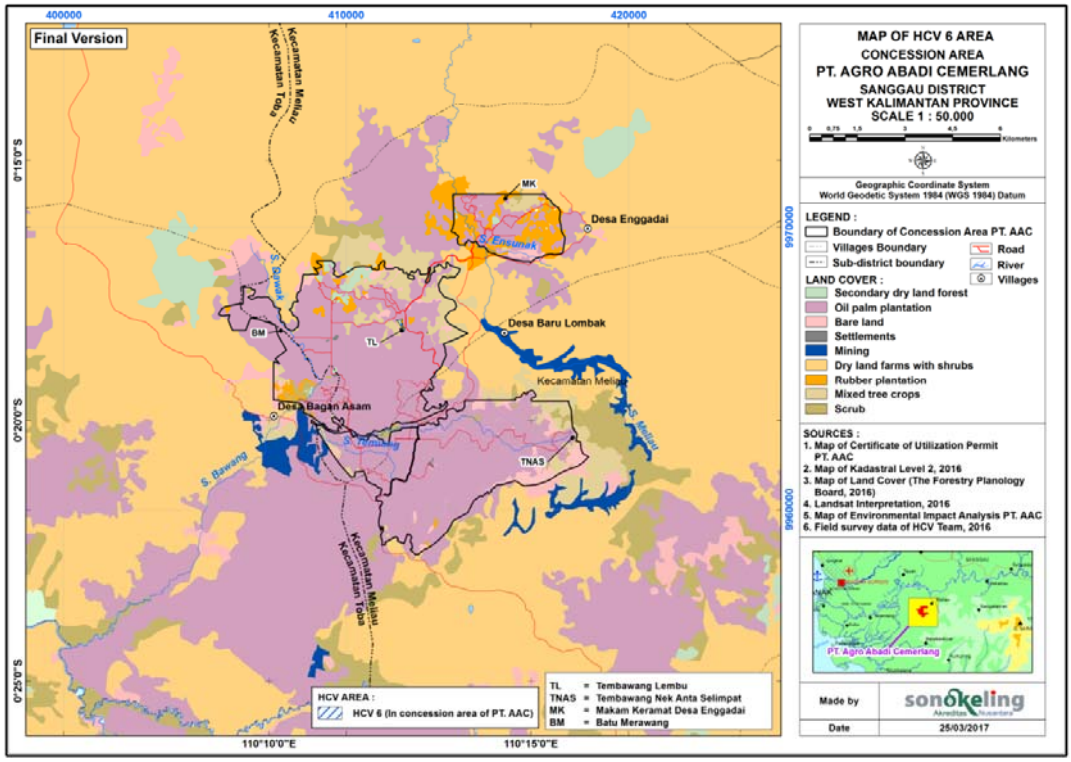


Figure 25. Map of distribution area of HCV 6 in concession area of PT. AAC

3.2.5. Summary of Stakeholder Consultation

Public consultation with stakeholders through meeting with various stakeholders was conducted on Wednesday, 2 November 2016 at Parish Hall of ST. Petrus Teraju Toba. Thirty six persons attended the meeting, representing various institutions, such as Regional Development Planning Agency of Sanggau District, Plantation Service of Sanggau District, Environmental Management Agency of Sanggau District, Board of Sub district Government Leaders of Meliau and Toba Sub district (head of sub district, police sector, and military rayon command), Management Unit Staff, Local Community (village head, Village Consultative Body-BPD, village apparatus, traditional leaders and community leaders). In addition, public consultation was also carried out through Focus Group Discussion (FGD) with village head, village apparatus, and community leaders in each village. Gender ratio of participants during public consultation was 1: 18. The consultation was also attended Baruno at the representative of NGO, and each village is represented by 3 – 5 participant. Consultation with stakeholders, particularly the NGO, was conducted only during public consultation, wheras during HCV assessment, this was not conducted. This was due to time constraint, while data and information originated from NGO, such as that of orang utan distribution has been obtained from literature study.

The subjects conveyed in the public consultation included: HCV definition and its category/sub-category, objectives and benefits of HCV assessments, HCV assessment processes, HCV assessment methods, field observations results (biodiversity, environmental and socio-cultural services), interim findings/results of HCV assessments and the related maps (draft versions), threats to HCV, and recommendation for HCV areas management and monitoring.

The main aspects/issues and recommendations resulted from the public consultation with stakeholders and the responses to HCV assessment in concession area of PT. AAC are presented in **Table 10**; while the main aspects/issues resulted from FGD and interview, and the responses to HCV assessment are presented in **Table 11**.

Table 10. Summary of consultation with stakeholders and main aspects or issues raised and recommendation proposed

Date	Name	Position/role	Organization / Social Group	Main aspects or issues and recommendations	Responses from Assessment Team
2 November 2016	Mr. Iyus	Staff	Regional Development Planning Agency of Sanggau District	Protection Forest located to the North of concession area of PT. AAC was Gunung Belungai Protection Forest AAC.	The name of Gunung Belungai Protection Forest had been accommodated in the HCV report of concession area of PT. AAC.
2 November 2016	Jaeni	Staff	Environmental Management Agency of Sanggau District	1. HCV assessment in the concession area of PT. AAC was carried out on August. Today, the interim result had been presented. How much the coverage and percentage of HCV areas inside the concession area of PT. AAC? 2. The Act No. 23 year	1. The HCV areas inside the concession areas of PT. AAC covered 282.71 ha area or as much as 4.28% of the total concession areas of PT. AAC (6,612.09 ha). 2. HCV assessment is one of activities to implement the Act No. 23 year 2009. 3. Settlement was not

Date	Name	Position/role	Organization / Social Group	Main aspects or issues and recommendations	Responses from Assessment Team
				2009 stated that all companies have the obligation to protect the environment. 3. Referring to the Environmental Impact Analysis (EIA), not all concession area was managed due to the existence of settlements, etc. 4. We propose to the consultant, PT. Sonokeling Akreditas Nusantara, to compose the management and monitoring plan of HCV. 5. What do you plan for the HCV management? Would you relate the management with the existing stakeholders, would SOP be composed, and how would you relate AMDAL and HCV?	included in HCV areas. Areas established as The Company, PT. AAC, should manage and maintain HCV areas. 4. HCV report of PT. AAC only provided recommendation related to management and monitoring plan of HCV. The composition of HCV management and monitoring plan is other activity outside the completed HCV assessment, and it should be reported in separated document. The composition of HCV management and monitoring plan was part of activities proposed in the recommendation from the HCV assessment team of PT. AAC. 5. The team suggested that the company cooperate and coordinate with related institutions and the community in implementing the HCV management and monitoring activities. Coordination and cooperation, and SOP composition/ revision, were among the activities written in the document of HCV management and monitoring plan. To increase the effectivity and efficiency of HCV management and monitoring, the implementation of environmental management and monitoring of EIA and its Environmental Management Plan/Environmental Monitoring Plan should be synchronized and synergized with HCV management and monitoring plan. Thus, both plan would be well aligned and would not crash with each other.

Date	Name	Position/role	Organization / Social Group	Main aspects or issues and recommendations	Responses from Assessment Team
2 November 2016	Yohanes	Head of Modang Hamlet	Bagan Asam Village	1. So long as we live in Modang Hamlet, during rainy season, the river would be muddy that we could not use it. 2. The EIA should be done, just like in PT. DSP.	1. There were three rivers flowing through Modang Hamlet, i.e. Bawang River, Dawak River, and Temiang River. Among the three rivers, Bawang River was the one that had the upstream inside concession area of PT AAC, in particular Bukit Durian (the area was established as HCV area); while the other two rivers, Dawak River and Temiang River had their upstream outside the concession area of PT. AAC. Therefore, HCV assessment, and further more HCV management and monitoring, were expected to be able to deal with the muddy water in your area. 2. PT. AAC had already completed its EIA on 2009.
2 November 2016	Patrisius	Head of Economic and Development Section	Teraju Sub-District	1. Follow up was necessary in socialization/familiarization of HCV areas to the related villages and hamlets. 2. We want to propose about the sanctions in relation to Governmental Regulation No. 7 year 1999, the regulation had been issued, but the effectiveness of the regulation had not been evaluated yet. Therefore, the use of customary law should be considered to strengthen governmental regulation. 3. Need a follow up by involving the community. Who would bear the cost?	1. HCV socialization to the community in the surrounding villages and hamlets of PT. AAC's concession area was one of activities recommended by the HCV Assessment Team. 2. Your suggestion to accommodate customary law in strengthening governmental regulation is very good. Just like in Wahau, one of oil palm company in that area developed sustainable oil palm management based on local wisdom, in which the community were actively involved in HCV management and monitoring, and customary law was implemented. 3. The company would be responsible for the cost of socialization of HCV.

Date	Name	Position/role	Organization / Social Group	Main aspects or issues and recommendations	Responses from Assessment Team
2 November 2016	Antonius Apit	Head of Village	Baru Lombak Village	1. As information for the company and HCV Assessment Team, there was an additional Pedagi (sacred place of Dayak tribe, *red*.) 2. Letter of Land Ownership/Tax Payable Letter: Business Use Rights (BUR/HGU) posts should be labelled with HGU mark or other marks. 3. Please build clean water infrastructure for Neighborhood 02. 4. Consultant was good enough, but who would carry out supervision when the community faced problems in the field.	1. The Pedagi that you suggested was apparently located far outside the concession area of PT. AAC. 2. We had recorded your suggestion about clear label on boundary posts, and we would convey this to the company and other related parties. 3. We had recorded your proposal in relation to clean water provision for neighborhood 02, and we would communicate it with PT. AAC. 4. The community and related stakeholders are the ones who should carry out supervision. When facing problems in the field, depending on the problem being faced, the community could make report to the Environmental Management Agency of Sanggau District or other related institutions.

Table 11. Summary of FGD and interview with the community around concession area of PT. AAC and the main aspects or issues raised and the recommendation proposed

Date	Name	Position / role	Organization / Social Group	Main aspects or issues and recommendations	Responses from Assessment Team
6 August 2016	Snapsyah	Head of Cooperative	Plasma Cooperative of PT. AAC	1. PT. AAC used clean water from concession area of PT. AAC, particularly from the catchment area in Block E 25 and Blocks E15C and 17A, for its employee need of drinking water and sanitation. 2. There were also employee of PT. AAC who uses water from Bawang River and Temiang River for sanitation purpose. 3. The community of Enggadai Village still used Meliau River for sanitation activities, while the	Water catchment area in Block E25, Water catchment area in Blocks E15C and 17A, Bawang river, Temiang river and Meliau river had been established as HCV 5 areas.

Date	Name	Position / role	Organization / Social Group	Main aspects or issues and recommendations	Responses from Assessment Team
				community of Modang Hamlet, Bagan Asam Village used Bawang River. 4. Enggadai Village had several locations used by its community to fulfil their cultural need, i.e. sacred tomb in Division 7 consecrated by people of Enggadai Hamlet, and Kampung Lembu, the old kampong of the people of Ensunak Hamlet. 5. The surrounding community and employee of PT. AAC often went fishing in Bawang River and Meliau River that flowed through the concession area of PT. AAC. However, fishing was only hobby.	
7 August 2016	B. Salib Suketi	Traditional/ Customary Leader	The customary institution of Modang Hamlet Bagan Asam Village	There was Batu Merawang sacred tomb inside concession area of PT. AAC consecrated by the people of Modang Hamlet, Bagan Asam Village.	Batu Merawang found inside concession area of PT. AAC had been established as HCV6.
8 August 2016	Mayau	Traditional/ Customary Leader	The customary institution of Ketanjak Hamlet Baru Lombak Village	There was an old kampong of Dayak tribe community in Ketanjak Hamlet Baru Lombak Village known as Tembawang Nek Anta Selimpat.	Tembawang Nek Anta Selimpat found inside the concession area of PT. AAC had been established as HCV6.

3.2.6. Threat Assessment

Threats are all human activities that can interfere with the sustainability of HCVs and / or eliminate the existence of HCV areas. Assessment of HCV threats in concession area of PT. AAC was conducted through four (4) ways, namely literature study, interviews with MU staff and community, *Focus Group Discussion* (FGD), and field observation,. In assessing the threats in concession area of PT. AAC was directed towards two (2) internal and external sources, as well as against current and potential events. The activities that could threaten the existence of HCVs in concession area of PT. AAC is presented in **Table 12**.

Table 12. Threats to HCV areas in concession area of PT. AAC and its surrounds

HCV	Brief Description Value Presence of Assessment Areas	Main Threats
1	**Species Diversity** • Area of HCV 1.1: River borders of Ensunak, Bawang, Temiang, Meliau and Dawak; Water catchment area (Water catchment area of Block E25, Water catchment area of Block E15C, E17A, and slope E (*Bukit Durian*)); and forested area (forested area of Block H3, H4 and forested area of Block C31, C32). • Species of HCV 1.2: four of plants, *Keladan* (*Dryobalanops aromatica* Gaertn.), *Merawan* (*Hopea mengarawan* Miq), *Cerindak* (*Shorea seminis* V. Slooten), and *Tengkawang layar* (*Shorea smithiana* Symington)); and two species of wild animal, Sunda Pangolin (*Manis javanica*) and Bornean Orangutan (*Pongo pygmaeus*). • Species of HCV 1.3: protected plant and wild animal species according to Government Regulation Number 7 of 1999 as many as 11 species (3 plant species and 8species of wild animal); species of flora and fauna including the CITES Appendix II list of 10 species (5 plant species and 5 species of wild animals) and Appendix I of 1 species (wild animal); and critically endangered species according to the IUCN red list of 6 species (4 plant species and 2 species of wild animal). • Species of HCV 1.4: Bornean Orangutan (*Pongo pygmaeus*).	**Current:** • Hunting wild animals by the community. • River water pollution caused by the use of chemical substance (fertilizers and pesticides) from oil palm plantation managed by the company, and gardens / farm fields managed by community. • Illegal gold mining by the community on the upstream riverbank outside the concession area that flowed into the concession area had caused the increase of sedimentation and the decrease of river water quality. **Potential:** • Reduced habitat area due to the conversion of secondary dryland forest in riparian areas, water catchment area, and forested area by the community into farms / fields. • Occurrence of habitat fragmentation due to illegal logging in areas with land cover in the form of secondary dryland forest. • Reduced river water quality due to land clearance, leaching / fertilizer runoff & pesticides or other pollution from oil palm plantations managed by the company entering rivers. • Pollution of household waste.
3	**Ecosystem and Habitat** • Ecosystem of association of mixed or hill dipterocarp ecosystem on volcanic rocks, metamorphic rock, and granite and association of mixed or hill dipterocarp ecosystem on metamorphic rock and granite that have land cover of secondary dryland forest i.e., rivers and its borders (Meliau and Dawak), water catchment area of block E25, forested area of block D12, D13, D14X, E14, E15A, E15B, F12, F13, forested area of block H3, H4, forested area of block J7, J9A, J9B, and forested area of Block C31, C32.	**Current:** • Hunting wild animals by the community. **Potential:** • Conversion of secondary dryland forest land in the water catchment area and forested area by the community into a farm / farm field. • Illegal logging in areas with landcover of secondary dryland forest.
4	**Ecosystem services** • Areas of HCV4.1 : five (5) rivers and its borders (Ensunak, Bawang, Temiang, Meliau, and Dawak), three (3) water catchment area (Water catchment area of Block E25, Water catchment area of Block E15C, E17A, and slope E (*Bukit Durian*)), and two (2) forested area (forested area of block H3, H4 and forested area of Block C31, C32). • Areas of HCV 4.2: Areas with severe Erosion Hazard Level (TBE): slope E (*Bukit Durian*).	**Current:** • The loss of secondary dryland forest and scrub land cover in riparian, water catchment area, and forested area. • River water pollution caused by the use of chemical substance (fertilizers and pesticides) from oil palm plantation managed by the company, and gardens / farm fields managed by community. • Illegal gold mining by the community on the upstream riverbank outside the concession area that flowed into the concession area had caused the increase of sedimentation and the decrease of river water quality. **Potential:** • Operational activities of company that may cause silting/sedimentation of the rivers; increase of streamflow discharge during rainy seasons and decrease of streamflow discharge during dry season, and increase of erosion. • Pollution of household waste. • Loss of water supply needed by the downstream community.
5	• **Local Community Needs** • People in the villages of Bagan Asam, Baru Lombak and Enggadai exhibit dependency level of > 50% toward the permit area of PT. AAC to fulfill their basic needs for water. • Locations of forest resources (including river) which are used by people in Bagan Asam village	**Current:** • River water pollution caused by the use of chemical substance (fertilizers and pesticides) from oil palm plantation managed by the company, and gardens / farm fields managed by community. • Illegal gold mining by the community on the upstream riverbank outside the concession area that flowed into the concession area had caused the increase of

HCV	Brief Description Value Presence of Assessment Areas	Main Threats
	to fulfill their need for drinking water and toilet use comprise the following : Bawang River, Temiang river, forested area Block H3, H4, slope E (Bukit Durian), water catchment Block E15C, E17A, and water catchment Block E25; whereas people in villages of Baru Lombak and Enggadai utilized Meliau river to fulfill their need for water. • Water utilization conducted by the community is carried out sustainably. • There is an alternative water source such as by buying in the market or shop, but it takes a more expensive cost.	sedimentation and the decrease of river water quality. **Potential:** • Pollution of household waste. • Loss of water supply needed by the downstream community.
6	**Cultural Values** • Zonation based on certain cultural rules : Tembawang Lembu, Tembawang Nek Anta Selimpat. • Distribution of archaeological sites: Tembawang Lembu, Tembawang Nek Anta Selimpat, Makam Keramat in Enggadai villages, and Batu Merawang.	**Current:** • None **Potential:** • Land clearing activities, road construction and other facilities that do not consider the existence of zonation based on certain cultural rules and archaeological sites. • Loss of public access to zonation based on certain cultural rules and archaeological sites.

3.3. Soil and topography

Description and soil classification

3.3.1. Inceptisols

Land of Inceptisols in the oil palm plantation area of PT. AAC is soil originating from old igneous rocks or young deposits of clay and sandstone with the development of a weak to nonexistent soil profile with gray to brownish color. Klei texture, sandy klei, sandy lom, sandy lom klei with a sand content of less than 75%. Blocky or granular structure and consistency A little hard to hard when dry and loose until firm when humid conditions. Several inceptisols sub-groups found in oil palm plantations of PT. Agro Abadi Cemerlang is presented in Table 12.

Tabel 13. Sub Ordo Inceptisols PT. Agro Abadi Cemerlang

Ordo	Great group	Group	Sub Group
Inceptosols	Udept	Dystrudepts	Typic Dystrudepts
	Aquept	Endoaquepts	Typic Endoaquepts

Aquept is a wet Inceptisols with natural drainage that is inhibited or severely inhibited if the soil has not been dried (artificially). Groundwater is at or near the surface of the ground for a long time. This soil generally has a black surface horizon and a gray bottom with redox concentration which starts at a depth of less than 50 cm. Some soils have brownish surface horizons less than 50 cm thick.

Meanwhile Udepts are Inceptisols that have an udic moisture regime; It does not have both between aquic and epipedon histic conditions, the color set for Aquepts or enough active ferrous iron which can give a positive reaction to alpha, alpha-Dipyridyl when the soil is not irrigated; does not have a percentage of sodium exchanged (ESP) of 15 or more (or the ratio of sodium adsorption [SAR] of 13 or more) in half or more of the volume of soil within 50 cm of mineral soil surface, ESP (or SAR) below 50 cm decreases with increasing depth, and groundwater within 100 cm of mineral soil surface for several years; do not have epipedon plaggen or epipedon anthropic; and has a warmer soil temperature regime than cryic.

Distrudepts are acidic eptepts from humid and Perhumid regions, mostly developing in the late Pleistocene or Holocene deposits. Some develop in older times. Generally the parent material is acidic, sufficient or weak rock consolidation of sediments or metamorphic or acidic sediments. Some soil formed in saprolite comes from igneous rock. Most of the Dystrudepts formed in alluvium can now be cultivated by getting good results and many of the Dystrudepts are used as pastures. The normal horizon sequence in Dystrudepts is the epipedon ochric horizon of the cambic. Some Dystrudepts located in steep regions have shallow densities in the form of lytic or paralithic

3.3.2. Ultisols

Ultisol can develop from a variety of parent ingredients, from acidic to alkaline. Some parent materials that can form ultisol soils include granite, sandstone, andesite, marl, laterite and limestone. Most of the ultisol soil parent materials found in the PT Agro Abadi Cemerlang region are laterite igneous rocks with Great Group udults, Hapludults groups and Typic Hapludults subgroups. Group Hapludults has a wide distribution, this is because the classification requirements are only based on the value of base saturation which is <35% and the existence of the argillic horizon, without any other additional conditions.

Ultisol is characterized by the presence of clay accumulation on the subsurface horizon thereby reducing water absorption and increasing surface flow and soil erosion. Erosion is one of the physical obstacles in Ultisol soil and is very detrimental because it can reduce soil fertility. This is because Ultisol soil fertility is often only determined by the content of organic matter in the top layer. When this layer erodes, the soil becomes poor in organic matter and nutrients.

Ultisol soil has a fairly advanced development rate, characterized by deep soil crossings, increase in clay fraction along with soil depth, acidic soil reaction and low base saturation. In general, this soil has the potential for Al poisoning and poor organic matter content. This soil is also poor in nutrients, especially P and cations can be exchanged such as Ca, Mg, Na and K, high Al levels, low cation exchange capacity, and sensitive to erosion.

3.3.3. Entisols

Entisol is a soil that is just beginning to develop which is characterized by the lack of development of the soil horizon. Entisol includes soils that are above the host rock or soil that develops on new material. Entisol which sits on the host rock in the national soil classification system is called Litosol. This type of soil is the land that is considered the youngest, so the parent material is often shallow (less than 45 cm) or appears as solid solid rock. In the area of PT. Agro Abadi Cemerlang has not found this type of Entisol soil. The type of Entisol soil found is Entisol which develops from both fluvial and alluvial parent materials.

Tabel 14. Sub ordo Entisol PT. Agro Abadi Cemerlang

Ordo	Great group	Group	Sub Group
Entisols	Aquent	Epiaquent	Typic Epiaquent
		Endoaquent	Typic Endoaquent
	Psamment	Udipsamment	Typic Udipsamment

Aquent is wet Entisol. It is generally formed in tidal swamps, in deltas, on the outskirts of lakes, on floodplains along rivers or saturated places or wet areas. Many Aquents have bluish or grayish colors and redoximorphic features. Endoaquent is an Aquent soil

that has ground water fluctuating from near or above the surface of the soil to a depth of about 100 cm below the surface of the ground and sometimes below 200 cm

Psamments are entisols which have rock fragments of less than 35 percent (based on volume) and fine or coarse sandy lom texture in all layers. This is sandy Entisol which has a sandy texture in all layers. Some psamments are formed from sand formed on shifting hills or weathering sandy parent materials that form in previous geological cycles. Some psamments can be formed by sand that is transported by water and buried in landfills, lakes, natural dikes or beaches. Some psamments are formed from weathering sandstone or granite rocks.

Udipsamment is a Psamments that develops in moist areas and has warm temperatures. Udipsamment has an udic moisture regime and has an average mineral of more than 10 (has a fraction of 0.02-2.0 mm) in particle size screening. Some Udipsamments are Late-Pleistocene deposits or more and most are brownish in color and can be drained smoothly. Typic Udipsamment is characterized by the absence of lithic contacts at depths less than 50 cm and not saturating water in all layers to a depth of 100 cm for 30 cumulative days or 20 consecutive days in normal years.

Unit and Land Map Descriptions

Land Map Unit

Land units are lands that have the same or almost the same characteristics, where these properties are related to the factors of soil formation. Based on this, the location of the survey area can be arranged into 17 Land Map Units and no peatland was founded in this area. The description and extent of the distribution of each land map unit can be seen in Table 14.

Tabel 15. Land Units Map in PT. Agro Abadi Cemerlang

SPT	Soil Name	Slope (%)	Slope Class	Drainase	Material	Area	
						Ha	%
1	Typic Epiaquent	8-15	Undulating	Rather bads	Clay sediment and sand	174.92	2.39
2	Typic Epiaquent	8-15	Undulating	Rather bads	Clay sediment and sand	624.32	8.53
3	Typic Endoaquents	8-15	Undulating	Rather bads	Clay sediment and sand	122.69	1.68
4	Typic Epiaquents	8-15	Undulating	Rather bads	Clay sediment and sand	388.31	5.31
5	Typic Uptipsamment	8-15	Undulating	Good	Clay sediment and sand	113.36	1.55
6	Typic Endoaquents	8-15	Undulating	Rather bads	Clay sediment and sand	284.52	3.89
7	Typic Dystrudepts	8-15	Undulating	Good	Old frozen rock	148.70	2.03
8	Typic Dystrudepts berasosiasi dengan Psamment dan Endoaquent.	8-25	Undulating	Good	Old frozen rock	832.54	11.38

SPT	Soil Name	Slope (%)	Slope Class	Drainase	Material	Area	
						Ha	%
9	Typic Dystrudepts berasosiasi dengan Typic Endoaquepts	8-40	Undulating – steep	Good	Old frozen rock	1,505.99	20.59
10	Typic Dystrudepts	8-25	Undulating	Good	Old frozen rock	343.51	4.70
11	Typic Hapludults	8-25	Undulating	Good	Old frozen rock	473.57	6.47
12	Typic Hapludults	8-25	Undulating	Good	Old frozen rock	487.81	6.67
13	Typic Hapludults	8-25	Undulating	Good	Old frozen rock	371.84	5.08
14	Typic Hapludults	8-40	Undulating - steep	Good	Old frozen rock	666.49	9.11
15	Typic Hapludults	8-25	Undulating	Good	Old frozen rock	480.89	6.57
16	Typic Hapludults	8-25	Undulating	Good	Old frozen rock	295.63	4.04

Topography

PT. AAC is at altitude ranging from 24 - 204 m above sea level. Based on the slope class, the slope class in the permit area of PT. AAC consists of 4 (four) types, namely (1) Slope class 8-15%, (2) Slope class 15-25%, (3) Slope class 25-40%, and (4) Slope class> 40%, as presented in Figure 27 and Table 16.

Table 16. Proportion of Slope Class Areas to the Area of Oil Palm Plantation PT. Agro Abadi Cemerlang

No	Land Slope	Slope	Area	
			Ha	%
1.	Choppy	8-15 %	3,623.18	54.80
2.	Undulating	15-25 %	2,755.13	41.67
3.	Little steep	25-40 %	191.29	2.89
4.	Steep	>40 %	42.50	0.64
Total			**6,612.09**	**100**

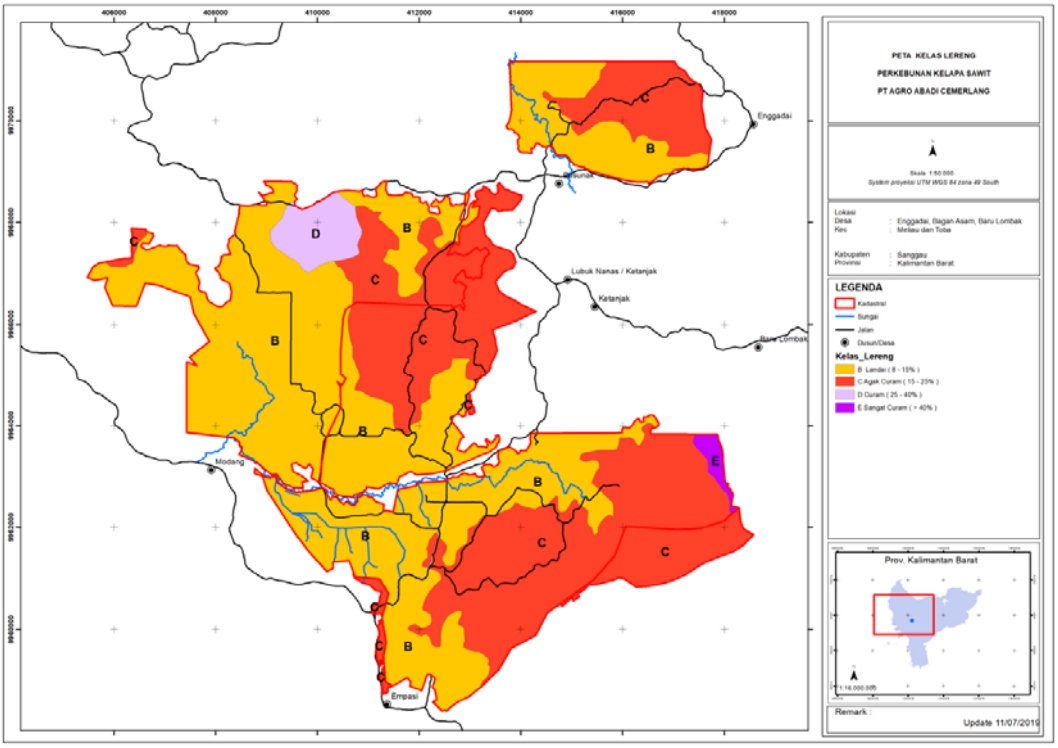


Figure 26. Slope class of Palm Oil Plantation Area PT Agro Abadi Cemerlang

3.4. Summary of Carbon Stock Assessment and GHG emissions

Total carbon stock in the area of PT. AAC is the total value of the amount of carbon stock in various classes of land cover (stratum) and the amount of carbon stock in the area of PT. AAC. Analysis of total carbon stock in various classes of land cover in the PT. AAC, presented in Table 17.

Table 17. Carbon Stock in various land cover classes

Land Cover Class	Area (ha)	Carbon Stock (tC/ha)	Total Carbon Stock (tC)
Shrubs (SCH)	389.00	55.59	21,624.51
Rubber Plantation (RPL)	1,346.74	49.78	67,040.72
Oil Palm Plantations (OPL)	4,585.08	40.00	183,403.20
Dry Cultivation Land (DCL)	71.41	10.00	714.10
Bareland (BRL)	219.87	3.88	853.09
Total	**6,612.09**		

Integration of Carbon Stock with HCV Findings

Based on the HCV area identification study, in the permit area of PT. AAC has a total HCV area of 301.51 ha. Table 18 shows the integration of carbon stocks at various land coverings with HCV areas.

Table 18. Summary Integration of Carbon Stock with HCV Findings.

Land cover & Carbon stock estimates	HCV Area (Ha)	Non HCV (Ha)
Shrubs (55,59 ton C/Ha)	64.42	324.58
Rubber Plantation (49,78 ton C/Ha)	114.61	1,232.13
Oil Palm Plantations (40 ton C/Ha)	84.70	4,500.38
Dry Cultivation Land (10 ton C/Ha)	2.21	69.19
Bareland (3,88 ton C/Ha)	9.23	210.63
Total	**301.51**	**6,310.58**

Map showing estimates of carbon stocks with HCV levels in the oil palm plantation area of PT. Agro Abadi Cemerlang is presented in Figure 27. Whereas maps showing areas to avoid and the potential for new planting in the oil palm plantation area of PT. Agro Abadi Cemerlang is presented in Figure 28.

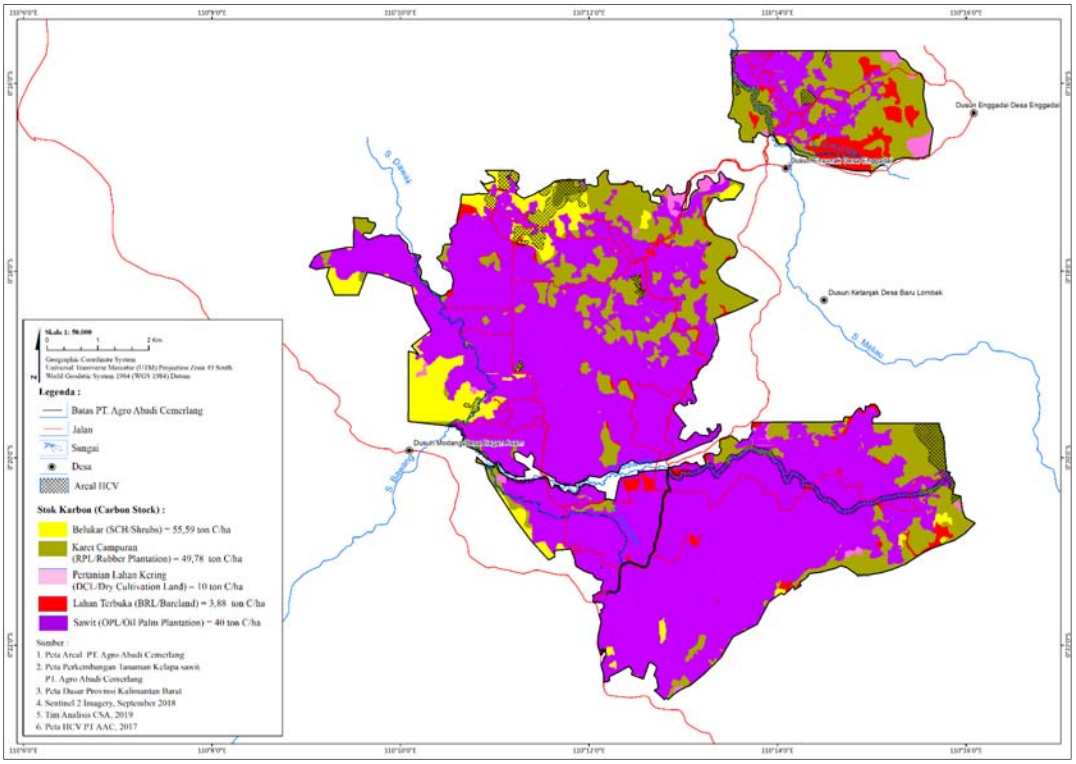


Figure 27. Map of Carbon Stock Estimates at various land cover with levels in the area of PT. AAC

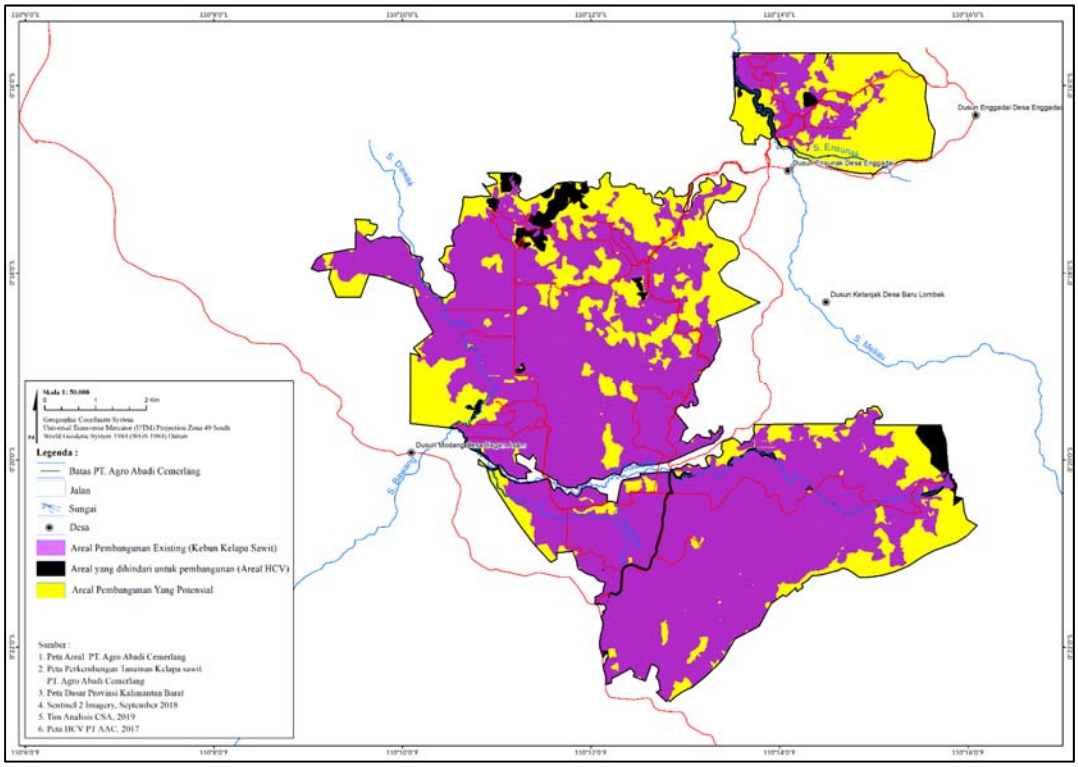


Figure 28. Map of areas to be avoided and the potential for new planting in the area of PT. Agro Abadi Cemerlang

New Development Scenario

Development of new development scenarios in the area of PT. Agro Abadi Cemerlang to guide the selection of optimal development plans by considering areas that need to be avoided in the development and choice of operational practices that lead to minimizing GHG emissions. Table 19 shows the scenarios for new development in the area of PT. Agro Abadi Cemerlang

Table 19. Scenario for new development in the PT Agro Abadi Cemerlang

Scenario	Explanation
Scenario 1 (S1)	▪ All potential land cover for new planting is opened for oil palm. ▪ There are no methane capture facilities planned for the mill ▪ There is no land clearing in the identified HCV area ▪ Planned plant area = 1,836.54 ha ▪ Plan for conservation area = 301.51 ha
Scenario 2 (S2)	▪ All potential land cover for new planting is opened for oil palm ▪ There are methane capture facilities planned for the plant ▪ There is no land clearing in the identified HCV area ▪ Planned plant area = 1,836.54 ha ▪ Plan for conservation area = 301.51 ha

		S1	S2
Regions avoided for new development	HCV	301.51 Ha	301.51 Ha
Areas that have the potential for new planting	Shrubs	324.58 Ha	324.58 Ha
	Rubber Plantation	1,232.13 Ha	1,232.13 Ha
	Dry Cultivation Land	69.19 Ha	69.19 Ha
	Bareland	210.63 Ha	210.63 Ha
POME treatment	Conventional treatment	Yes	No
	Methane trap	Not	Exist

Based on Table 19 for the development scenario, it can be observed that land clearing, and POME are the main sources of emissions; while emissions and removals are avoided from conservation areas, the practice of methane capture is a key emission savings.

4.3. GHG Emission Projection

The GHG emission projection in the area of PT. Agro Abadi Cemerlang is calculated using the RSPO New Development GHG Calculator to determine the emissions projections associated with the choice of scenarios developed.

Scenario 1

Summary of results

Summary of results

Field emissions & sinks (Assumes vigorous growth for oil palm - for use by large scale operations)

	t CO_2e	t CO_2e/ha	t CO_2e/t FFB
Land clearing	40.133,22	6,34	0,28
Crop sequestration	-59.247,26	-9,36	-0,41
Fertilisers	3.776,23	0,60	0,03
N2O	3.988,06	0,63	0,03
Field fuel	1.398,30	0,22	0,01
Peat	0,00	0,00	0,00
Conservation credit	-2.764,85	-0,44	-0,02
Total	-12.716,29	-2,01	-0,09

Mill emissions & credit	tCO_2e	t CO_2e/ha	tCO_2e/tFFB
POME	28.532,08	4,51	0,20
Mill fuel	5.449,74	0,86	0,04
Purchased electricity	0,00	0,00	0,00
Credit (excess electricity exported)	0,00	0,00	0,00
Credit (sale of biomass for power)	0,00	0,00	0,00
Total	33.981,82	5,37	0,23

Total emissions, tCO_2e (field and mill)	21.266

Scenario 2

Summary of results

Summary of results

Field emissions & sinks (Assumes vigorous growth for oil palm - for use by large scale operations)

	t CO_2e	t CO_2e/ha	t CO_2e/t FFB
Land clearing	40.133,22	6,34	0,28
Crop sequestration	-59.247,26	-9,36	-0,41
Fertilisers	3.776,23	0,60	0,03
N2O	3.988,06	0,63	0,03
Field fuel	1.398,30	0,22	0,01
Peat	0,00	0,00	0,00
Conservation credit	-2.764,85	-0,44	-0,02
Total	-12.716,29	-2,01	-0,09

Mill emissions & credit	tCO_2e	t CO_2e/ha	tCO_2e/tFFB
POME	2.967,35	0,47	0,02
Mill fuel	5.449,74	0,86	0,04
Purchased electricity	0,00	0,00	0,00
Credit (excess electricity exported)	0,00	0,00	0,00
Credit (sale of biomass for power)	0,00	0,00	0,00
Total	8.417,09	1,33	0,06

Total emissions, tCO_2e (field and mill)	-4.299

Based on the consideration up to now PT AAC has no plans to build Methane Capture and then for the new planting plan, the land cover that is opened is only prioritized on shrubs (SCH), rubber plantations (RPL), dry cultivation land (DCL) and bareland (BRL). Then scenario 1 is the optimal development choice in the area of PT. Agro Abadi

Cemerlang. In this scenario, GHG emissions from land clearing and operational activities will be absorbed by Conservation Areas (HCV Areas) and oil palm plants. Summary of GHG emissions for new development plans in the PT. Agro Abadi Cemerlang is presented in Figure 29. While the New Development Plan Map in the area of PT. Agro Abadi Cemerlang is presented in Figure 30.

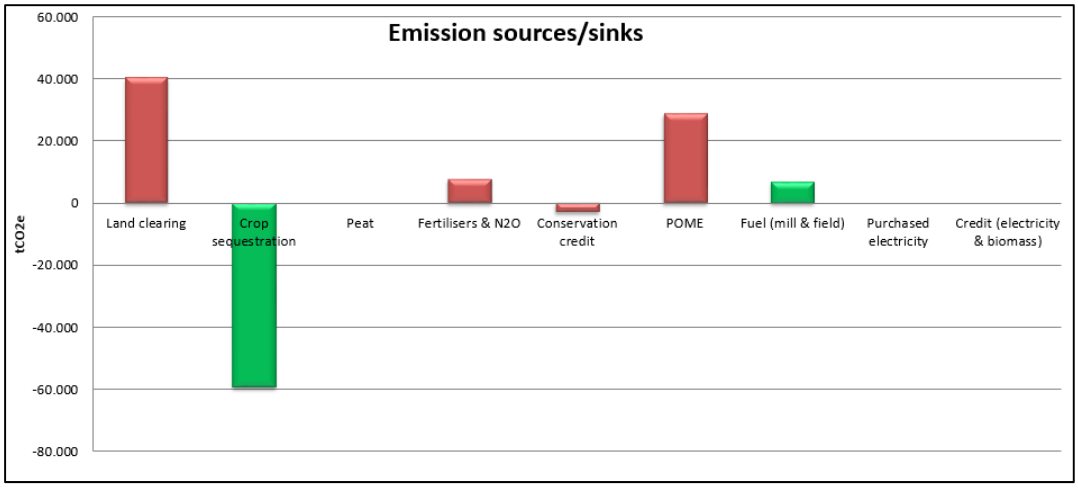


Figure 29. Summary of GHG emissions (tCO_2e) for new development plans in the PT. Agro Abadi Cemerlang

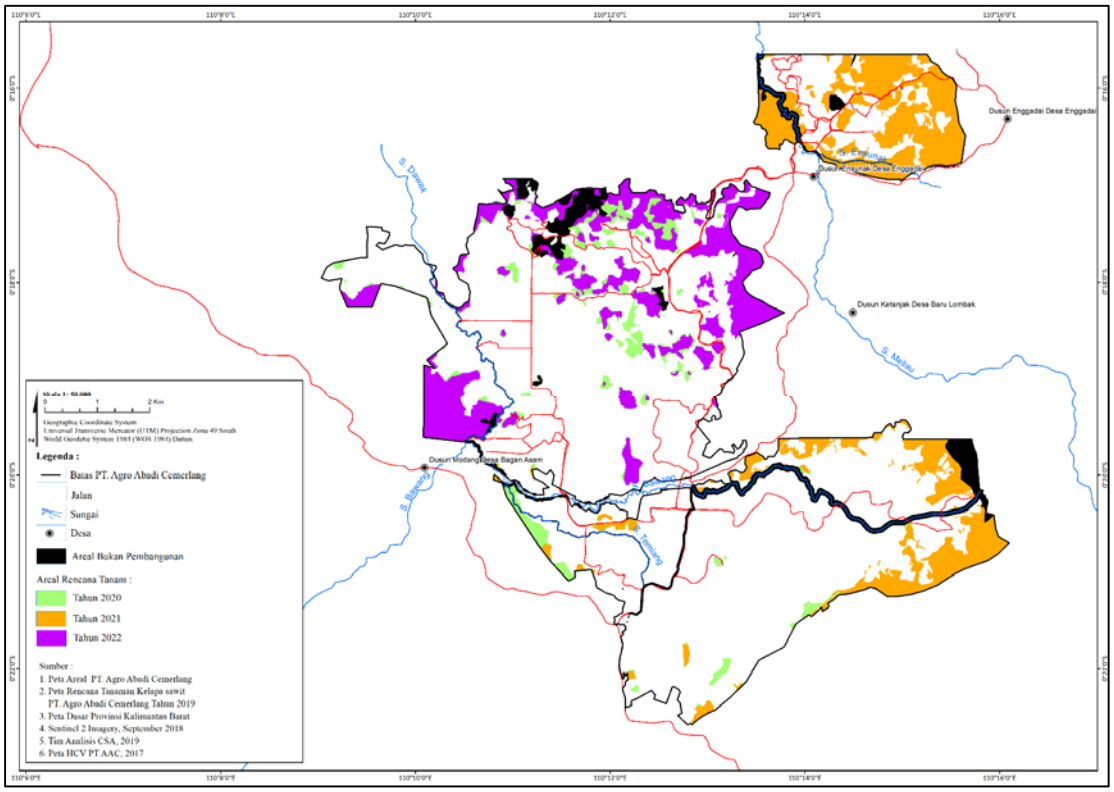


Figure 30. New Development Plan Map in the area of PT. AAC

3.5. LUC analysis

Historical Analysis of Land Use Change

Table 20. Historical Analysis of Land Use Change in the PT AAC

No.	Code	Land cover	Large (ha)					
			Before November 1, 2005	November 1, 2005 - November 31, 2007	December 1, 2007 - December 31, 2009	January 1, 2010 – May 9, 2014	May 9, 2014 – HCV identified	Ground truthing, 2019
1	SCH	*Shrubs*	1180.03	725.41	723.52	499.16	376.89	389.00
2	RPL	*Rubber Plantation*	4578.29	4543.95	3380.36	2284.82	1515.69	1346.74
3	OPL	*Oil Palm Plantations*	56.89	785.73	1394.89	3630.85	4585.08	4585.08
4	DCL	*Dry Cultivation Land*	100.59	108.39	185.85	33.70	27.81	71.41
5	BRL	*Bareland*	696.28	1448.61	927.48	163.56	106.62	219.87
Total (ha)			**6612.09**	**6612.09**	**6612.09**	**6612.09**	**6612.09**	**6612.09**

Environmental Remediation

Table 21. Remediation potential in each liability period in PT AAC Area

Period of clearance	Riparian Buffer	Steep slope	Total (Ha)
After May 9, 2014 – HCV identified	81.39	2.72	84.65
January 1, 2010 – May 9, 2014	44.21	-	44.21
December 1, 2007 – December 31, 2009	23.37	-	23.37
November 1, 2005 – November 31, 2007	2.26	-	2.26
Total (Ha)	**151.77**	**2.72**	**154.49**

LUCA result before multiplying with vegetation coefficient

Table 22. The results of LUCA calculations in the PT Agro Abadi Cemerlang area before multiplying by the vegetation coefficient

Land cover class	Vegetation Coefficient	Nov 1, 2005 to Nov 30, 2007	Dec 1, 2007 to Dec 31, 2009	Jan 1, 2010 to May 9, 2014	After May 9, 2014
One or more land cover classes which fulfill the criterion of vegetation coefficient 1.0	1.0	-	-	-	-
One or more land cover classes which fulfill the criterion of vegetation coefficient 0.7	0.7	-	-	-	-
One or more land cover classes which fulfill the criterion of vegetation coefficient 0.4	0.4	-	-	-	-
One or more land cover classes which fulfill the criterion of vegetation coefficient 0.0	0	728.83	609.16	2235.96	954.23
Total (sum of rows)		728.83	609.16	2235.96	954.23

Final compensation liability

Prediction of compensation amount is calculated using the area of land clearing that occurs in each period of liability multiplied by the vegetation coefficient of land cover in 2005 (Baseline).

Table 23. The results of LUCA calculations in the PT Agro Abadi Cemerlang area after multiplied by the vegetation coefficient

Period of land clearance	Land controlled by a non-member at time of clearance	Land controlled by a RSPO member at time of clearance. This Includes land acquired from other RSPO members
After May 9, 2014	0	-
January 1, 2010 – May 9, 2014	0	-
December 1, 2007 - December 31, 2009	0	-
November 1, 2005 - November 31, 2007	0	-
Total (ha)	0	-

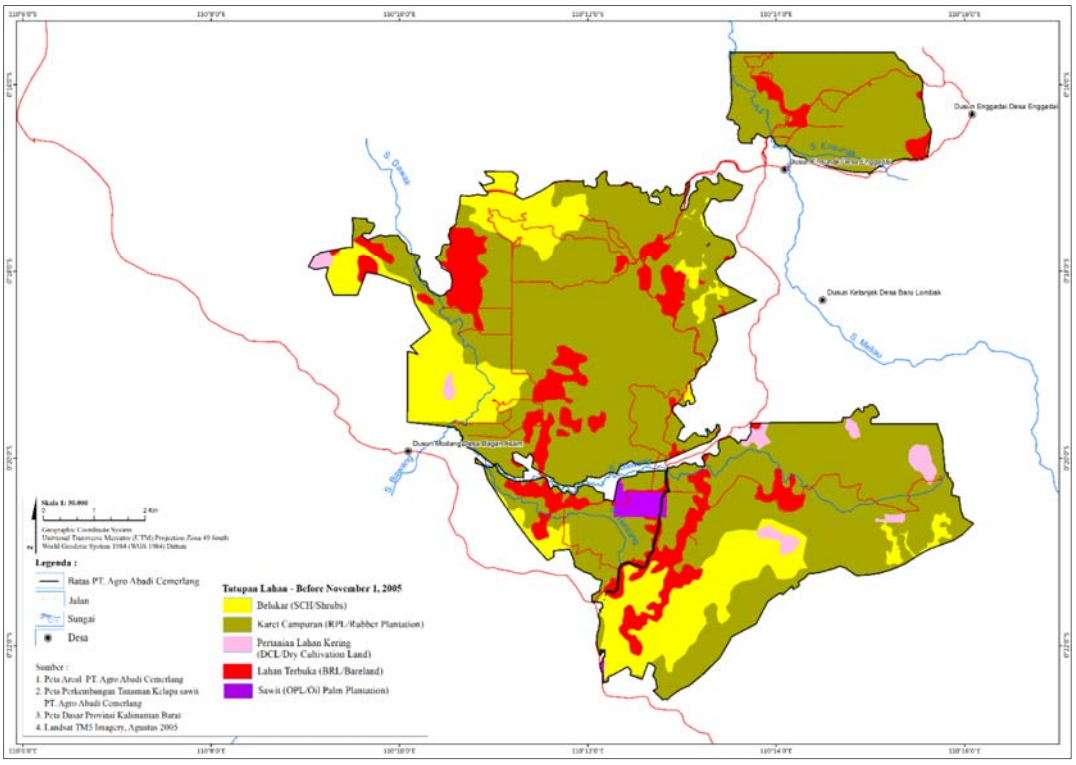


Figure 31. Land cover map - *Before November 1, 2005*

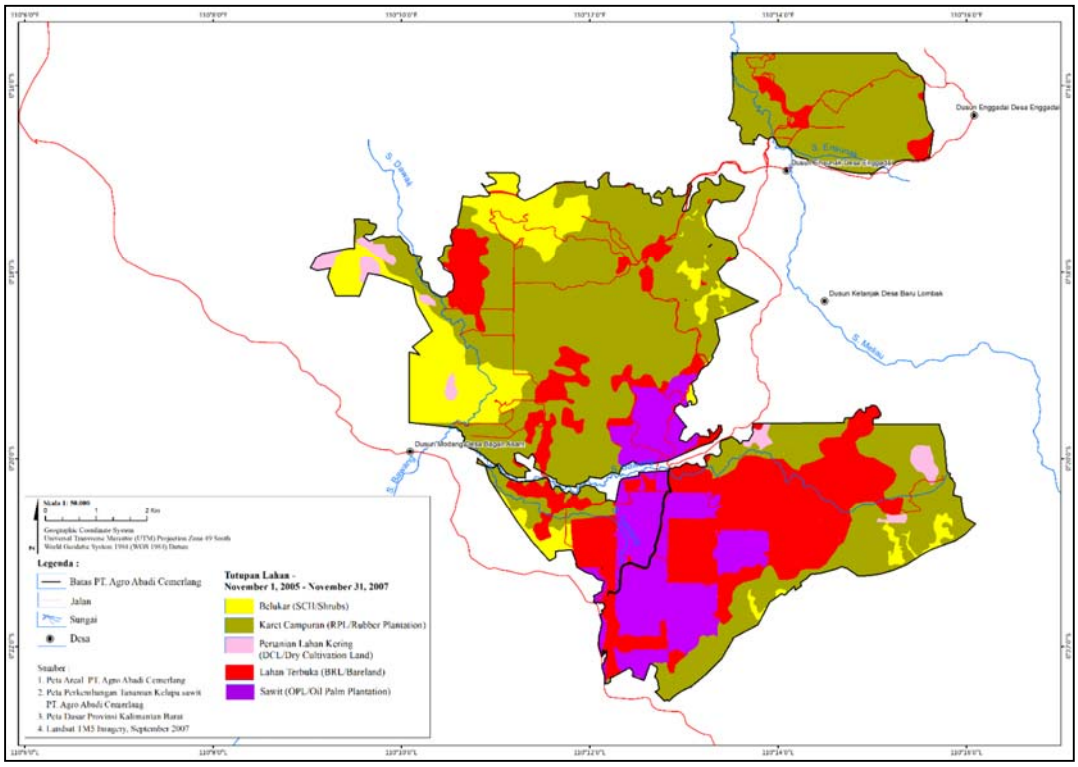


Figure 32. Land cover map - *November 1, 2005 - November 31, 2007*

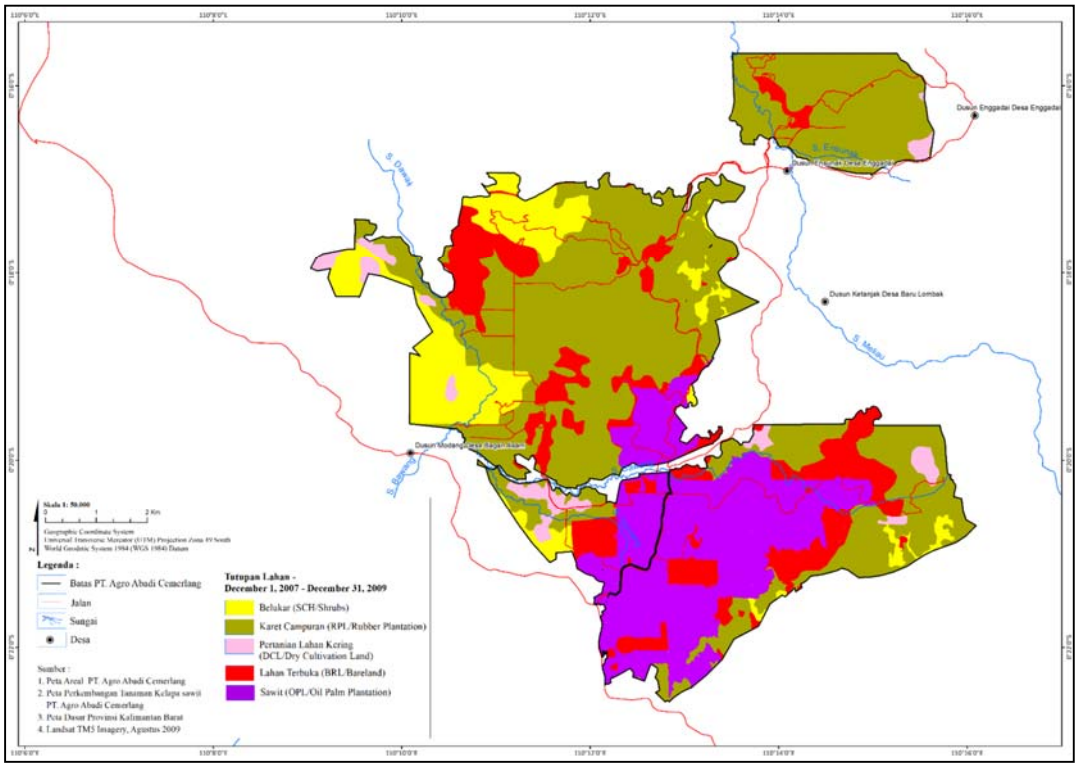


Figure 33. Land cover map - *December 1, 2007 - December 31, 2009*

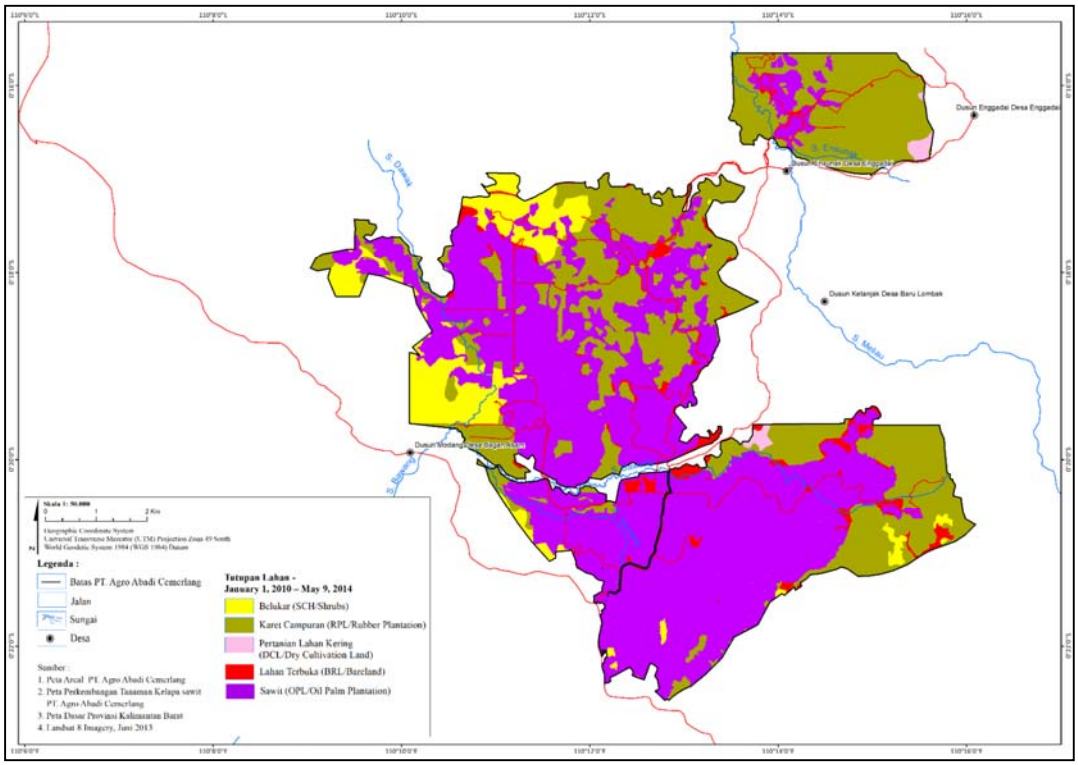


Figure 34. Land cover map - *January 1, 2010 – May 9, 2014*

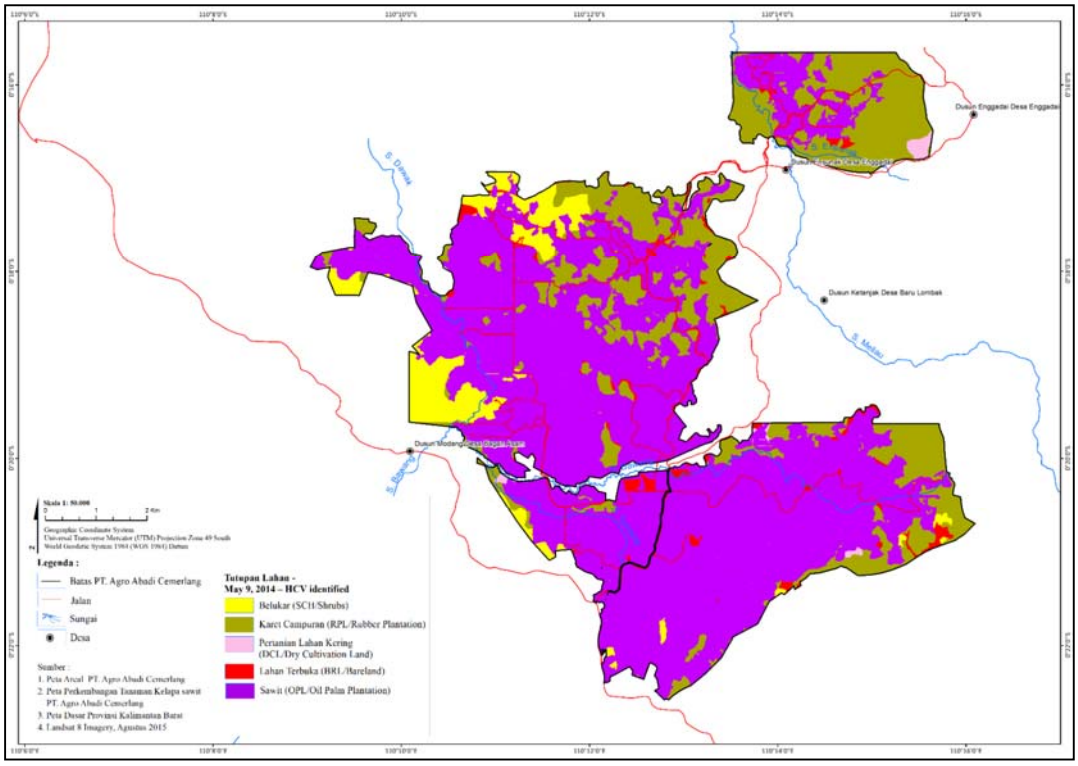


Figure 35. Land cover map - *May 9, 2014 – HCV identified*

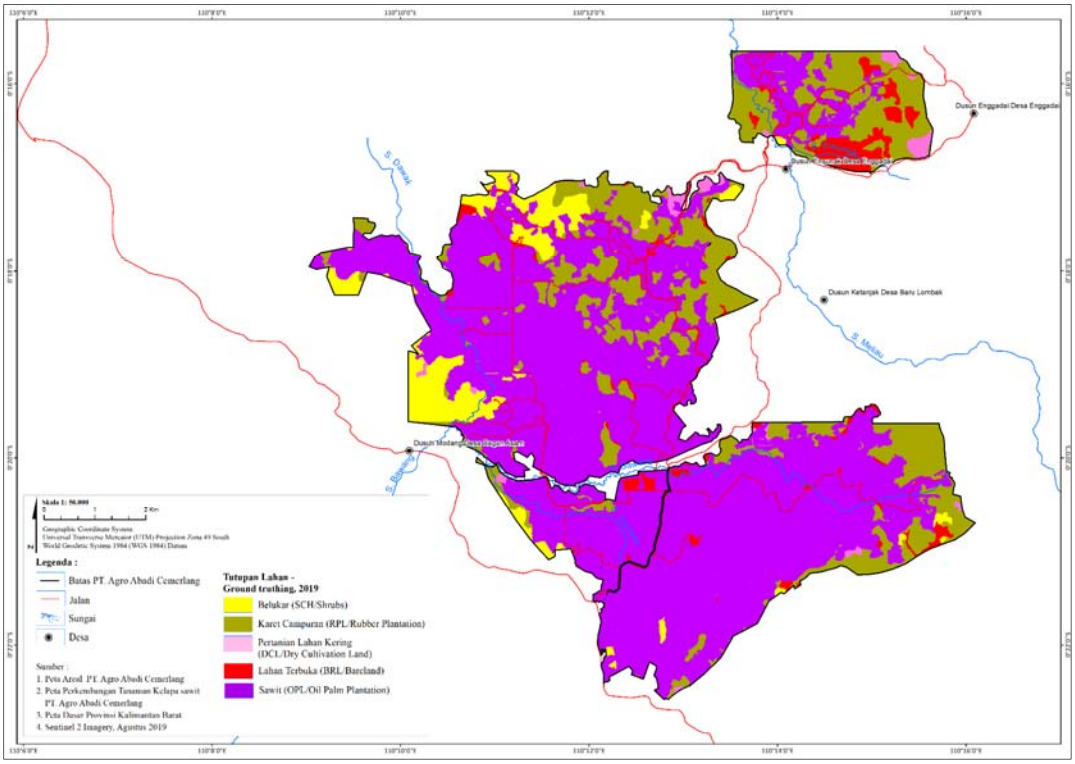


Figure 36. Land cover map - *Ground truthing, 2019*

3.6. FPIC process

3.6.1. Land Ownership and Use

In general, land ownership by the village community around PT AAC is different in area. These lands are recognized communally and individually even though they are not certified. On the other hand, to increase the ownership of the land the residents do it by means of shifting fields Next, the ownership or ownership of land within the concession is presented by residents

Enggadai Village

- Most residents do not know the land area they have.
- Most of the land acquired by residents is mostly within the PT AAC concession.
- Some residents have already handed over their land to PT AAC, but there are also residents who have not given up their land until the HCS and FPIC surveys are conducted.
- because it doesn't match the current price of GRL

Baru Lombak Village

- Most of the land ownership of residents has not been certified either SKT or SPPT.
- Some of the people's land belongs to the family (inheritance / heirs).
- During a survey, some residents did not know the exact area of land that was within the PT AAC concession

Bagan Asam Village

- Some of the land owned by residents in the concession belongs to the heirs.
- There is no certainty about the size of the residents' land inside the concession.
- Residents want there to be measurement of their land with PT AAC.
- Location of land owned by majority residents is in Division 4 or next to Dawak River.

The use of land in the PT AAC concession area by villagers has almost the same. Land in the concession area is used by residents for rubber gardens / forests, oil palm plantations, swamp rice / field rice, tengkawang, dompeng emas, and fruit trees, as well as utilization for traditional events

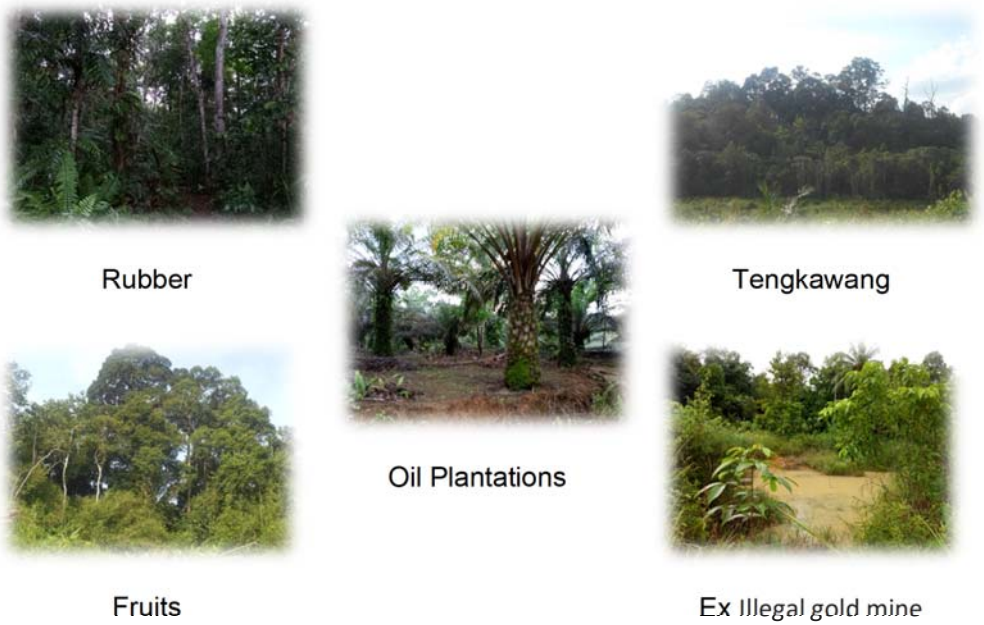


Figure 37. Land Use by Residents in the Concession Area

The utilization of other concession areas is for ritual needs of the people known as "Pedagi Rituals" or commonly referred to as fruit bait rituals. The ritual event was last held in 2010, after which there was no more ceremony. When FPIC is carried out for Pedagi ritual activities, it will not be handed over / released to PT AAC for the oil palm plantation area.

Based on the discussion, interviewing an independent consultant team with villagers around PT AAC in 2019, information was obtained that the rubber land included in the PT AAC location permit had been partnered and compensated by the company. For people whose rubber plantation lands are in company location permits, there are also people who voluntarily partner with companies with land compensation mechanisms using a profit sharing pattern of 80: 20 (80% of the yield for companies and 20% of the yield will be plasma land). the results will be handed over to the landowners). In 2019 community plasma land has been produced so that the community gets additional income from land that has partnered with the company

3.6.2. FPIC Analysis

FPIC Phase 1 – Stakeholder identification

The identification process begins by determining the position / position that has a central role in the village that has an influence on the community, then analyzes the strength of the influence of stakeholders with the mastery of access to natural resources, as well as the potential for conflict and cooperation between stakeholders. Regarding the plan to open a garden by PT AAC, several parties have been identified, including muspika, residents as village government officials, community leaders,

religious leaders, and so on. In detail the identification of key stakeholders around PT AAC is as follows:

Table 24. List of Key Stakeholders Around PT AAC

No	Name	Position	Organization/ Social Group
1.	Minsen	Village Head	Enggadai Village Government
2.	Acen	Tumenggung	Enggadai Customary Village Institutions
3.	Martinus Cara	Traditional Head	Enggadai Customary Village Institutions
4.	Dominikus Munhadi, SH	Village Head	Baru Lombak Village Government
5.	Mayau	Traditional Head	Baru Lombak Customary Village Institutions
6.	Nobertus Sukarto	Village chief	Baru Lombak Village Government
7.	Hendrikus	Village government Agencies	Baru Lombak Village Government
8.	Liliapati	Village Head	Bagan Asam Village Government
9.	Herkulanas Usunasa	Traditional figure	Bagan Asam Customary Village Institutions
10.	Martinus	Village government Agencies Head	Bagan Asam Village Government
11.	Andreas Hiskin	Village chief	Bagan Asam Village Government

Source: FPIC Primary Data Processing, 2019

Land users can be mapped according to the 2015 RSPO FPIC Toolkit, namely landlords, farmers, migrant workers, seasonal users, communal land, private land, etc. This information is adjusted to the prevailing habits in the villages around PT AAC, so that it can be different in each region.

In order to start the opening of oil palm plantations, the company first conducts socialization including those related to land compensation or commonly referred to as land compensation (GRL). According to residents, the release / acquisition of land by the company began in 2014. In its implementation, some residents still have various considerations in land acquisition with reasons such as those presented in Table 25 below.

Table 25. Considerations of Villagers in Land Release

No	Village	Consideration or Release of Land Problems
1.	Enggadai	• The main problem faced by residents with PT AAC is the process of releasing GRL that is not clear and clean, because residents want high GRL prices and at least the same as GRL that has been done by tambag companies (PT Alu Santosa), which is around Rp. 13,000,000. - per hectare. • Land that is still inside the concession, should be measured again with the residents so that there is no misunderstanding. • Residents want land that is located within the concession so they can get ownership legality. • Swap exchanges between AAC land outside the HGU and the land owned by residents in the HGU / concession.

No	Village	Consideration or Release of Land Problems
		• Company prudence in carrying out Land Clearing (LC)
2.	Baru Lombak	• For inheritance with family heirs from generation to generation, usually the land will not be released or on GRL right to any company, including PT AAC. However, the condition of the land does not rule out the possibility of being released to the PT with a record of negotiation or depending on the price of GRL and the agreement of all the heirs of the land concerned. • For residents who own a forest / rubber plantation within the concession, they will continue to maintain (will not be released / GRL) to PT AAC, but will continue to be used as a forest / rubber plantation. • The emergence of certain individuals who sell land to PT AAC. This happened in Lombak Baru Village, where there were individuals who sold Pa Mayau's land (in Blok G 48) to the company. • By custom, the land / area used by the residents for Pedagi Ritual will not be handed over / released to PT AAC for the expansion of oil palm plantations, this is due to: a) land with communal / customary utilization, b). Ancestral inheritance, c) still in the form of still beautiful forest, d) there are still springs to fulfill the residents' clean water, and e) there are various types of fruits
3.	Bagan Asam	• Companies can facilitate participatory land measurement. • Some residents admit that their land is inherited from parents. • The types of plants cultivated by residents are tengkawang, durian fruit, rice, palawaija, and so on. • The majority of residents want their land to be cultivated / cultivated on their own and will not be released / handed over to the PT AAC even hoping to be enclosed. However, it is still possible for the land to be released according to negotiations and the GRL value that is felt by the residents. • Traditionally, tengkawang and durian trees are protected, so the company needs to be careful in LC activities

Source: Survey of PT AAC CSA Team by PT SAN Consultant Team, 2016

Then in 2019, a re-survey related to FPIC / FPIC was related to the issue of GRL. Based on the discussion, interviewing an independent consultant team with the villagers, information was obtained that the rubber land included in the PT AAC location permit had been partnered and compensated by the company. For people whose rubber plantation lands are in company location permits, there are also people who voluntarily partner with companies with land compensation mechanisms using a profit sharing pattern of 80: 20 (80% of the yield for companies and 20% of the yield will be plasma land). The results will be handed over to the landowners). In 2019 community plasma land has been produced so that the community gets additional income from land that has partnered with the company

FPIC Phase 2 – Formation of Work Group

After the community agreed to take part in the overall stages of FPIC in stage 1, the next step was the establishment of a working group or working group. This working group will follow the whole process to the end, and also as the person in charge if there

is a dispute in the future. When FPIC studies are conducted, it is expected that there will be a kind of working group formation.

In accordance with the conditions imposed by the RSPO on the 2015 FPIC Toolkit the formation of working groups must involve representatives of each layer of society, and the community determines for themselves the representative. From the FGD results and interviews with several community leaders who were proposed to be able to join work teams or work groups. This working group is referred to as the Village Team and consists of names already listed in Table 13 above.

FPIC Phase 3 - Participatory Mapping

The next FPIC stage is to identify the existence of plans to open oil palm plantations to be built, whether they have an impact on the rights of the communities that have already been established before being opened by the company. These principles and criteria require two stages that apply, namely by studying the community land tenure system and through participatory mapping.

Participatory mapping is carried out to identify important areas protected by the community because they contain elements of culture, history, spirituality, or as a source of livelihood and identification of land use. Participatory mapping was also carried out to identify landowners in the PT AAC concession area.

The implementation of participatory mapping was carried out by showing sketches of concession maps planned for opening partner gardens. The next stage is discussion participants (Village Heads, BPD Chairpersons, Chairpersons of LPM, community leaders, and traditional leaders) are asked to indicate the location or area within the concession that is still used by residents to grow crops as a source of livelihood, concession boundaries PT AAC, village administration boundaries, fulfillment of basic needs and other land uses.

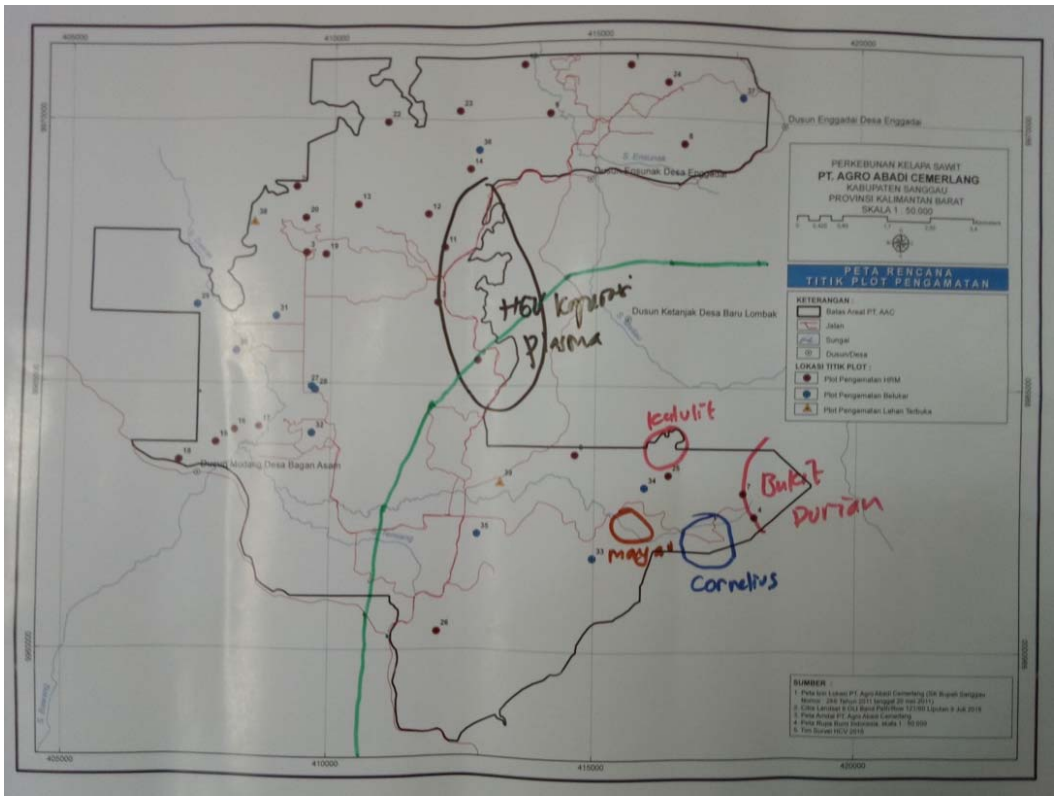
The results of the study with the participatory mapping method will obtain information on the areas indicated as needing mitigation and areas that are the focus of FPIC activities. Map sketches made with participatory mapping are then verified. Verification method by overlaying sketches of maps with real conditions in the field using the application of geographic information systems (GIS) for the benefit of the results of FPIC analysis regarding the concession area. The participatory mapping process can be seen in Figure 38.

FGD

FGD and Social Mapping in the Baru Lombak Village

FGD and Social Mapping in the Bagan Asam Village

Figure 38. Process of Participatory Mapping (Sketch)



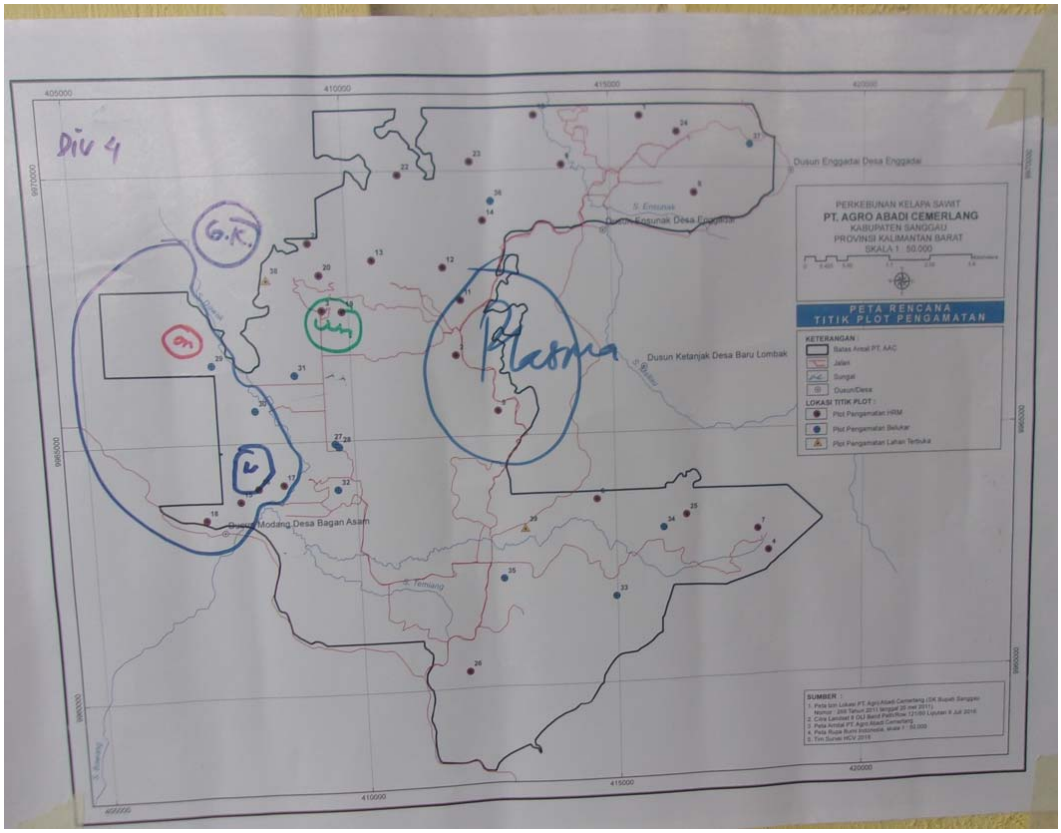


Figure 39. Sketch of Participatory Maps

From Figure 12 it can be seen that in the area of the prospective concession there are already many people who use their land to fulfill their livelihood needs with oil palm, rubber, pepper, secondary crops, horticulture and other dryland agriculture and when FPIC is carried out on the land. And based on the discussion it was found that each citizen was able to open land for agriculture / plantations within the concession area ranging from ± 2-4 hectares.

FPIC Phase 4 - Information Giving Process from the Company

The process of providing information is one form of affirmation of the rights for the community, that they have the right to know the risks and benefits obtained if their land is cooperated with oil palm companies. For companies, providing information is part of a commitment to transparency to ensure that the public understands the risks to be faced in the future by providing relevant and adequate information.

Based on Guidance 4 on the 2015 FPIC Toolkit issued by the RSPO, the process of providing this information must be carried out openly and documented. The company must also provide documents that are published and accessible to villagers regarding the rights and obligations of the community towards the company.

The process of providing information regarding the planned opening of oil palm plantations by PT AAC has been carried out, but only limited to public awareness / consultation at the time of AMDAL, socialization of land acquisition, public consultation on HCV, HCS, SIA activities and so on.

But the socialization has not yet all the people understood it, some people still question related:

- Residents have long waited for clarity on the realization of the opening of the garden.
- When the FPIC was conducted the residents also asked about the clarity of the company's obligation to fulfill the plasma plantation (partnership plantation).
- Questioning the problem of employment opportunities at PT AAC
- On November 1 - 08, 2016, PT AAC collaborated with PT SAN consultants to carry out FPIC / FPIC as well as part of the efforts to plan the opening of the oil palm plantation.

FPIC Phase 5 - Negotiation Process in the Community

A vital stage in FPIC is the process of discussion among the community to make conscious decisions, armed with adequate information and without coercion. The decisions taken must be free from external pressure, intimidation, coercion, manipulation, and also internal pressure from the village officials themselves.

The negotiation stage in the community has been carried out by the company as stated in the minutes of socialization and the process of land acquisition in each village. In addition, negotiations are also carried out within the framework of fulfilling MOUs or cooperation between the company and surrounding villages, including agreement on the pattern of distribution of plasma nucleus gardens with proof of physical land tenure (SPORADIK), declaration of land surrender, map results, declaration release of rights and receive compensation, photos of themselves and other evidence as a sign of agreement and agreement in the negotiations.

FPIC Phase 6 - Decision-making

After all elements of the process in FPIC have been approved and carried out with the community, the next step is the decision making process. Although consent in FPIC means agreement, but the community has the right to reject the presence of the company if in the process of FPIC there are things that are not impartial to the community. The agreement taken in relation covers all aspects of people's lives (social, economic, legal, environmental, etc.) that are affected by the planned development of partnership gardens.

Agreements that have been obtained must be legalized through the recording of a notary, and officially known by the local government. The process of signing a cooperation agreement as a result of a community decision was limited to land owners with the PT AAC company. However, in the future, an agreement must be made through the recording of a local notary so that the agreement is not misused in the future.

CHAPTER 4. Summary of Management Plans

4.1. Team responsible for development and implementation of management plans

Show the key personnel that is involved during the development and implementation of management plans.

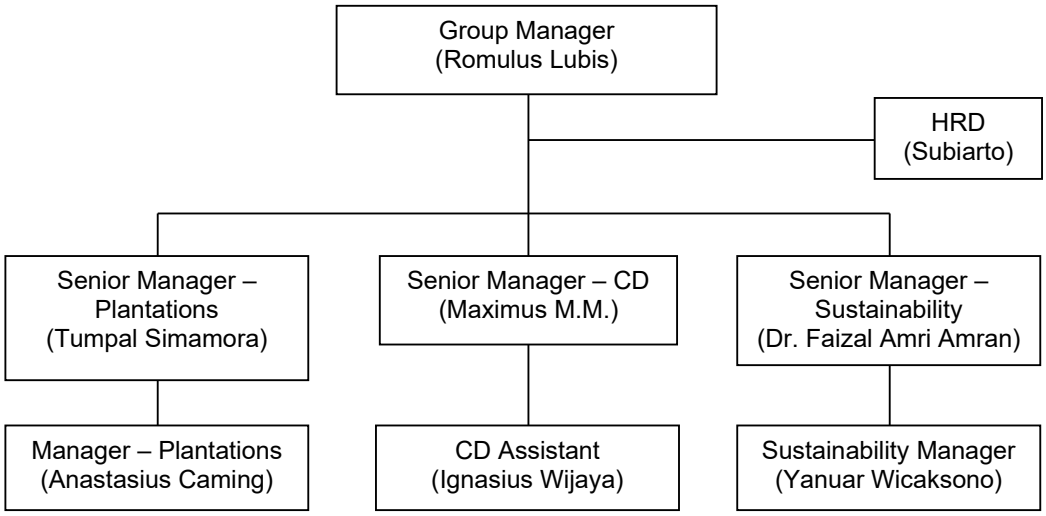


Figure 40. Team responsible for development & implementation of management plans

4.2. Stakeholder to be involved

Stakeholders are parties who give or receive influence from existence oil palm plantation in PT AAC. The parties referred to in this study focused on key stakeholder, are parties directly, significant and interactive and give each other a sustainability stakeholder.

In addition to involving stakeholders, PT AAC in the future in management and monitoring is also shared with stakeholders, such as conducting studies on the conservation of natural resources and ecosystems with the BKSDA, the Community and NGOs engaged in the environment, coordinating with companies around them, namely PT. Duta Surya Pratama, PT. Sawit Desa Kapuas and PT. Sumatera Jaya Agro Lestari and the Forestry Service in the management of HCV areas that are interconnected and coordinate and collaborate with the community and related agencies in order to prevent, protect, and overcome disturbances to the river and its boundaries, and hilly areas, as well as effective law enforcement. Stakeholder involvement is also described point 4.3.2. Elements to be included for HCV Assessment.

4.3. Elements to be included in management plans

4.3.1. Elements to be included for SEIA

Matrix of Social Environmental Management Plans in Oil Palm Plantations PT AAC

Type of Impact	Impact Sources	Impact Benchmark	Management objective	Management Method	Management Area	Times	Implementing Social Management		
							Executor	Partner	Coordination
External Potential Social Impact									
Socio - Economic	Limited sources of economic citizens	Unfair competition among citizens in obtaining jobs and sources of income	• Proportionally providing employment and business opportunities to citizens • Encouraging the development of new economic resources such as processing industries, traditional crafts, workshop, culinary, and so on	• Provide correct and clear information about the Oil Palm Plantation Development Plan and type of work to the community transparently • Skills training • Courses, visits. • Receive self-managed oil palm products to the company's palm oil mill to be built	In all villages around the PT AAC area	Tentative	PT AAC	Villages around PT AAC	Head of sub-district, village head and related office
Socio - Culture	Negative perception of the company and social jealousy for non-local labor	• Incorrect understanding of oil palm companies • Disputes between non-local workers and surrounding communities	• For the public to have a positive perception regarding the management of PT AAC's oil palm plantations • So that the community has a good understanding and accepts the existence of non-local labor	• Conduct intensive socialization to the community both formally, formally and informally • Carrying out a custom-culture approach and family and active involvement of the community in every activity that comes into contact with the community • Informing the community around each workforce recruitment including the qualifications needed by the company. • Provide knowledge and skills about the work system needed by the company to local residents in the form of training and courses	In all villages around the PT AAC area	Tentative	PT AAC	Villages around PT AAC	Head of sub-district, village head and related office

Understanding of the plasma scheme	plasma management	Management of plasma is not correct	So that people get more detailed and complete information about plasma management	• Intensive socialization both directly and through the media about plasma management .	In all villages around the PT AAC area	Tentative	PT AAC	Villages around PT AAC	Head of sub-district, village head and related office
Demography	Land ownership claims	Disputes between residents and mutual land claims	So that there is clarity on land boundaries and land ownership	• Mediation by involving village officials, community leaders and muspika to determine land boundaries and ownership to avoid mutual claims .	In all villages around the PT AAC area	Tentative	PT AAC	Villages around PT AAC	Head of sub-district, village head and related office
Public health	Changes in environmental conditions	Changes in surrounding community health conditions and infectious disease outbreaks	Community health conditions that remain stable and environmental health maintained	• Conduct socialization about the importance of maintaining health. • Doing greening around settlements with productive types of plants • Providing medical assistance such as free medical treatment, mobile health centers, medical personnel assistance, medicines, and ambulance facilities	In all villages around the PT AAC area	Tentative	PT AAC	Villages around PT AAC	Head of sub-district, village head and related office
Environment	Concerns about environmental pollution, especially river water and damage to springs	The emergence of wrong perceptions by the community about pollution of river water and springs that people use	• So that people get an understanding of the treatment of oil palm plants that do not pollute river water and damage springs. • Encouraging the formation of public awareness to protect the environment, especially pollution of the river due to illegal mining.	• Socialization • Community participation in carrying out reforestation along the riverbanks and hills of the springs located within the PT AAC concession area • Counseling about the importance of maintaining environmental sustainability, especially regarding the rampant illegal mining in villages around PT AAC. • Development and management of community clean water resources affected by company	In all villages around the PT AAC area	Tentative	PT AAC	Villages around PT AAC	Head of sub-district, village head and related office

				operations					
Internal Potential Social Impact PT AAC									
Workforce recruitment system	The recruitment system is less transparent, proportional and priority scale	The occurrence of unfair competition among prospective workers	Prevent unhealthy competition for prospective workers	• Transparent recruitment of workers • Give proportional priority to local residents in recruitment of workers	In all villages around the PT AAC area	Every workforce recruitment	PT AAC	Manager, Head of Administration	Head of sub-district, village head and related office
Occupational Safety and Health Aspects (K3)	Application of rules and SOPs for K3 aspects and the use of APD that is not strict	Occurrence of workplace accidents and lack of work safety and health of employees	Preventing work accidents and ensuring the health and safety of work	Implement rules and P3K SOPs and use of Personal protective equipment and sanction those who violate	Work area PT AAC.	Tentative	PT AAC	All staff and employee	Manager, Head of Administration
Industrial relations	Don't understand about employee organization functions .	Not all know and become members of employee organizations so there are still many who do not have channels for staff and employee aspirations	Provide space for staff and employees to channel aspirations and establish institutional relationships externally	• Overall employee organization socialization • Maintaining good relations between company management and employee organizations	Work area PT AAC.	Tentative	PT AAC	All staff and employee	Manager, Head of Administration
Competency development	Employee training patterns that are biased locally	Jealousy of local people and local employees in a pattern of training that is not proportional to the local community	Providing opportunities for local staff and employees to improve their competence	Conduct training with community priorities and local employees	Work area PT AAC.	Tentative	PT AAC	Manager, Head of Administration	Director
Career path and Employee Facilities	• Career based education level • Need-based employee facilities	• Competition is not healthy internally and social jealousy especially for experienced but low education employees • Fulfillment of employee facilities	• Suppress the occurrence of social jealousy and unfair competition among staff and employees • Creating a sense of comfort at work	• Provide equal opportunities to all staff and employees according to the level of education and experience they have • Fulfill housing needs, education, especially PAUD facilities and health and other appropriate benefits to employees	Work area PT AAC.	Tentative	PT AAC	Manager, Head of Administration	Director

Matrix of Social Monitoring Plan PT AAC Oil Palm Plantation Development Activities

Type of Impact	Impact Sources	Monitored environmental parameters	Monitoring Objectives	Monitoring Method	Monitoring Area	Times	Implementing Social Management Monitoring		
							PIC	Supervisor	Coordination
External Social Impact									
Socio - Economic	Limited sources of economic citizens	Information on proportional employment opportunities for the community around the PT AAC area is opened	Ensure and maintain continuity in the implementation of socio-economic programs	Observation and interview	In all villages around the PT AAC area	Tentative	PT AAC	Villages around PT AAC	Head of sub-district, village head and related office
Socio - Culture	Social jealousy for non-local labor	There is a correct and good understanding of the community regarding the presence of non-local workers	Ensure that there is good socialization and the formation of citizens' understanding of non-local employees	Observation and interview	In all villages around the PT AAC area	Every six month	PT AAC	Villages around PT AAC	Head of sub-district, village head and related office
Understanding of the plasma scheme	Socialisation plasma management scheme	Establishment of a good understanding of the community regarding the plasma management scheme	• Ensure the implementation and understanding of the plasma scheme regarding smallholdings • Ensure consistency in managing plasma plantations and transparent and proportional distribution of results	Observation and interview	In all villages around the PT AAC area	Every six month	PT AAC	Villages around PT AAC	Head of sub-district, village head and related office
Demography	Mutual land claims	Certainty and clarity of land ownership	Ensure the implementation of mediation and the clarity of land ownership	Observation and interview	In all villages around the PT AAC area	Tentative	PT AAC	Villages around PT AAC	Head of sub-district, village head and related office
Public health	Changes in environmental conditions	Maintaining the health of the community around the PT AAC concession area	Ensure the implementation of public health programs implemented by PT AAC	Observation and interview	In all villages around the PT AAC area	Every six month	PT AAC	Villages around PT AAC	Head of sub-district, village head and related office
Environment	Concern about environmental pollution, especially river water	• Maintaining river water from pollution originating from the PT AAC concession area • Availability of alternative	• Ensure the maintenance of river water conditions that are free of pollution • Make drill wells and help with water management in	Observation and interview	In all villages around the PT AAC area	Every three month	PT AAC	Villages around PT AAC	Head of sub-district, village head and related office

		clean water sources for the community	the community .						
Internal Social Impact PT AAC									
Workforce recruitment system	A recruitment system that does not prioritize local workforce	Availability of labor recruitment systems that prioritize local residents	Ensure that the implementation of management impacts on jealousy and labor competition runs well according to planning	Observation and interview	Work area PT AAC.	Every workforce recruitment	PT AAC	All employee	Manager, Head of Administration
Safety and Health Aspects (K3)	Application of rules and SOPs for K3 aspects and the use of APD that is not strict	Implementation of rules and SOP related to K3 and use of APD	Ensure the implementation of rules and SOP K3 and the use of APD consistently	Observation and interview	Work area PT AAC.	Tentative	PT AAC	All staff and employee	Manager, Head of Administration
Industrial Relations	Don't Socializations about employee organization functions	Employee organization - PT AAC	Ensure that the implementation of management of industrial relations impacts runs well according to planning	Observation and interview	Work area PT AAC	Tentative	PT AAC	All employee	Manager, Head of Administration
Competency development	Employee training	There is a priority for training for local employees to improve their competence	Ensure that the implementation of the management of the impact of competency development runs well according to the plan	Observation and interview	Work area PT AAC.	Tentative	PT AAC	Manager, Head of Administration	Director
Career path and Employee Facilitation	• Career based education level • Need-Based Employee Facilities	• Equitable career path opportunities for staff and employees according to their level of education and experience • Feasibility of employee facilities	• Ensure that the implementation of career path impact management runs well according to planning • Ensure that adequate housing facilities, complete educational facilities at all levels starting from PAUD, health services at the garden clinic are available at all times.	Observation and interview	Work area PT AAC.	Tentative	PT AAC	Manager, Head of Administration	Director

4.3.2. Elements to be included for HCV Assessment

HCV	Threats	HCV Management	HCV Monitoring	Times	Coordination
1 & 3	• Hunting wild animals by the community. • River water pollution caused by the use of chemical substance (fertilizers and pesticides) from oil palm plantation managed by the company, and gardens / farm fields managed by community. • Illegal gold mining by the community on the upstream riverbank outside the concession area that flowed into the concession area had caused the increase of sedimentation and the decrease of river water quality. • Reduced habitat area due to the conversion of secondary dryland forest in riparian areas, water catchment area, and forested area by the community into farms / fields. • Occurrence of habitat fragmentation due to illegal logging in areas with land cover in the form of secondary dryland forest. • Reduced river water quality due to land clearance, leaching / fertilizer runoff & pesticides or other pollution from oil palm plantations managed by the	• Conduct boundary markings and maintenance of boundary markings of river borders (10 to 50 meters width), water catchment areas, and forested area in the field. • Conduct socialization regarding internal and external HCVs. • Preventing, protecting and managing disruptions to HCV management areas (wildlife hunting, illegal logging, area conversion, and illegal mining) through activities: the installation and maintenance of HCV signs in strategic access points, and conducting patrols on regular basis. • Conduct further surveys to ascertain the population status of HCV 1 species. • To carry out maintenance of riverbanks (riverine areas) by: (1) conducting rehabilitation and restoration on riverbanks area that have scrub and bare land; (2) applying sustainable management practice on land cover of oil palm plantation, mixed plantation, rubber plantation, and dryland farms with shrubs, i.e. land clearing only on 1 m radius from the plant without using herbicides, and applying fertilizers by burying it into the soil; (3) making bundle or ridges; (4) overcoming narrowing (due to garbage and other wastes) and silting of river; ((5) Activity	• Conduct annual monitoring of HCV 1 species populations in the HCV management area. • Develop a periodic monitoring system to ensure that hunting, illegal logging, land conversion, and illegal gold mining activities can be minimized. • To conduct periodic monitoring toward the effectivity of prevention, protection, and control of disturbances to HCV management areas that had been implemented. • Monitoring the intensity of the encroachment of river borders, water catchment areas, and forested area, and periodic areas around the streets, including illegal hunting, illegal logging, land conversion, and illegal gold mining. • Conduct periodic monitoring of rehabilitation and restoration activities in border areas of rivers and water catchment areas. • Conducting periodic monitoring toward species Orang utan (*Pongo pygmaeus*) in the distribution area of orang utan which	• species monitoring, socialization to the surrounding community is carried out every 6 months	• Villages public figure • Company around • BKSDA West Kalimatan • Consult with local / regional expert of orang utan, such as FORINA, OFI or BOSF to ascertain the existence of orangutan in the distribution area of orangutan which overlap with the concession area of PT. AAC • Contact with relevant authorities (Office of Mining Services and Environmental Impact Control of Sanggau district and other relevant institutions) for prevention and overcoming illegal mining outside HGU (land area with utilization right), because this actitivity affects the HCV which have been found.

HCV	Threats	HCV Management	HCV Monitoring	Times	Coordination
	company entering rivers. • Pollution of household waste.	to control and prevent the spreading of exotic and invasive species should be carried out on secondary dry land forest cover; (6) increasing 'filter' of watershed area particularly along the riverbanks by planting grasses or other plants that would cover the soil surface, and (6) securing landslide-prone river cliffs, such as by planting relatively light and deep-rooted plants such as bamboo (if the sediment came from river cliff erosion). • Conduct rehabilitation and restoration in the water catchment area. • Coordinate with relevant agencies in order to reduce illegal hunting, illegal logging and the conversion of areas within the permit area, as well as effective law enforcement. • Conducting further survey to ascertain the existence of orangutan in the distribution area of orangutan which overlap with the permit area of PT AAC.	overlaps with the permit area of PT. AAC.		
4	• The loss of secondary dryland forest and scrub land cover in riparian, water catchment area, and forested area. • River water pollution caused by the use of chemical substance (fertilizers and pesticides) from oil palm plantation managed by the company, and gardens / farm fields managed by community. • Illegal gold mining by the	• Conduct boundary markings and maintenance of boundary markings of river borders (10 to 50 meters width), water catchment areas, and forested area in the field. • Preventing, protecting and managing disruptions to HCV management areas (illegal logging, area conversion, and illegal gold mining) through activities: the installation and maintenance of HCV signs in strategic access points, and	• Establish a monitoring station for the physical condition of rivers and water springs in the water catchment areas, as well as the quality and quantity of river water and water springs. • Conduct periodic community monitoring of the physical condition of rivers and water springs, as well as the quality and quantity of river water and	• demarcation marking, socialization and installation of signboards is done once and monitoring is done every 6 months. • The security of the area is carried out in conjunction with the security team patrol activities	• Coordinate and cooperate with communities and relevant agencies in order to prevent, protect, and overcome disruptions to rivers and its borders, checkdam and its borders, and catchment areas, and effective law enforcement. • Company around • Contact with relevant authorities (Office of Mining

HCV	Threats	HCV Management	HCV Monitoring	Times	Coordination
	community on the upstream riverbank outside the concession area that flowed into the concession area had caused the increase of sedimentation and the decrease of river water quality. • Operational activities of company that may cause silting/sedimentation of the rivers; increase of streamflow discharge during rainy seasons and decrease of streamflow discharge during dry season, and increase of erosion. • Pollution of household waste. • Loss of water supply needed by the downstream community.	conducting patrols on regular basis. • Develop and implement Standard Operating Procedures (SOPs) for the use of chemicals and SOPs for waste management, as well as SOPs for land clearing, construction and maintenance of roads and other facilities, as well as planting and maintenance of plants that minimize erosion and maintain water quality. • Ensure that road construction and other facilities, as well as land clearing, have been carried out properly in accordance with the SOPs that have been prepared. • Given that all river borders water catchment area, and forested areas are currently occupied by the community, it is necessary to be further discussed with the community through Free, Prior, Informed and Consent (FPIC) activities to obtain approval whether or not to be compensated.	water springs. • Conduct periodic monitoring of illegal logging activities, land conversion, and illegal gold mining by communities. • Conduct periodic erosion monitoring. • Periodically monitor the changes of land cover and regeneration naturally in the border area of the river and the water catchment areas. • Perform monitoring and evaluation of SOPs that are applied periodically.		Services and Environmental Impact Control of Sanggau district and other relevant institutions) for prevention and overcoming illegal mining outside HGU (land area with utilization right), because this actitivity affects the HCV which have been found.
5	• River water pollution caused by the use of chemical substance (fertilizers and pesticides) from oil palm plantation managed by the company, and gardens / farm fields managed by community. • Illegal gold mining by the community on the upstream riverbank outside the concession area that flowed into the concession area had caused the increase of sedimentation and	• Installing sign boards for limited hunting (e.g: no hunting of protected and / or rare animals). • Controlling community hunting activities. • Protecting HCV 5 through clear boundary marking activities on the ground and routine patrols. • Prevention, protection and control of disturbances to HCV management areas (wildlife hunting, illegal logging, land conversion, and illegal gold mining) through activities: the installation and	• Develop and implement a participatory monitoring system to track periodic availability of basic community needs. • Conduct periodic monitoring of community participation in reducing environmental impacts (e.g., illegal logging, land conversion, illegal gold mining, and use of fertilizers and pesticides in gardens). • Conduct periodic monitoring of	• Socialization is done every 6 months. • The security of the area is carried out in conjunction with the security team patrol activities	• Villages public figure • Company around • Contact with relevant authorities (Office of Mining Services and Environmental Impact Control of Sanggau district and other relevant institutions) for prevention and overcoming illegal mining outside HGU (land area with utilization right), because this actitivity affects the HCV

HCV	Threats	HCV Management	HCV Monitoring	Times	Coordination
	the decrease of river water quality. • Pollution of household waste. • Loss of water supply needed by the downstream community.	maintenance of HCV signs in strategic access points, and conduct patrols on regular basis.	community perceptions of the quantity and quality of river water and water springs.		which have been found.
6	• Land clearing activities, road construction and other facilities that do not consider the existence of zonation based on certain cultural rules and archaeological sites. • Loss of public access to zonation based on certain cultural rules and archaeological sites.	• Conduct boundary markings on HCV 6 area if permitted by the community and perform periodic maintenance of markings on the ground periodically to prevent occurrence of sites disturbance. • Develop SOPs for identification, boundary marking and maintenance of boundary markings in the field, as well as the protection of all HCV 6 sites together with the community. • Provide convenience to all communities to access HCV 6 sites.	• Develop a simple HCV 6 monitoring system that is easily understood by the community. • The Company, together with the community, regularly monitor HCV 6 sites and prepares its reporting.	• Socialization is done every 6 months. • The security of the area is carried out in conjunction with the security team patrol activities	• Involve community members during land clearing activities, especially those located adjacent to or adjacent to HCV 6 areas to avoid disruption to existing sites.

4.3.3. Elements to be included for soil analysis

SPL	Suitability of Actual Land		Limiting Factor	Suitability of Potential Land	Repair Recommendations	Large	
	Class	Sub Class			Input Type	Ha	%
1	S3	S3t,nr,rc	Topography, danger of erosion, fertility, texture	S3	Erosion control, terassering, cover crops, fertilization, organic matter	174.92	2.12%
2	S2	S2t,nr,rc	Topography, danger of erosion, nutrient fertility and retention, texture	S2	Erosion control, terassering, cover crops, fertilization, organic matter	624.32	7.58%
3	S3	S3t,nr,rc	Topography, danger of erosion, fertility, texture	S3	Erosion control, terassering, cover crops, fertilization, organic matter	112.69	1.37%
4	S2	S2t,nr,rc	Topography, danger of erosion, nutrient fertility and retention, texture	S2	Erosion control, terassering, cover crops, fertilization, organic matter	388.31	4.71%
5	S2	S2t,nr,rc	Topography, danger of erosion, nutrient fertility and retention, texture	S2	Erosion control, terassering, cover crops, fertilization, organic matter	113.36	1.38%
6	S3	S3t,nr,rc	Topography, danger of erosion, fertility, texture	S3	Erosion control, terassering, cover crops, fertilization, organic matter	284.52	3.45%
7	S2	S2t,nr,rc	Topography, danger of erosion, nutrient fertility and retention, texture	S2	Erosion control, terassering, cover crops, fertilization, organic matter	148.70	1.81%
8	S3	S3t,nr,rc	Topography, danger of erosion, fertility, texture	S3	Erosion control, terassering, cover crops, fertilization, organic matter	832.54	10.11%
9	S2	S2t,nr	Topography, danger of erosion, nutrient fertility and retention	S2	Erosion control, terassering, cover crops, fertilization	1,505.99	18.28%
10	S3	S3t,nr,rc	Topography, danger of erosion, fertility, texture	S3	Erosion control, terassering, cover crops, fertilization, organic matter	343.51	4.17%
11	S2	S2t,nr	Topography, danger of erosion, nutrient fertility and retention	S2	Calcification, addition of organic matter, erosion control, drying, cover crops, fertilization	473.57	5.75%
12	S2	S2t,nr	Topography, danger of erosion, nutrient fertility and retention	S2	Erosion control, terassering, cover crops, fertilization	487.81	5.92%
13	S2	S2t,nr	Topography, danger of erosion, nutrient fertility and retention	S2	Erosion control, terassering, fertilization, organic matter	371.84	4.51%
14	S3	S3t,nr,rc	Topography, danger of erosion, fertility, texture	S3	Erosion control, terassering, fertilization, organic matter	666.49	8.09%
15	S3	S3t,nr,rc	Topography, danger of erosion, fertility, texture	S3	Erosion control, terassering, fertilization, organic matter	480.89	5.84%

SPL	Suitability of Actual Land		Limiting Factor	Suitability of Potential Land	Repair Recommendations	Large	
	Class	Sub Class			Input Type	Ha	%
16	S2	S2t,nr	Topography, danger of erosion, nutrient fertility and retention	S2	Erosion control, terassering, fertilization	295.63	3.59%
17	S2	S2t,nr	Topography, danger of erosion, nutrient fertility and retention	S2	Erosion control, terassering, cover crops, fertilization	931.54	11.31%

Information *:*

Land Suitability :
S1 : Very Appropriate
S2 : Sufficiently Appropriate
S3 : According to Marginal
N1 : Not Current

Faktor Pembatas :
t : Topography
rc : Texture
nr : Hara Fertility and Retention

SPL : Land Map Unit

4.3.4. Elements to be included for carbon stocks and GHG emissions

Maintain/enhancing and monitoring plan for protected areas in PT. Agro Abadi Cemerlang

No	Maintain/enhancing	Monitoring	Protected Area	Frequency
1.	Marking participatory protected area boundaries	Maintenance of protected area boundary signs periodically.	HCV area	Once every 6 months
2.	Socialization of boundary signs and protected areas to contractor and PT staff who handle land clearing, construction of roads and other facilities, and maintenance of oil palm plants, harvesting and transportation of palm fruit.	Understanding of contractor / UM staff is related to boundaries and boundaries of protected areas, extension services, and prevention and control of forest and land fires, illegal logging and encroachment in protected areas	HCV area	For employees and contractors, counseling is held every 3 months while for the surrounding community, counseling is conducted every 6 months
3.	Socialization of protected areas to surrounding communities	Understanding of surrounding communities is related to the boundaries and boundaries of protected areas, education, and prevention and control of forest and land fires, illegal logging and encroachment in protected areas	HCV area	
4.	Prevention and control of fire and encroachment disturbances in protected areas through the establishment of task forces	Periodic patrol	HCV area	Simultaneously with site patrol
5.	Inventory and identify land cover in protected areas	Monitor the structure and composition of vegetation	HCV area	Once every 6 months
6.	Rehabilitation and enrichment planting in protected areas	Realization and percentage of life of plants planted in rehabilitation and enrichment activities.	HCV area	Once every 2 months

Greenhouse gas emission reduction strategies for Area PT. Agro Abadi Cemerlang

Operational Stages	Type of activity		Maintain/enhancing Actions Done	
Land Clearing and Planting (Land use change)	1	LC and Planting	1	Conduct land clearing by not burning (zero burning)
			2	Do not open conservation areas and reserve conservation areas
			3	Implement good plantation practices in accordance with the guidelines for oil palm cultivation (for example: No planting in certain sloped areas)
			4	Planting trees in the river border and critical areas
			5	Carry out patrols to prevent land fires
			6	Disseminating information to all levels of workers regarding greenhouse gas emissions mitigation programs in LC and planting activities
	2	Use of machinery / heavy equipment	1	routine maintenance of vehicles and engines
			2	Testing vehicle emissions regularly
			3	Greening planting in strategic places
			4	Make effective and efficient transportation arrangements
			5	Disseminate all workers about the mitigation program of greenhouse gas emissions that may result from the use of fossil fuels to run transportation and machinery
	3	fertilizer	1	Perform effective fertilization according to the dosage in the fertilizer recommendation
			2	Do not do fertilization when it rains
			3	No fertilizer application in river border areas
			4	Disseminating information to all levels of workers regarding the mitigation program for greenhouse gas emissions resulting from fertilization activities
Care and harvesting	1	Use of fossil fuels for transportation (FFB, fertilizers, etc.)	1	routine maintenance of vehicles and engines
			2	Testing vehicle emissions regularly
			3	Greening planting in strategic places
			4	Make effective and efficient transportation arrangements

Operational Stages	Type of activity		Maintain/enhancing Actions Done	
			5	Disseminate all workers about the mitigation program of greenhouse gas emissions that may result from the use of fossil fuels to run transportation and machinery
	2	Fertilization and application of pesticides	1	Perform effective fertilization according to the dosage in the fertilizer recommendation
			2	Do not do fertilization and spraying when it rains
			3	No application of fertilizer and spray in river border areas
			4	Disseminating information to all levels of workers regarding the mitigation program for greenhouse gas emissions resulting from fertilization activities
Housing	1	The use of fossil fuels for diesel engine energy sources that are used as electricity providers	1	Perform regular machine maintenance / service
			2	Conduct periodic emission monitoring
			3	Socializing electricity savings
	2	Garbage decay in landfills	1	Conduct landfill after full landfill

Greenhouse gas emission reduction strategies for mill PT. Agro Abadi Cemerlang

Operational Stages	Type of activity		Maintain/enhancing Actions Done	
Processing and transportation process	1	The use of fossil fuels for combustion in boilers and diesel engines (for electricity sources)	1	Conduct periodic monitoring of boiler and diesel engine emissions
			2	Perform maintenance / service regularly for the machines used
			3	Use biofuels (shells, fiber) to reduce the use of fossil fuels
			4	Providing information to workers regarding the mitigation program of greenhouse gas emissions that can be generated from the processing of FFB into CPO by using fossil fuels as an energy source in boiler and diesel engines
	2	The use of fossil fuels for CPO transportation, an empty run	1	maintenance of vehicles and engines on a regular basis
			2	Testing vehicle emissions regularly
			3	Greening planting in strategic places
			4	Make effective and efficient transportation arrangements
			5	Disseminate all workers about the mitigation program of greenhouse gas emissions that may result from the use of fossil fuels to run transportation and machinery
POME (Palm Oil Mill Effluent)	1	Liquid waste	1	Land aplication
			2	Monitor the physical condition of the POME pool and freeboard level
			3	Perform routine monitoring for POME
	2	empty bunches	1	Used for compost
			2	Used for mulching

CHAPTER 5. REFERENCES

AMDAL of PT Agro Abadi Cemerlang, date July 2014, Conduct and Prepare by PT. Ersarindo Persada West Kalimantan. Indonesia.

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RSPO New Planting Procedure . Endorsed by the Board of Governors on 20th November 2015

Social Impact Assessment (SIA) Report of PT Agro Abadi Cemerlang, date July 2019, Conduct and Prepare by Kresno Dwi Santosa, et.al. West Java, Indonesia

CHAPTER 6. INTERNAL RESPONSIBILITY

The oil palm grower signs to confirm that the necessary assessment have been done and completed in accordance to the relevant RSPO procedure.

Sign of Behalf SIA Assessor

Ir. Kresno Dwi Santosa, MSi.
Lead Assessor

Date :

Sign of Behalf HCV Assessor

Ir. Kresno Dwi Santosa, MSi.
PT. Sonokeling Akreditas Nusantara

Date :

Sign of Behalf LUCA Assessor

Kasuma Wijaya, S.Hut., MSi.
Lead Assessor

Date :

Sign of Behalf CSA/GHG Assessor

Kasuma Wijaya, S.Hut., MSi.
Lead Assessor

Date :

The implementation of the management and mitigation plan will be carried out, to follow each of the propossed management plan.

Dr. Faizal Amri Amran
Head Sustainability
Date : 22 Juli 2019 .

Contact Person :

PT. Agro Abadi Cemerlang

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