CETRAL SERAM IFM RestorationWise PROJECT

Document Prepared by

Project title	CETRAL SERAM IFM RestorationWise PROJECT
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Project location	Central Seram Region, Maluku Province, Indonesia
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History of CCB status	First application
Gold Level criteria	The Central Seram IFM RestorationWise Project (CSIR) will meet the Gold Level criteria for community and biodiversity as summarized below. GL2: Exceptional Community Benefits with Direct Benefits, Community Engagement and Sustainability. CSIR will create Sustainable Income Generating Scheme (SIGS) Groups (SDG1: No Poverty) through implementing a High Conservation Value (HCV) Agarwood Restoration with high protein legume tree companion planting and provide chicken/goat raising (SDG2: Zero Hunger) and other NTFPs. The Project will improve the skills and/or knowledge and health service of community members through dental/oral education enhancement/training, mobile service and telehealth/telemedicine health/hygiene facilities enhancement to community members (SDG3: Good Health and Well-Being). These SIGS groups will empower the communities by creating new jobs with gender equality (SDG5: Gender Equality) and sustainable income through the Education, Communities Participatory Engagement (SDG8: Decent Work and Economic Growth) and a Micro-Finance assistance to sustainable agriculture, community-based ecotourism and sustainable management of natural resources (SDG9: Industry, Innovation and Infrastructure). CSIR will Achieve 12 SDGs by building clean water reservoir and filter system in project accounting area villages (SDG6: Clean Water and Sanitation), which will greatly improve the community members wellbeing. GL3: Exceptional Biodiversity Benefits with efforts to protect endangered species, restore habitats, and maintain ecosystem functions.
Expected verification schedule	TBD
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SUMMARY OF PROJECT BENEFITS

The Central Seram IFM and Agarwood ForestWise Project (CSIR) will bring the following benefits for climate, community and biodiversity as summarized below. 12 SDGs

1.1 Unique Project Benefits

Outcome or impact estimated by the end of project lifetime	Section reference
1) Building RestorationWise Silviculture (hereafter referred to as 'CSIR') System and a Sustainable Agri-Ecosystem Land Uses by CSIR to form the Sustainable Income Generating Scheme (hereafter referred to as 'SIGS'): The SIGS groups will be built each plantation will combine with silviculture chicken /goat husbandry, at the same time establishing the High Conservation Value (HCV) Agarwood Restoration system by restoring the CITES Appendix II Critical Endangered Agarwood species with microbial Inoculation, intercropping with Sesbania Nitrogen Fixation to eliminating artificial fertilizer. FWARA plantation will be built with this SIGS groups. The project aims to improve the livelihood of the Project Accounting Area (PAA) surrounding communities by the above-mentioned SIGS to decrease the dependence on the clearing additional land. The project will also provide direct Employment and Training on Sustainable Income Generating Scheme. These Agarwood restoration/productions will build up feature rich Eco-Tourism.	*4.1.2* *4.1.3* *4.2.1* *4.2.4*
2) Strengthening Community Organizations and Improve Health Facilities and Care: The CSIR project will improve the dental/oral health by adding a mobile dental annual service, work with all the clinics/hospitals in increasing support to health care capability by investing *in telecommunication* infrastructure, telehealth, telemedicine by team up nternational medical teams, provide drone medical supply to the remote islands. CSIR will also build drinking water wells, reservoirs and purification system, solar panel systems, sanitation and support for outreach (hand washing stands at local schools). Improvement of the emergency mobility by adding ambulances. Enhance the capability by potentially building the telemedicine infrastructure.	*4.2.1* *4.4.1* *4.5*
3) Micro-finance set up: The CSIR Project will revolve micro-finance fund, micro-loans, micro-insurance and family savings system to support CSIR/NTFP activities to the local communities especially the chicken/goat raising and other NTFPs, thus	*4.2.1* *4.2.1* *4.2.3*

providing more sustainable and valuable alternatives to current destructive forest practices. The one most important use of the revenue from the carbon credit sales will be directly supporting the Sustainable Income Generating Scheme of Agarwood, Sesbania plantation and Chicken/goat raising and other NTFPs through the Micro-finance.	
4) Enhanced Forest Conservation and Law Enforcement combined with Sensitization and Awareness Raising: A current ranger/community watch-post combination will be enhanced in function to address the threats to the Project zone landscape by additional recruitments and educations. The continuous forest conservation and SIGS education program will build up the sensitization and awareness of ecosystem protection. The forest ecosystem conservation will be fortified by ranger/community watch-post members integrated with community by a participatory framework.	*4.2.1* *5.1.1* *5.2.1* *5.4.1*

1.2 Standardized Benefit Metrics

Category	Metric	Estimated by the end of project lifetime	Section reference
GHG emission reductions or carbon dioxide removals	Net estimated removals in the project zone, measured against the without-project scenario	Not Applicable	N/A
	Net estimated reductions in the project zone, measured against the without-project scenario	NER_Project	3.2.4.2
Forest[1] cover	For REDD[2] projects: Estimated number of hectares of reduced forest loss in the project zone measured against the without-project scenario	Not Applicable	N/A
	For ARR[3] projects: Estimated number of hectares of forest cover increased in the project zone measured against the without-project scenario.	Not seeking carbon credits at the time being.	2.1.18 3.1.2
Improved land management	Number of hectares of existing production forest land in which IFM[4] practices are expected to occur as a result of project activities, measured against the without-project scenario	57,548	N/A
	Number of hectares of non-forest land in which improved land management practices are expected to occur as a result of project activities, measured against the without-project scenario	BLM+GES2_NonForest	N/A

[1] Land with woody vegetation that meets an internationally accepted definition (e.g., UNFCCC, FAO, or IPCC) of what constitutes a forest, which includes threshold parameters, such as minimum forest area, tree height and level of crown cover, and may include mature, secondary, degraded and wetland forests (VCS Program Definitions)

[2] Reduced emissions from deforestation and forest degradation (REDD) - Activities that reduce GHG emissions by slowing or stopping conversion of forests to non-forest land and/or reduce the degradation of forest land where forest biomass is lost (VCS Program Definitions)

[3] Afforestation, reforestation and revegetation (ARR) - Activities that increase carbon stocks in woody biomass (and in some cases soils) by establishing, increasing and/or restoring vegetative cover through the planting, sowing and/or human-assisted natural regeneration of woody vegetation (VCS Program Definitions)

[4] Improved forest management (IFM) - Activities that change forest management practices and increase carbon stock on forest lands managed for wood products such as saw timber, pulpwood, and fuelwood (VCS Program Definitions)

Training	Total number of community members who are expected to have improved skills and/or knowledge resulting from training provided as part of project activities	About 10% of Total_Population= 2000 person	2.1.15 4.2.1 4.4.1
	Number of female community members who are expected to have improved skills and/or knowledge resulting from training as part of project activities	About 1/2 of Total_Population= 10,000person	2.1.15 4.2.1 4.4.1
Employment	Total number of people expected to be employed in project activities[5], expressed as number of full-time employees[6]	About Full_Time_Employee full time employees	2.1.15 4.2.1 4.4.1
	Number of women expected to be employed as a result of project activities, expressed as number of full-time employees	Half of Full_Time_Employee About 1000 people	2.1.15 4.2.1 4.4.1
Livelihoods	Total number of people expected to have improved livelihoods[7] or income generated as a result of project activities	Full_Time_Employee 2000 people	2.1.15 4.2.1 4.4.1
	Number of women expected to have improved livelihoods or income generated as a result of project activities	About 1000 people (1/2 of Full_Time_Employee) based on local women/men distribution 50:50 estimation[8]	2.1.15 4.2.1 4.4.1
Health	Total number of people for whom health services are expected to improve as a result of project activities, measured against the without-project scenario	Total_Population About 15,000 people	2.1.15 4.2.1 4.4.1

[5] Employed in project activities means people directly working on project activities in return for compensation (financial or otherwise), including employees, contracted workers, sub-contracted workers and community members that are paid to carry out project-related work.

[6] Full time equivalency is calculated as the total number of hours worked (by full-time, part-time, temporary and/or seasonal staff) divided by the average number of hours worked in full-time jobs within the country, region or economic territory (adapted from the UN System of National Accounts (1993) paragraphs 17.14[15.102];[17.28])

[7] Livelihoods are the capabilities, assets (including material and social resources) and activities required for a means of living (Krantz, Lasse, 2001. The Sustainable Livelihood Approach to Poverty Reduction. SIDA). Livelihood benefits may include benefits reported in the Employment metrics of this table.

[8] https://maluku.bps.go.id/id/statistics-table/2/MTA3IzI=/rasio-jenis-kelamin-menurut-kabupaten-kota-di-maluku.html

	Number of women for whom health services are expected to improve as a result of project activities, measured against the without-project scenario	Total_Population About 50% of 15,000= 7,500 women	2.1.15 4.2.1 4.4.1
Education	Total number of people for whom access to, or quality of, education is expected to improve as result of project activities, measured against the without-project scenario	Entire Project zone: About 15,000 people	2.1.15 4.2.1 4.4.1
	Number of women and girls for whom access to, or quality of, education is expected to improve as result of project activities, measured against the without-project scenario	About 50% of the above population	2.1.15 4.2.1 4.4.1
Water	Total number of people who are expected to experience increased water quality and/or improved access to drinking water as a result of project activities, measured against the without-project scenario	Total_Population About 15,000 people	2.1.15 4.2.1 4.4.1
	Number of women who are expected to experience increased water quality and/or improved access to drinking water as a result of project activities, measured against the without-project scenario	About 50% of Total_Population 15,000 = 7,500 women	4.2.1 4.4.1
Well-being	Total number of community members whose well-being[9] is expected to improve as a result of project activities	About Total_Population 15,000 people	4.2.1 4.4.1
	Number of women whose well-being is expected to improve as a result of project activities	About 50% of Total_Population 15,000 = 7,500 women	4.2.1 4.4.1
Biodiversity	Expected change in the number of hectares managed significantly better by the project	57,548 ha	2.1.18 4.1.3

[9] Well-being is people's experience of the quality of their lives. Well-being benefits may include benefits reported in other metrics of this table (e.g. Training, Employment, Livelihoods, Health, Education and Water), and may also include other benefits such as strengthened legal rights to resources, increased food security, conservation of access to areas of cultural significance, etc.

conservation	for biodiversity conservation[10], measured against the without-project scenario		
	Expected number of globally Critically Endangered or Endangered species [11] benefiting from reduced threats as a result of project activities[12], measured against the without-project scenario	Endangered_Sp Vulnerable, Critically Endangered and Endangered species occurring in the project zone. Including Agarwood Aquilaria malaccensis(CR), Aquilaria hirta (VU), Aquilaria cumingiana(VU), Aquilaria filaria (VU), and Gyrinops decipiens (EN), Gyrinops salicifolia (EN), Gyrinops moluccana (EN) and Gyrinops versteegii (VU[13]). Shorea selanica (CR), Shorea montigena (CR), Lorius domicella (VU), Monarcha boanensis (CR)	5.4.1 5.5.2 2.1.18

[10] Managed for biodiversity conservation in this context means areas where specific management measures are being implemented as a part of project activities with an objective of enhancing biodiversity conservation, e.g. enhancing the status of endangered species

[11] Per IUCN's Red List of Threatened Species

[12] In the absence of direct population or occupancy measures, measurement of reduced threats may be used as evidence of benefit

[13] https://cites.org/sites/default/files/documents/E-CoP19-Inf-05-R1.pdf

2 PROJECT DETAILS

2.1 Project Goals, Design and Long-Term Viability

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

The Project Zone involves in Central Seram Region, Maluku Province, Indonesia of total area of 57,748 ha, and geographical coordination is -3.0893 ~ -3.4675 S, 128.8178 ~129.6464 E. Project zone is distributed in 5 sub-districts including Tehoru, Teluk Elpaputih, Teon Nila Serua, Kota Masohi and Amahai.

There are 2 Project Accounting Area (PAA):

PAA1: BLM_Forest ha Improved Forest Management from logged to protect.

PAA2: GES2_Forest ha Improved Forest Management from logged to protect

There is 1 Project Agarwood Restoration Area (PARA) not counted for carbon credites:

PARA1: Agarwood Restoration Plantation.

CSIR IFM project implements measures designed to protect the natural ecosystems in the above mentioned PAAs, with a focus on preventing the main drivers of deforestation and conversion in these PAAS. These activities provide new opportunities to change the agents' behavior and include:

- increased employment opportunities, and implementations of sustainable income generating scheme (SIGS) activities throughout PA.
- Improve the general welfare of local community with the UN SDGs framework.
- training and equipping and build a participatory ranger force by government rangers with community watch-posts in order to maintain control over the PA and enforce the law and protect forest from illegal logging and poaching.
- empowerment with local communities NTFP, with microfinance through cooperatives to convert deforestation activities to forest protection.

Project objectives and activities are designed to benefit climate, communities and biodiversity in this area. The objectives of each of these components are as follows:

Climate Objectives

- Reduce CO_2 emissions resulting from the PAAs Improved Forest Management From Logged to Protect Forest of 33,989,500 tCO_2e in crediting period from 15 Auguest 2022 to 14 Auguest 2047.

Community Objectives

- Improve *community welfare* by Sustainable *Income* Generation Groups (SIGG), Creating local foods in meat/egg and milk with SIGG, have clean and safe drinking water in villages, equality of women, having good dental oral health, improve q*uality* of e*ducation* and *gender equality,* construct affordable solar energy to villages.
- Implement Sustainable Income Generation Scheme by forming Agarwood_Plantation Agarwood plantation and other NTFP generation groups.

- Promote and support local community development

Biodiversity Objectives

- Maintain habitat for viable, abundant and diverse natural populations of High Conservation Value of Fauna and Flora.
- Reduce threats to rare, threatened, endangered and vulnerable Fauna and Flora

2.1.2 Audit History (VCS, 4.1)

2.1.3 Sectoral Scope and Project Type (VCS, 3.2)

Sectoral scope	14: Agriculture, forestry, and other land use
AFOLU project category [14]	Improved Forest Management (IFM)
Project activity type	Logged to Protected Forest

2.1.4 Project Eligibility (VCS, 2.1.1, 3.1, 3.6, 3.8, 3.18, 4.1; APPENDIX 1 ELIGIBLE AFOLU PROJECT CATEGORIES for REDD; CCB Program Rules, 4.2.4, 4.6.4)

The scope of VCS 2.1.1 Program requirements have been discussed following:

1) The seven Kyoto Protocol greenhouse gases.

CO_2, Included

CH_4, Not Included

N_2O, Not Included

HFC_s, Not Included

PFC_s, Not Included

SF_6, Not Included

NF_3, Not Included

2) Ozone-depleting substances (ODS).

CFCs, Not Included

HCFCs, Not Included

Halons, Not Included

Methyl Bromide, Not Included

CCl4, Not Included

1,1,1-trichloroethane, Not Included

HBFCs, Not Included

[14] See Appendix 1 of the VCS Standard

3) Project activities supported by a methodology approved under the VCS Program through the methodology development and review process.

VCS VM0010 V 1.4

4) Project activities supported by a methodology approved under an approved GHG program, unless explicitly excluded (see the Verra website for exclusions).

N/A

5) Jurisdictional REDD+ programs and nested REDD+ projects as set out in the Jurisdictional and Nested REDD+ (JNR) Requirements.

N/A

The scope of VCS 3.1 Program requirements have been discussed following:

VCS 3.1.1. Projects shall meet all applicable rules and requirements set out under the VCS Program, including this document. Projects shall be guided by the principles set out in Section 2.2.1.

Described above.

VCS 3.1.2 Projects shall apply methodologies eligible under the VCS Program. Methodologies shall be applied in full, including the full application of any tools or modules referred to by a methodology, noting the exception set out in Section 3.14.1.

The current applied methodology is VCS methodology VM0010 in full and project activities has not be mandated by any law, statute, or other regulatory framework, or for UNFCCC non-Annex I countries, any systematically enforced law, statute, or other regulatory framework.

VCS 3.1.3 Projects shall apply the latest version of the applicable methodology in all cases unless a grace period applies to the project as set out in 3.22 below. Projects shall update to the latest version of the methodology when reassessing the baseline or renewing a crediting period.

The current applied methodology is VCS methodology VM0010 Version 1.4, October 24, 2024, which is the newest version. Also VCS Standard v4.7 16 April 2024. Project Template CCB 3.0 VCS 4.3.

VCS 3.1.4 Projects and the implementation of project activities shall not lead to the violation of any applicable law, regardless of whether or not the law is enforced.

Project activities have not violated any applicable laws. (see section 3.1.2 and 3.1.5)

VCS 3.1.5 Where projects apply methodologies that permit the project proponent its own choice of model (see the VCS Program Definitions for the definition of model), the model shall meet the requirements set out in the VCS Methodology Requirements, and it shall be demonstrated at validation that the model is appropriate to the project circumstances (i.e., use of the model will lead to an appropriate quantification of GHG emission reductions or carbon dioxide removals).

Project uses VM0010 methodology standards and demonstrates all calculation according to the Methodology. (section 3.2)

VCS 3.1.6 Where projects apply methodologies that permit the project proponent to choose

a third-party default factor or standard to ascertain GHG emission data and any supporting data for establishing baseline scenarios and demonstrating additionality, such default factor or standard shall meet the requirements set out in the VCS Methodology Requirements.

All third-party default factor or standard to ascertain GHG emission data are quoted from FAO, IPCC, Indonesia Government publication and published scientific papers.

VCS 3.1.7 Where the rules and requirements under an approved GHG program conflict with the rules and requirements of the VCS Program, the rules and requirements of the VCS Program shall take precedence.

There is no conflict of GHG program with VCS program in this project.

VCS 3.1.8 Where projects apply methodologies from approved GHG programs, they shall conform with any specified capacity limits (see the VCS Program Definitions for the definition of capacity limit) and any other relevant requirements set out with respect to the application of the methodology and/or tools referenced by the methodology under those programs.

The project follows the delineation of capacity limit.

VCS 3.1.9 Where Verra issues new VCS Program rules, the effective dates of these requirements are set out in Appendix 3 Document History and Effective Dates or equivalent for other program documents, and are listed in a companion Summary of Effective Dates document which corresponds with each update.

The most recent and effective version of VCS standards (v4.7) Project description document template (CCB 3.0 VCS 4.3) is used followed the effective date.

CCB Program Rules, 4.2.4,4.6.4

CCB 4.2.4 VCS shall receive the validation and/or verification report and validation and/or verification statement within one year of the initiation of the relevant public comment period.

Project Complied

CCB 4.6.4 The public comment period should be completed before the start of the validation/verification body site visit, so that the validation/verification body may make appropriate enquiries onsite about any comments received. In the event that the public comment period ends after the site visit is complete, the validation/verification body shall give full consideration to any comments received and may need to return to the project site to do so.

The first Public comment will be listed after the project listing. The responses will be listed at section 2.3.10 Table 10 afterward.

VCS 3.2 AFOLU-Sepcific matter of VCS standard: 3.2.1-3.2.8

VCS 3.2.1 There are currently six AFOLU project categories eligible under the VCS Program.

The project is eligible under the scope of the VCS program as a Improved Forest Management (IFM) project. It does not include Reduced Emissions from Deforestation and Degradation (REDD) afforestation, reforestation and revegetation (ARR),

agricultural land management (ALM), avoided conversion of grasslands and shrublands (ACoGS), and wetland restoration and conservation (WRC).

VCS 3.2.2 Where projects are located within a jurisdiction covered by a jurisdictional REDD+ program, project proponents shall follow the requirements in this document and the requirements related to nested projects set out in the Jurisdictional and Nested REDD+ Requirements.

The project is not a Jurisdictional and Nested REDD+ project.

VCS 3.2.3 Where an implementation partner is acting in partnership with the project proponent, the implementation partner shall be identified in the project description. The implementation partner shall identify its roles and responsibilities with respect to the project, including but not limited to implementation, management, and monitoring of the project, over the project crediting period.

No implementation partner is acting in partnership with the project proponent.

VCS 3.2.4 The project proponent shall demonstrate that project activities that lead to the intended GHG benefit have been implemented during each verification period in accordance with the project design. Where no new project activities have been implemented during a verification period, project proponents shall demonstrate that previously implemented project activities continued to be implemented during the verification period (e.g., forest patrols or improved agricultural practices of community members).

As this is before the first monitoring validation verification period, the intended GHG benefit have been implemented according to the project design and there is no new project activities.

VCS 3.2.5 For all IFM, Avoiding Planned Deforestation (APD) (except where the agent is unknown), Restoring Wetland Ecosystems (RWE), Avoiding Planned Wetland Degradation (APWD), Avoiding Planned Conversion (APC), and ALM project types, the project proponent shall, for the duration of the project, reassess the baseline every ten years.

The project areas include IFM and will reassess the baseline every 10 years.

VCS 3.2.6 The following shall apply with respect to the baseline reassessment:

1) The latest version of the VCS Program rules (including the latest version of the VCS Standard) and applied methodology, or its replacement shall be applied at the time of baseline reassessment. The grace periods for using the previous version of a methodology are set out in Section 3.22 and in the document history section of each VCS Program document.

   Project Complied.

2) The baseline shall be reassessed in accordance with the timelines in Section 3.2.5 above and shall be validated at the same time as the subsequent verification.

Project Complied.

3) The reassessment will capture changes in the drivers and/or behavior of agents that cause the change in land use, hydrology, sediment supply and/or land or water management practices and changes in carbon stocks, all of which shall then be incorporated into revised estimates of the rates and patterns of land-use change and estimates of baseline emissions.

   The project reassessment will comply.

4) The validity of the original baseline scenario shall be reassessed. Such assessment shall include an evaluation of the impact of new relevant national and/or sectoral policies and circumstances on the validity of the baseline scenario. If still valid, the GHG emissions associated with the original baseline scenario shall be reassessed for the new baseline validity period following the provisions of the applied methodology. If no longer valid, the current baseline scenario shall be established in accordance with the VCS Program rules.

   The project reassessment will comply.

5) Ex-ante baseline projections beyond the baseline reassessment period specified in Section 3.2.5 above are not required.

   The project reassessment will comply.

6) Sections 1.14, 3.1-3.4, Section 4 and Section 5 of the project description shall be updated to reflect any changes as described in Section 3.2.6 (3) and any updates to the baseline emissions quantifications.

   The Project will comply.

VCS 3.2.7 The following shall apply with respect to Agricultural Land Management ALM baseline reassessment:

This project is not a ALM project.

VCS 3.2.8 Where ARR, ALM, IFM or REDD project activities occur on wetlands, the project shall adhere to both the respective project category requirements and the WRC requirements,

This project is not a project. on wetland

Appendix 1 Eligible AFOLU Project Categories regarding IFM (A1.3-1.4)

VCS A1.3 Eligible IFM activities are those that increase carbon sequestration and/or reduce GHG emissions on forest lands managed for wood products such as sawtimber, pulpwood and fuelwood by increasing biomass carbon stocks through improving forest management practices. The baseline and project scenarios for the project area shall qualify as forests remaining as forests, such as set out in the 2019 Refinement to the 2006 IPCC Guidelines for National GHG Inventories, and the project area shall be designated, sanctioned or

approved for wood product management by a national or local regulatory body (e.g., as logging concessions or plantations).

The Project Area definition of forest as set by the Indonesia Ministry of Environment and Forestry, who is the designated national authority (DNA) as "a land area of more than 0.25 hectares with trees higher than 5 metres at maturity and a canopy cover of more than 30 percent (reference 38) for more than 10 years.

VCS A1.4 Various sanctioned forest management activities may be changed to increase carbon stocks and/or reduce emissions, but only a subset of these activities make a measurable difference to the long-term increase in net GHG emissions compared to the baseline scenario. Eligible IFM activities include:

1) Reduced Impact Logging (RIL): This category includes practices that reduce net GHG emissions by switching from conventional logging to RIL during timber harvesting.

2) Logged to Protected Forest (LtPF): This category includes practices that reduce net GHG emissions by permanently converting logged forests to protected forests. By eliminating harvesting for timber, biomass carbon stocks are protected and can increase as the forest re-grows and/or continues to grow. Harvesting of trees to advance conservation purposes (e.g., the removal of diseased trees) may continue in the project scenario.

3) Extended Rotation Age / Cutting Cycle (ERA): This category includes practices that reduce net GHG emissions of evenly aged managed forests by extending the rotation age or cutting cycle and increasing carbon stocks.

4) Low-Productive to High-Productive Forest (LtHP): This category includes practices that increase carbon sequestration by converting low-productivity forests to high-productivity forests. Note - Activities that reduce GHG emissions from unsanctioned forest degradation (e.g., illegal logging) are considered REDD activities. Activities that degrade wetlands to increase forest production are not eligible.

The CSIR Project is a Logged to Protected Forest (LtPF) project and complied the VCS A1.4 (2).

For Justifying and demonstrating that the project activity is included under VCS Scope 14, that the correct AFOLU project category was selected, and that all related category requirements are met as following.

There are 3 project activities PAA1, PAA2, all three are eligible under REDD. The first one is to prevent conversion from forest to farmland. The second one is to prevent legal logging. And the third one is to prevent illegal logging within the project zone. The project activities have been designed as part of the REDD+ project with the intention of reducing carbon emissions from planned deforestation, degradation and unplanned deforestation compared to baseline levels.

For projects seeking registration/validation approval, provide the relevant information to demonstrate that the project underwent public comment prior to the opening meeting with the validation/verification body and the validation report and validation statement was submitted within one year of the initiation of the public comment period.

CSIR submitted: 2023 April 20

Public comment period: TBD

Public comment expiration date: TBD

The current applied methodology is VCS methodology VM0010

VVB on site validation: TBD.

The project was submitted on 2025 April 15, within 3 years of its project start date.

The Project meets all Verra specified deadline.

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

No CPA included in this project: Not applicable

2.1.6 Project Design (VCS, 3.6)

Indicate if the project has been designed as:

☐ Single location or installation

☒ Multiple locations or project activity instances (but not a grouped project)

☐ Grouped project

2.1.6.1 Eligibility Criteria for Grouped Projects (VCS, 3.6; CCB, G1.14)

Not Grouped Project: Not applicable

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

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	Desa/Kelurahan Kwitang, Kec. Senen, Kota Adm. Jakarta Pusat, Provinsi DKI Jakarta
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2.1.8 Other Entities Involved in the Project

Organization name	Sinetics Accreditation International Taiwan Ltd.
Role in the project	Technical Advisor
Contact person	Kai-Hsien Chen. Ph. D.
Title	President
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2.1.9 Project Ownership (VCS, 3.2, 3.7, 3.10; CCB, G5.8)

Conditions Prior to Project Initiation:

The Central Seram IFM RestorationWise Project (CSIR) officially commenced on **15 August, 2022**. The project area comprises two adjacent forestry concessions located in Central Maluku Regency, Maluku Province, Indonesia, totaling approximately **57,748 hectares**:

- **Site 1 (BLM - PAA1, ±24,550 Ha):** Held by PT. Bintang Lima Makmur (PT. BLM) under IUPHHK-HA No. SK.537/Menhut-II/2012 (valid 2012-2057). This site was legally designated for commercial logging (primarily HPT). PT. BLM had a detailed, government-approved Work Plan (RKUPHHK-HA 2016-2025, based on IHMB, approved via SK.16/UHP-1/2015 and revised via SK.10084/2019). This plan

mandated selective logging (TPTI system, ≥50cm limit) across an effective production area of ±19,655 ha, projecting an average annual harvest of **681.5 ha** yielding **~30,861 m³** (File 3, Table 3.11). PT. BLM actively logged from 2016-2022

- **Site 2 (GES Unit II - PAA2, ±33,198 Ha):** Held by PT. Green Ekonomi Sejahtera (PT. GES) under a forestry concession license (exact decree TBC, but license acknowledged in **GES2 Recommendation Letter.pdf**). This site was also legally designated for commercial logging. However, unlike BLM, detailed government-approved RKU/RKT documents specifying harvest plans for GES2 are not available. The MoEF recommendation letter supports the planned transition from logging to protection. Therefore, the likely baseline logging activity for GES2 is credibly estimated **by proxy** using BLM's approved plans and intensity (see Section 2.2.2 and 3.1.4 for detailed proxy justification and calculation), suggesting a planned annual harvest of approx. **923 ha** yielding approx. **41,850 m³** within its estimated effective production area (~26,558 ha). Similar to BLM, the post-2022 operational pause likely increased degradation risks prior to the project.

  Combined Baseline Activity: Prior to AAD securing rights and initiating the CSIR project, the combined project area (~57,748 ha) faced a credible, legally sanctioned baseline scenario involving planned annual selective logging across approx. **1,605 hectares**, yielding approx. **72,711 m³** of commercial timber per year, alongside risks of uncontrolled degradation.

Both concessions are situated on State Forest Land legally designated primarily as Limited Production Forest (Hutan Produksi Terbatas - HPT) with some areas potentially designated as Production Forest (Hutan Produksi - HP), mandating forest management with commercial timber harvesting as the primary objective under Indonesian law prior to this project's intervention.

2.1.10 Project Start Date (VCS, 3.8)

Project start date	15-Auguest-2022
Justification	Project Accounting Area start at the same date as 15 Auguest 2022 per AAD signed a MOU with PT BLM on the CSIR IFM from Logged to Forest Protection.

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

Crediting period	The project lifetime will be 25 years from the Project start date of 15 August, 2022 and an end date of 14 August, 2047 The GHG accounting period will be the same 25 years as the lifetime of the project. (Annex. 1 Forest Protection and Agarwood Development Contract. Contract with PT BLM and PT GES2 for ownership transfer, dated 9 July 2019)
Start date of first or fixed crediting period	15-Auguest-2022
CCB benefits assessment period	15-Auguest-2022 to 14-Auguest-2047

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

The GHG emissions accounting, climate adaptive capacity and resilience, community, and/or biodiversity assessment periods are identical for the CSIR. The project lifetime will be 25 years commencing from 15 Auguest 2022 to 14 Auguest 2047. The GHG accounting period will be the same 25 years as the lifetime of the project as climate adaptive capacity and resilience, community, and biodiversity assessment periods.

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

Indicate the estimated annual GHG emission reductions/carbon dioxide removals (ERRs) of the project:

☐ < 300,000 tCO_2e/year (project)

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

Calendar year of crediting period	Estimated reductions (tCO_2e)	Estimated removals (tCO_2e)
15-Auguest-2022 to 31-December-2022	663,334	829,168
01-January-2023 to 31-December-2023	550,952	688,690
01-January-2024 to 31-December-2024	589,820	737,275

01-January-2025 to 31-December-2025	629,267	786,584
01-January-2026 to 31-December-2026	659,482	824,353
01-January-2027 to 31-December-2027	702,740	878,425
01-January-2028 to 31-December-2028	757,453	946,817
01-January-2029 to 31-December-2029	813,761	1,017,201
01-January-2030 to 31-December-2030	874,598	1,093,248
01-January-2031 to 31-December-2031	922,643	1,153,303
01-January-2032 to 31-December-2032	882,072	1,102,590
01-January-2033 to 31-December-2033	910,898	1,138,622
01-January-2034 to 31-December-2034	950,868	1,188,585
01-January-2035 to 31-December-2035	1,003,591	1,254,489
01-January-2036 to 31-December-2036	1,050,293	1,312,866
01-January-2037 to 31-December-2037	1,117,681	1,397,101
01-January-2038 to 31-December-2038	1,166,853	1,458,566
01-January-2039 to 31-December-2039	1,219,531	1,524,413
01-January-2040 to 31-December-2040	1,284,611	1,605,763
01-January-2041 to 31-December-2041	1,373,299	1,716,624
01-January-2042 to 31-December-2042	1,438,432	1,798,040
01-January-2043 to 31-December-2043	1,472,379	1,840,474
01-January-2044 to 31-December-2044	1,574,168	1,967,710
01-January-2045 to 31-December-2045	1,649,893	2,062,366
01-January-2046 to 31-December-2046	1,714,325	2,142,906
01-January-2047 to 31-Auguest-2047	1,813,920	2,267,400
Total number of years	25	

Average annual ERRs	1,099,266	1,374,083

2.1.14 Physical Parameters (CCB, G1.3)

Topography

The island of Seram originated as part of the Sula Spur (22. Jonathan Pownall and Hall, 2014) a promontory of Australian crust located at the leading edge of the Australian Plate that collided with part of Sulawesi after subduction of the eastern Ceno-Tethys beneath the North Sulawesi-Philippines- Halmahera volcanic arc (16. Hall, 2012). The Australian–SE Asian collision, which began at c. 25 Ma (15. Hall, 2011), is still underway.

The CSIR project zone is located in central Seram which mainly comprises lower-greenschist to upper-amphibolite facies phyllites, schists, and gneisses of the Tehoru Formation. Garnet mica- schists are widespread, which are often intercalated with amphibolites. Scarce kyanite-grade schists (containing also staurolite and garnet) represent the highest grade part of the complex; however, large areas are of a low metamorphic grade and preserve original sedimentary structures (22. Pownall and Hall, 2014).

The Project zone includes 2 logging consseions and one sixth of the Central Seram cover mostly Primary Dry Land Forest ranging from 10m. asl along the coastal plain to small portion of hill at 1040 m. asl. is at an altitude of 200 – 500 m. asl. However, the dominance of the altitude is in the interval 0-200 m. asl.

.

The Geological Criteria of Project zone composted largely by Kanikeh Formation, Mafic Rock and Kelang volcanic rocks, followed by tehuru complex, Uli tectonic unit, Aluvium and Reef Limestone close to the coast line. A small area of Lava embeds in Kanikeh Formation.

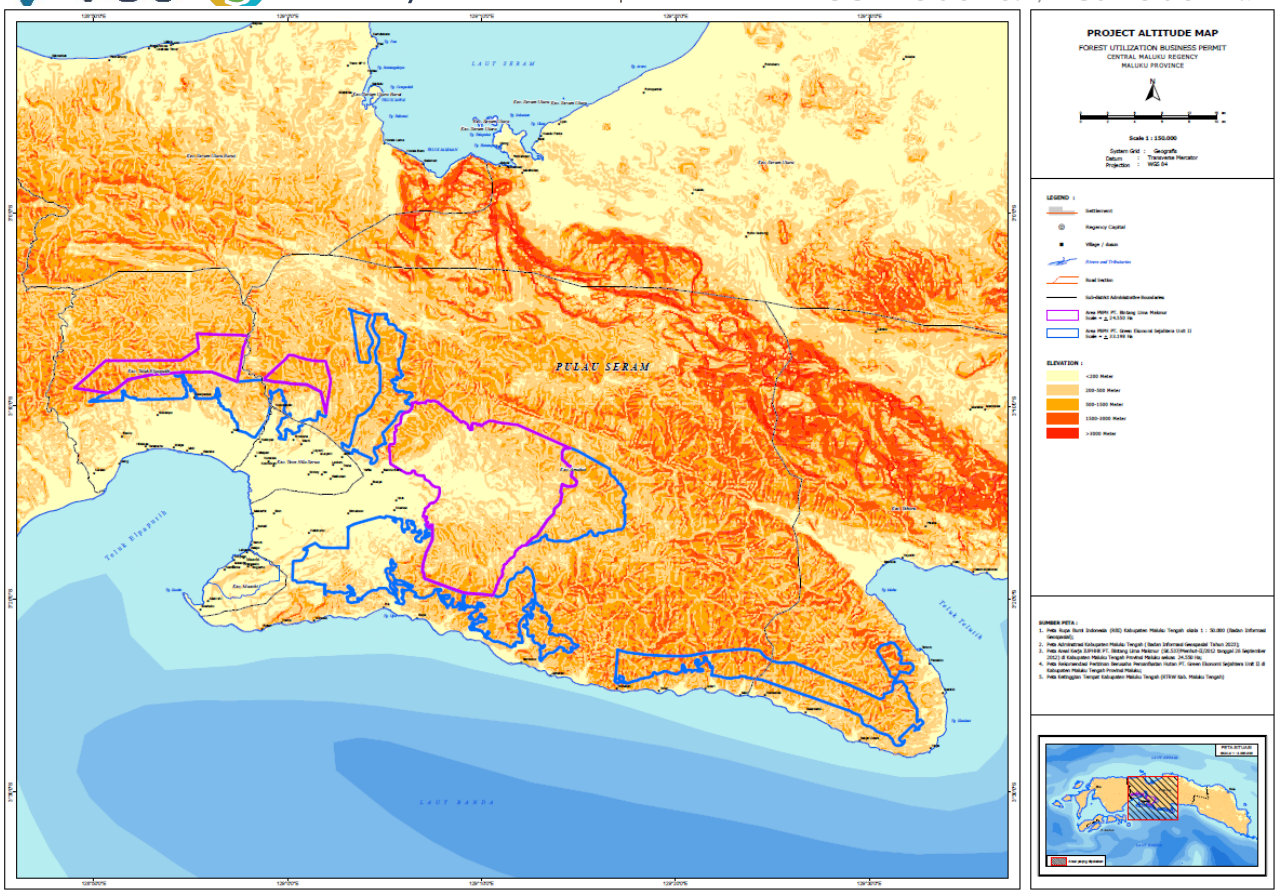


Figure 2-1. Map of the elevation within the project

Based on land slope class, the working area of BLM and GES2 have land with a slope level of mostly slow slopes (5-40%) covering an area of ± 57,748 ha while the smallest slope class is a flat slope class (0-8%) covering an area of 4,877.55 ha or 13.28% of the area of Central Seram (Appendix A6. 2022 Slope Map, Central Seram, Indonesia).

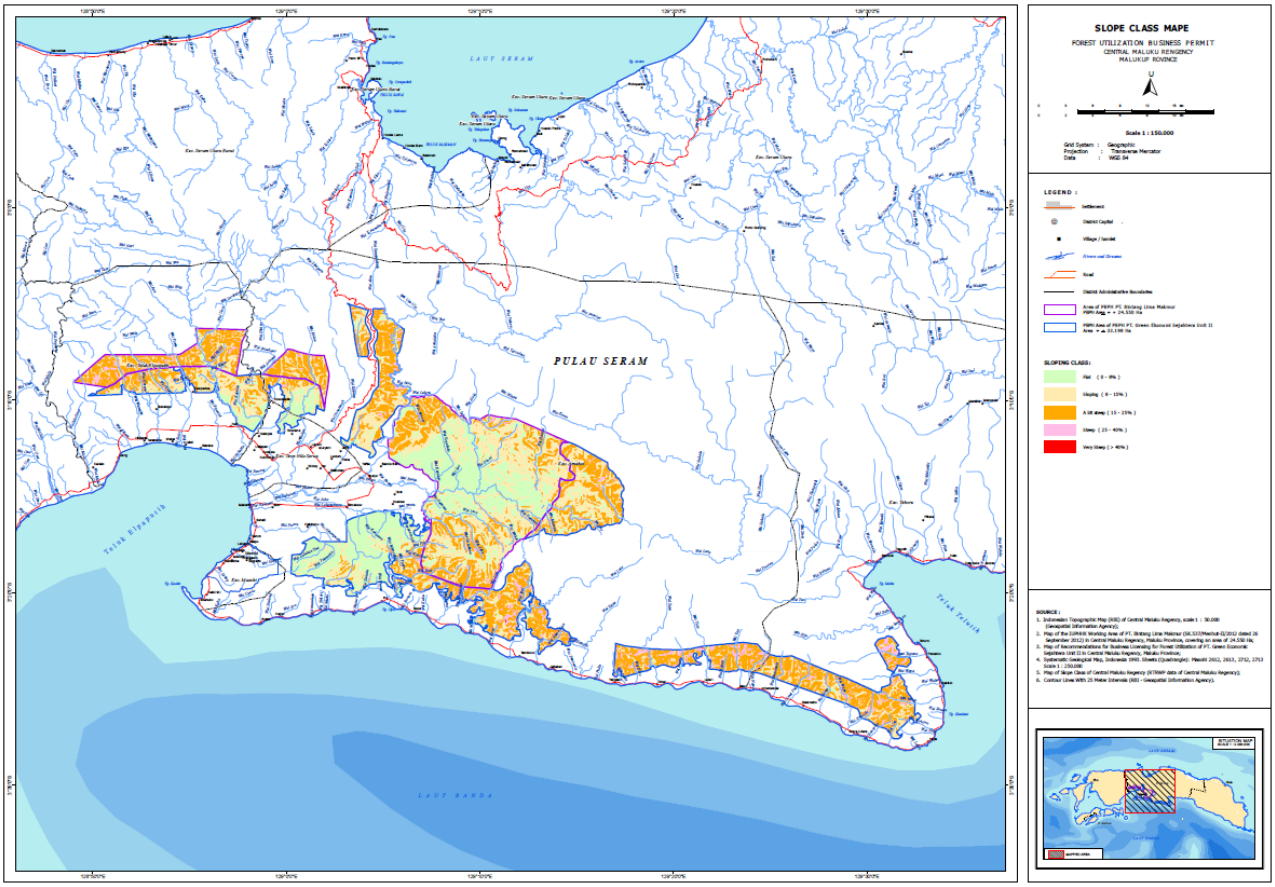


Figure 2-2. Map of the slope within the project

Based on nature morphology, physics and chemistry, at the project area found six species land, that is Dystrudepts-Hapludults, Dystrudepts-Udorthents, Endoaquepts-Dystrudepts, Eutrudepts-Hapludalfs, Haprendolls-Hapludalfs and Haprendolls-Hapluldalfs. Determination type soil refers to System National Soil Classification and Soil Taxonomy (USDA, 1999) in the Great Group Category. Fifth type soil this have texture start from sand argillaceous until clay dusty (Team Amdal Unpatti). According to the Bogor Soil Research Institute, the land developed in Central Maluku Regency consists of: on type organosol, alluvial, rendzina, grumusol, podzolic and soil complex. (Appendix A5. 2022 Soil Classification Map, Central Seram, Indonesia)

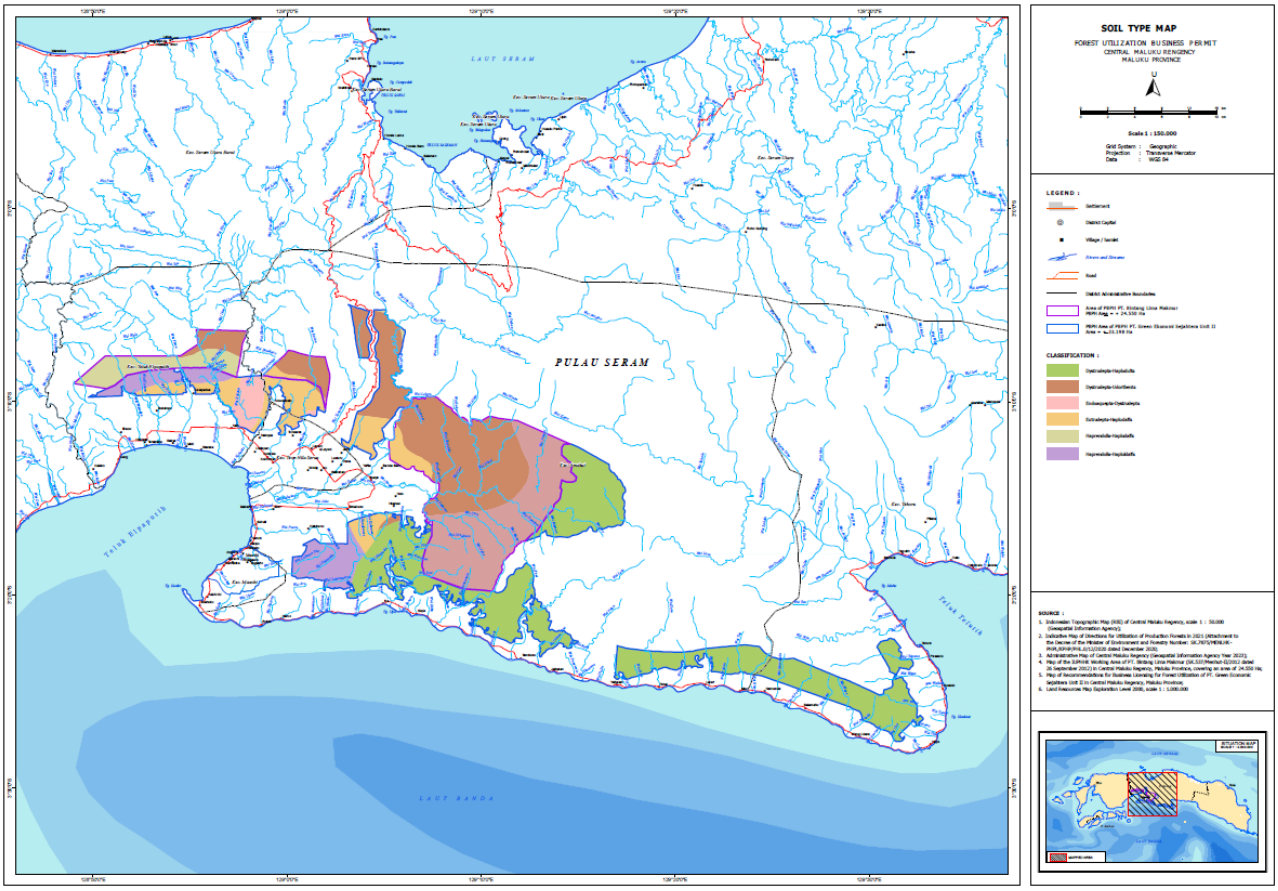


Figure 2-3. Map of the Soil Type within the project

Central Seram experiences a tropical rainforest climate characterized by high humidity and significant rainfall throughout the year. The temperature is between 20-30°C. (see Figure 1; from Technical Report1: Biophysical report 47.).

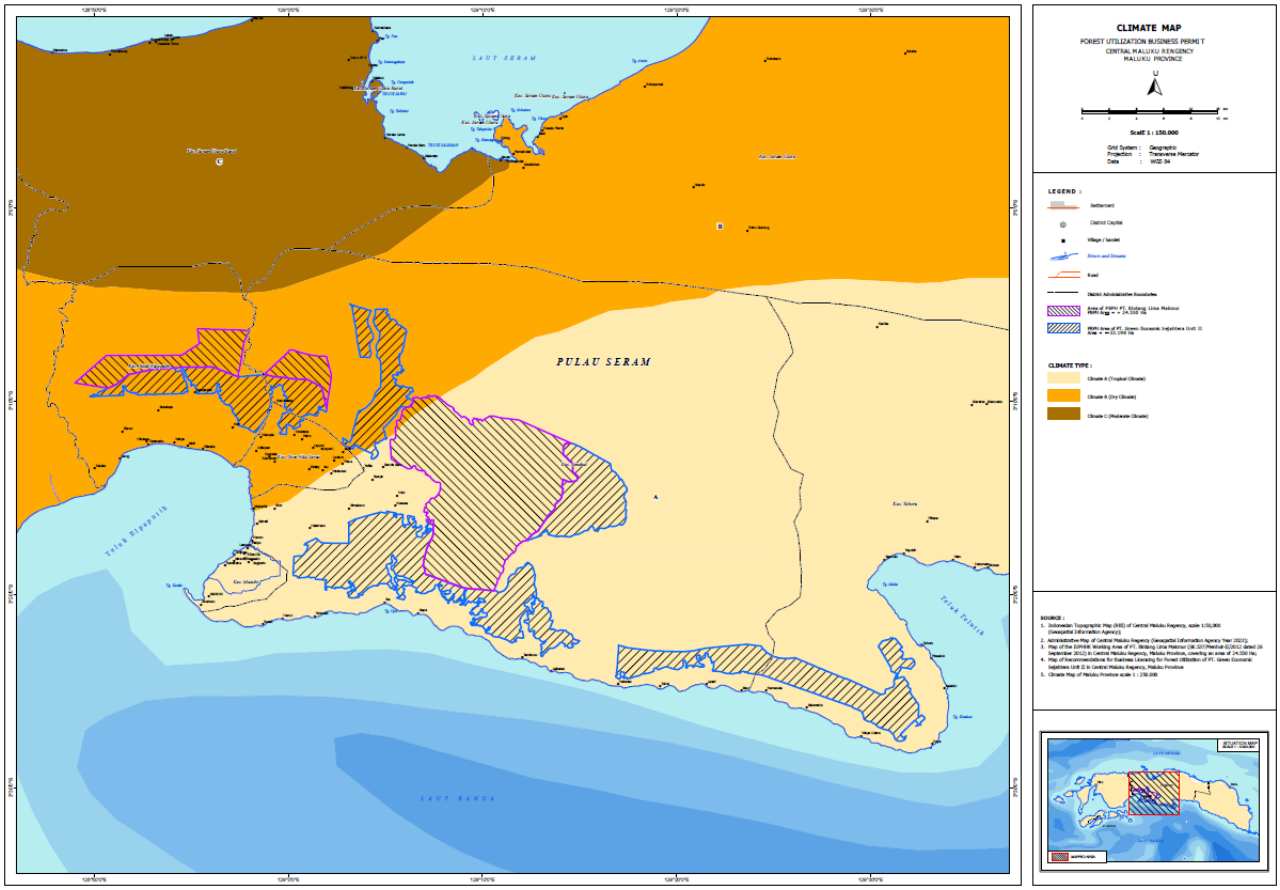


Figure 2-4. Climate Map within the project

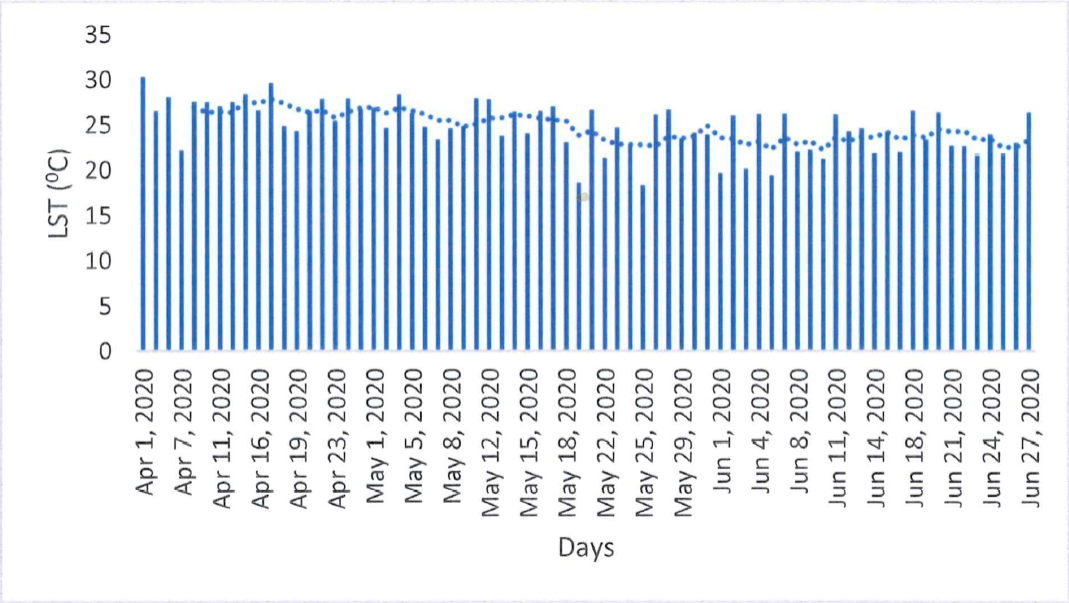


Figure 2-5: Temperature profile of Central Seram from 1 April 2020 to 27 June 2020 (from Technical Report 1. Biophysical Report. (47.)

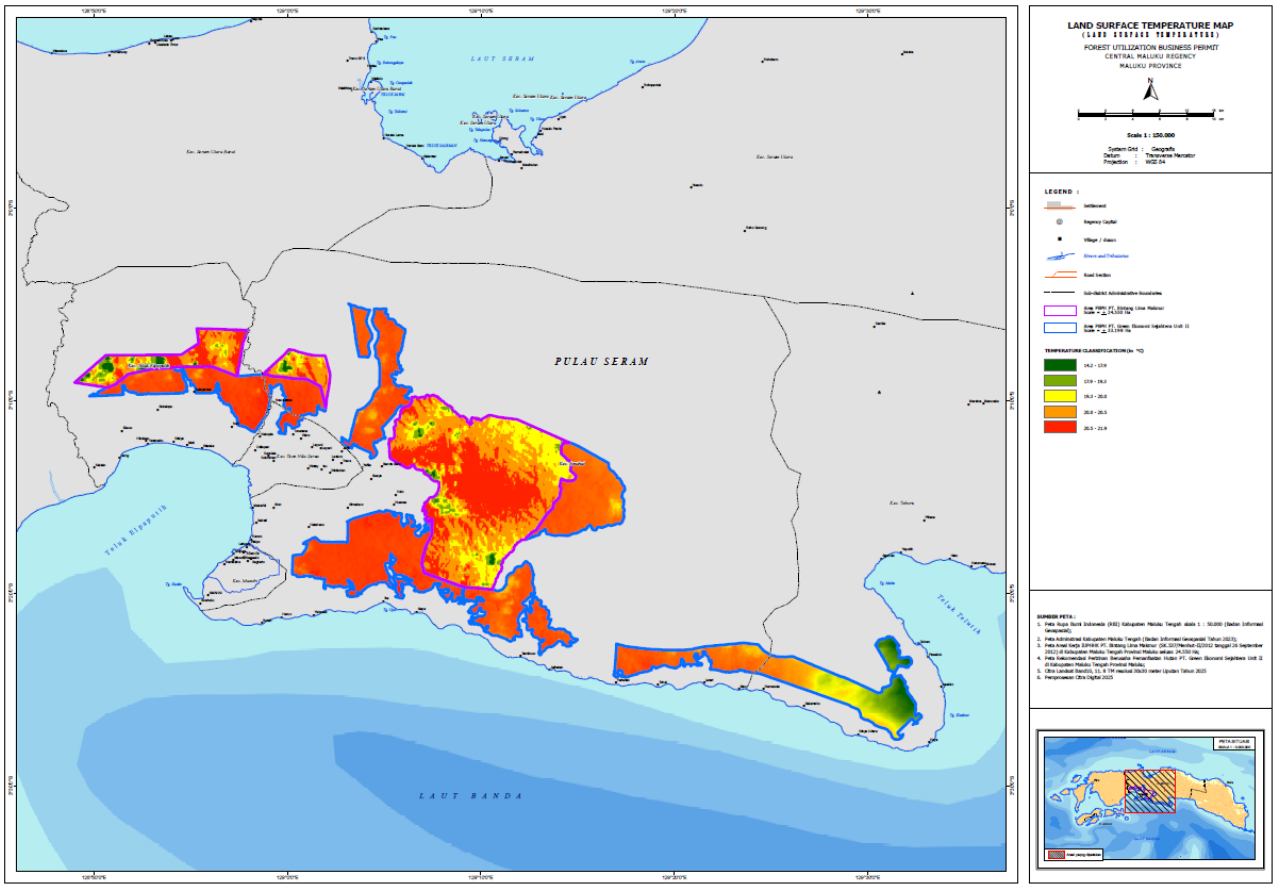


Figure 2-6. Map of the average Land Surface Temperature within Project Area.

Average Temperature: Approximately 26.8°C annually.

Humidity: Average relative humidity is about 85.9% (1. Anna Yuliana Wattimena 2023).

Watershed

Judging from the boundaries of the water catchment area, the IUPHHK-HA area as a whole is included in 2 Sub-DAS areas, namely the Wae Ruata - Wae Kawa Sub-DAS. This work area is a forest area that plays a very large role in the infiltration of rainwater droplets into the soil reaching the impermeable rock layer. Then it moves horizontally towards low places and appears along the Ruata, Pia and Nari Rivers as springs. There are many springs along this river, especially during the rainy season.

In the dry season, the springs along this river can be said to be almost dry, so they have no potential for river transportation. Very few people use this river, apart from not having potential, there are no villages in this area.

The Ruata river water shows physical properties that are suitable for use for the needs of the population. However, when the water level rises, chlorine is added for clarification.

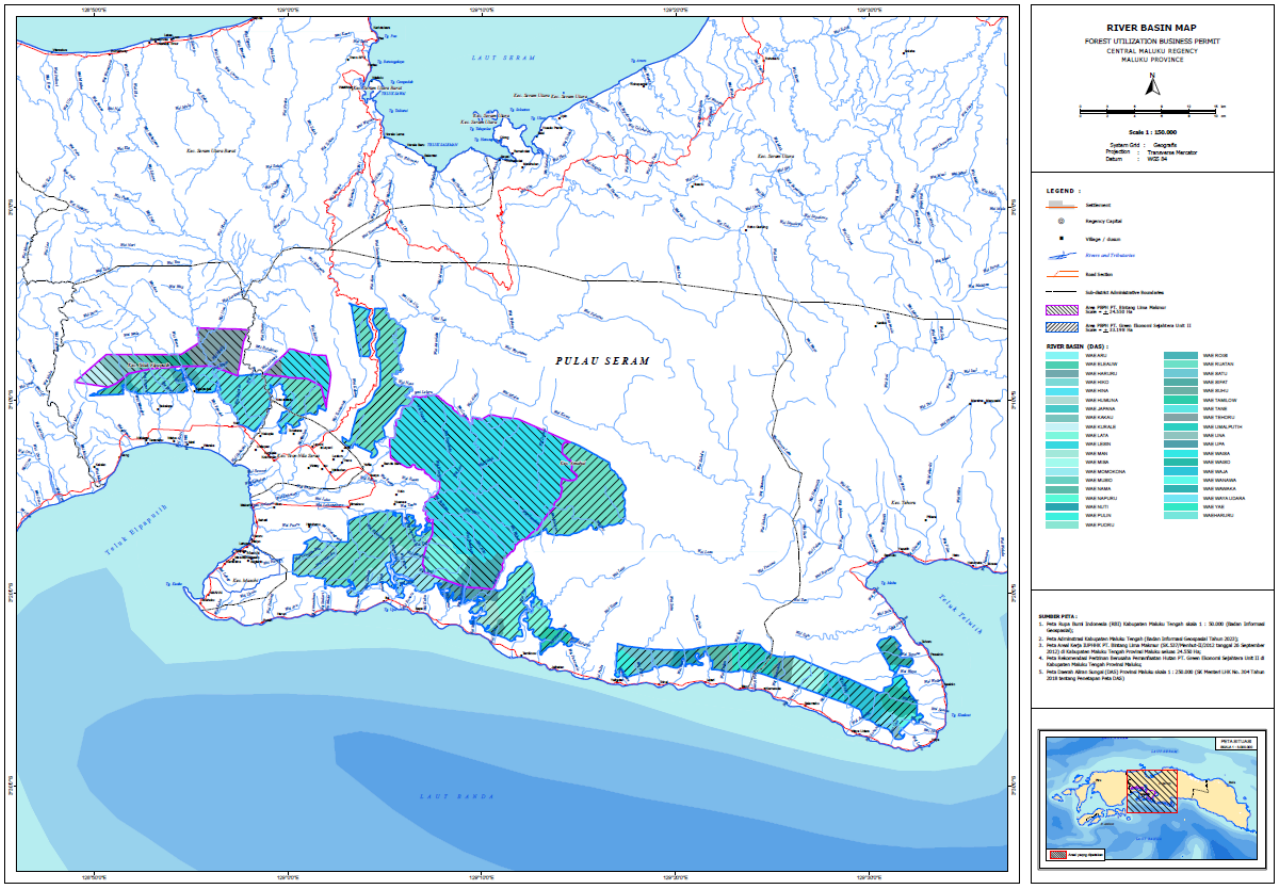


Figure 2-7. Map of the Water Basin within Project Area

Precipitation

Rainfall data obtained from TRMM (Tropical Rainfall Measurement Mission). The results of image analysis shown that the project zone annual rainfall is all within the 1000-1500 mm/yr. Based on 10 years average, Annual Rainfall: Around 2,261 mm, with the wettest months typically between October and March (1. Anna Yuliana Wattimena 2023)

Based on the rainfall time series for 60 years (period 1950-2009) at the Amahai Rain Station and Amahai Meteorological Station, it shows that the study area is a fairly wet area with an average annual rainfall of 2,419 mm with a peak in June-July with rainfall that generally exceeds 30o mm/month. November is the driest month of the year with an average rainfall of 103 mm/month. Using rainfall time series data for the period 1950-2009 and based on the climate classification made by Schmidth-Fergusson (1951), the Work Area area is included in climate type B which is characterized by an average dry month (rainfall, 60 mm/month) of 1.90 months and an average wet month (rainfall, 100 mm/month) of 8.25 months with a Q value of 23.03%. This value characterizes this area as a wet area with tropical rainforest vegetation.

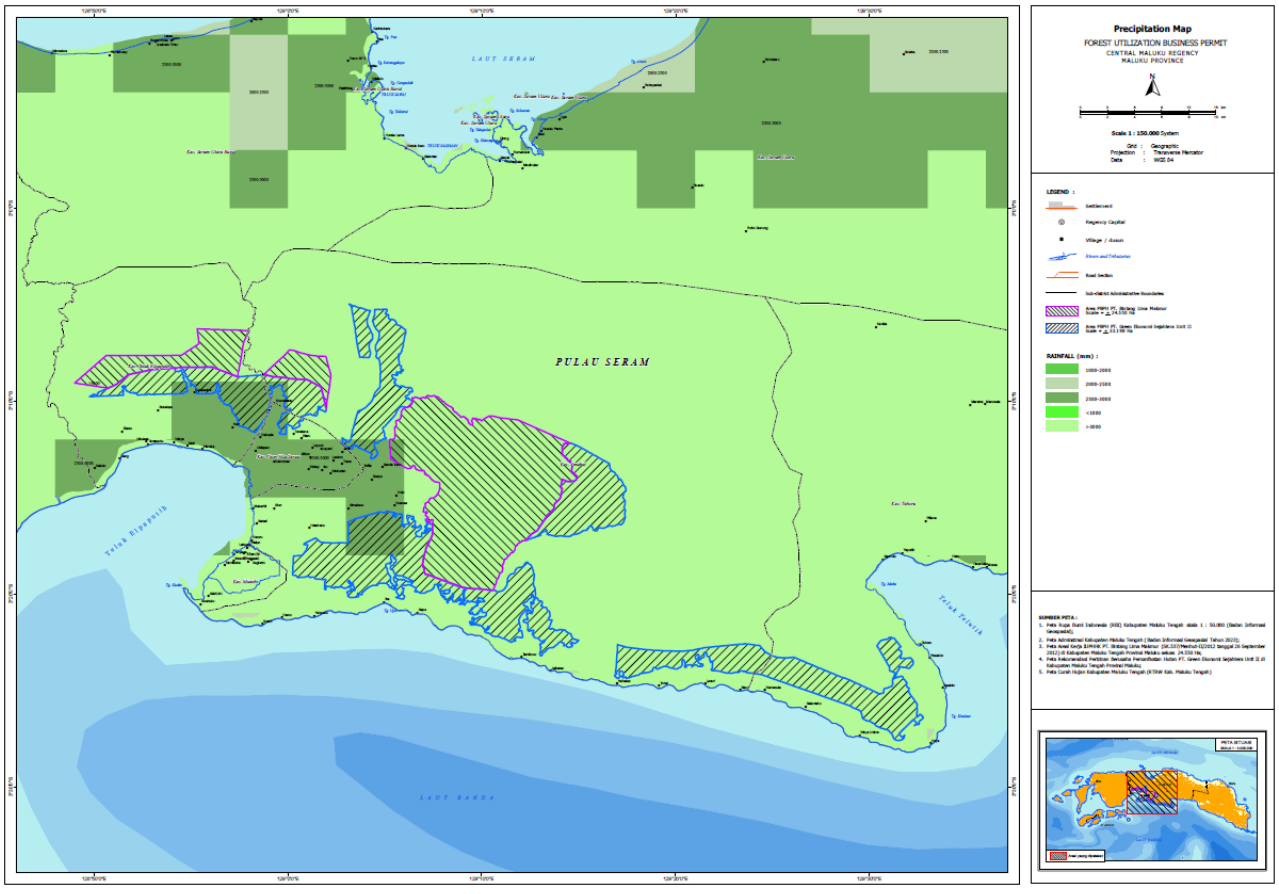


Figure 2-8. Precipitation Map within Project Area

Vegetation Land Cover and Forest Type

The work area is included in the type of lowland wet tropical rainforest, while in terms of edaphic aspects it is included in the type of dry lowland forest. Based on the interpretation results of Landsat 8 OLI + Band 653 Path 108/Row 62 Image Coverage Date 20 April 2014, the land cover conditions of PT. BINTANG LIMA MAKMUR and PT. Green Ekonomi Sejahtera work area are dominated by forested areas, land cover conditions consist of logged-over forests, non-forests and covered by clouds. Detailed land cover conditions are presented in Table 1 below.

Table 1: Vegetation Land Cover Types of the Central Seram IFM Project.

No	Land Cover Class	Amount	
		Ha	%
1	Primary Dry Land Forest	491.98	0.85%
2	Secondary Dry Land Forest	53,572.89	92.77%
3	Savanna	1,471.30	2.55%
4	Non-Forest	2,211.83	3.83%
Total area		57,748.00	100.00%

The Vegetation Density Inventory that has been carried out by the Project team is used as a reference for validating land cover in the field.

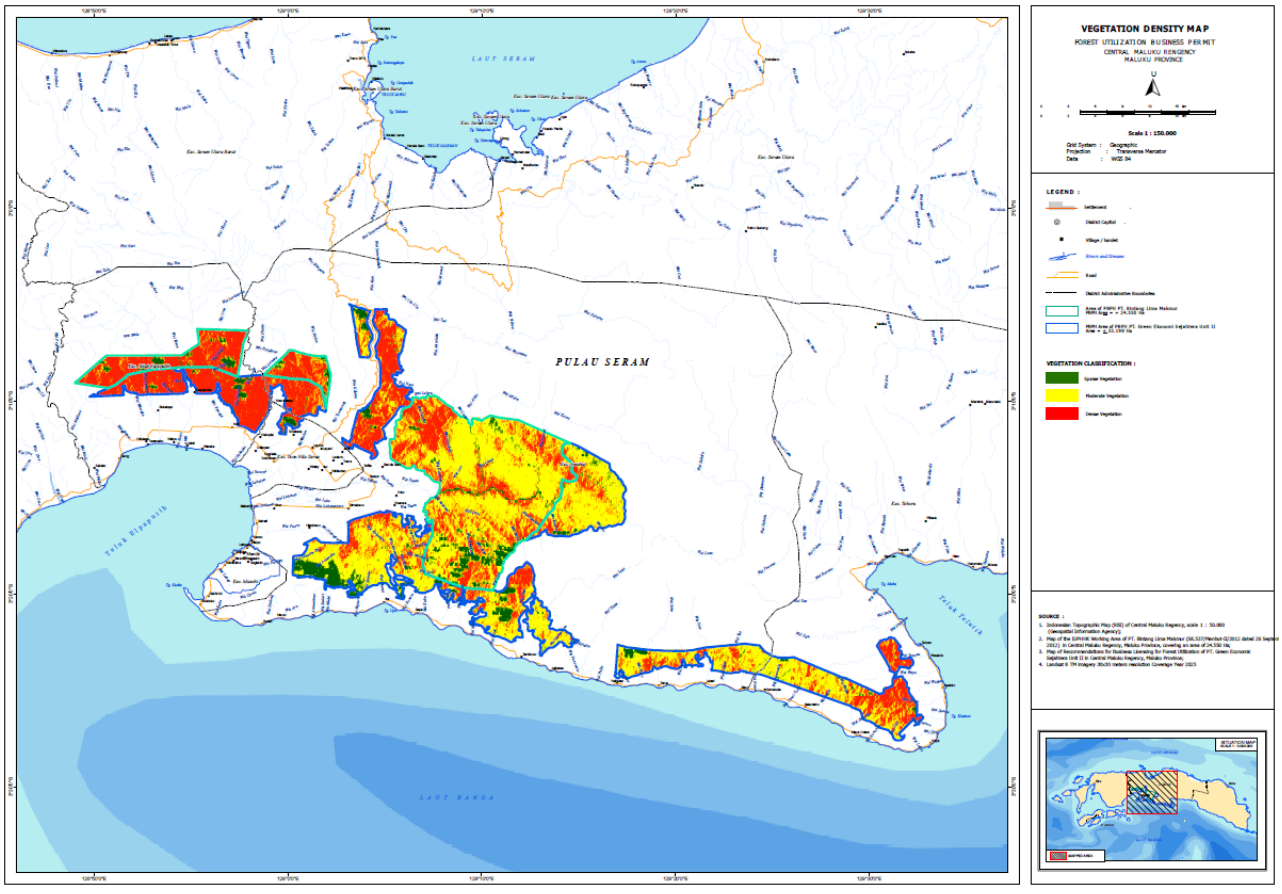


Figure 2-9. Vegetation Density Map within Project Area

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

Communities and main settlements

There are 5 counties Tehoru, Teluk Elpaputih, Teon Nila Serua, Kota Masohi, Amahai, bordering the CSIR with of 59 villages and with a population of 128,946 were included to define the Project zone. Most villages in Maluku, including those in Central Seram, maintain a dual structure of governance that includes both traditional indigenous **Negeri** villages led by a Hamlet Chief or Village Chief and is in the transition to modern Desa villages governed by elected heads.

Land uses and economic activities

Land uses:

The Central Seram region is a diverse ecosystem with an area of approximately 10,680.55 square kilometers. Land use in the region has traditionally been based on subsistence agriculture, hunting, and forest resources utilization, with indigenous communities practicing shifting cultivation or slash-and-burn agriculture on the traditional customary land.

Land ownership is often communal, where rights are held by groups or clans rather than individuals. This reflects the traditional structure of the society, where land is passed down through generations within families or communities.

The legal framework for these rights is based on the recognition of customary law, which is acknowledged in the national land law system. However, there are challenges in formal recognition by local government authorities. There are 4 types of land ownership: (31. Mispa Christian Science Paisina, 2021)

Soa Land: Typically associated with specific clans or families.

Marga Land: Represents broader community ownership.

State Land: Areas designated by the government for public use. As in current Project zone.

Individual Land: Ownership that can be claimed by individuals under customary agreements

In recent years, there has been a significant increase in commercial agriculture activities. As a result, there has been a corresponding increase in deforestation and degradation of natural habitats.

Economic Activities:

The primary economic activities in the region include subsistence agriculture, hunting and forest resources utilization.

Agriculture is the primary economic activity in the region, with both subsistence and commercial agriculture being practiced. The major food source is Sago which can be collected naturally. Commercial crops include palm oil, cocoa, cloves, and nutmeg, which are grown for export.

Fisheries are also an important economic activity in the region, with the area having rich marine biodiversity. Traditional fishing methods such as hook and line, and gillnet fishing are commonly used, as well as more modern fishing methods like purse seining and trawling.

In addition, the region also has potential for eco-tourism, with its unique culture, wildlife biodiversity, and natural beauty.

In Maluku Province, according to the Indonesian Central Statistics Agency (BPS), the Maluku region produced around 1.4 million tons of food crops in 2019, including Sago, rice, maize, cassava, sweet potatoes, and various fruits and vegetables.

Most rice farming in the Maluku region is done using traditional methods, which involve planting rice seedlings in flooded fields. This method, known as wet-rice farming, is labor-intensive and requires a lot of water. Farmers in the region typically use simple tools like hand plows and sickles to tend to their rice paddies, although some larger farms may use mechanized equipment like tractors and combines.

In recent years, there has been some effort to introduce more modern and efficient rice farming methods in the region. One example is the System of Rice Intensification (SRI), which involves planting fewer seedlings per square meter and giving them more space to grow. This method has been shown to increase yields while using less water and fertilizer than traditional wet-rice farming methods.

Ethnic groups and migration:

The island has been inhabited for thousands of years, with evidence of human settlement dating back to the Neolithic period. Over time, the island was inhabited by various ethnic groups, including the Manusela, Nuaulu, and Wemale peoples. These groups lived in small, isolated communities, and their populations were relatively stable for many centuries.

In the 16th century, Seram Island became an important center of the spice trade, with European powers such as Portugal and the Netherlands vying for control of the island. This led to increased immigration of people from other parts of Indonesia and Europe, as well as the forced relocation of some indigenous peoples.

In the 19th century, the Dutch East Indies colonial government encouraged the migration of people from other parts of Indonesia to Seram Island to work in plantations and other industries. This led to a significant increase in the island's population, particularly in coastal areas.

Today, the population of Seram Island is diverse, with a mix of indigenous peoples, migrants from other parts of Indonesia, and people of European and Chinese descent. The island's population growth has led to a number of challenges, including pressure on natural resources, urbanization, and cultural changes. Among the 56 Villages bordering the Project all have **Negeri** structure. The term "negeri" translates to "village" or "state" in Indonesian and is used to describe local indigenous community administrative units that have their own governance and community structures. The negeri system is deeply rooted in local customs and traditions, often reflecting the historical and cultural identity of the indigenous communities. Each negeri may have unique customs, rituals, and governance practices that align with their cultural heritage.

Religion:

While most Seram residents are Muslim or Christian, the Manusela tribe (7,000 people) practices Hinduism.

Historical Context:

Central Seram was a base for the Republic of South Maluku rebellion (1954–1962) against Indonesian rule. Post-conflict, the area has remained relatively peaceful, though informal religious divisions persist in towns like Masohi.

Population expansion:

Based on data from Central Statistics Agency (BPS), during the 20th century, Seram Island continued to experience population growth, with the population increasing from around 300,000 in the 1960s to over 600,000 in the 2010s (46. Stein Kristiansen). This growth was driven by a combination of natural increase (births minus deaths) and migration from other parts of Indonesia.

According to BPS data, the population of the Seram Island was estimated growth rate of 3.5%. The Project Area population by 2024 has reach 128,946. This indicates that the population has increased by 114% during the last 23 years.

Poverty:

According to data from the Central Statistics Agency (BPS) [15]of Indonesia, the average monthly income per capita in Central Seram was around 1.700 million IDR (approximately 94.52 US dollars) in 2024, that is significantly lower compared to the average in Jakarta, which is 2.692 million IDR or the national average of 1.807 million IDR.

Food security:

As an island in Indonesia, Seram Island is self-sufficient in terms of food production. However, like many other islands in Indonesia, it also relies on food imports from other regions to supplement its own production.

The Maluku province, which includes Seram Island, is known for its agriculture and fisheries. The region produces a variety of crops, such as cloves, nutmeg, maize, and other spices, as well as sago, cassava, corn, and various fruits and vegetables. These products are often traded with other parts of Indonesia, including Java, Bali, and Sulawesi.

In addition, Seram Island also imports some food products from other regions in Indonesia, such as rice, wheat flour, and cooking oil. These products are typically transported by boat or airplane from other parts of the country to the island. However, the island's isolation and lack of infrastructure can sometimes make it difficult to transport goods, leading to occasional shortages and higher prices for certain food products.

Public Health

The Seram public health system needed to be built. The current level of health sector preparedness status is low in all health sectors (district health office, hospital and primary

[15] https://www.bps.go.id/en/statistics-table/1/MjIzOSMx/average-of-net-income-per-month-of-self-employed-by-province-and-age-group--thousand-rupiah---2024.html

health care). Multiple elements of disaster preparedness are also on the low level. Urgent interventions are recommended to improve several elements of health sector preparedness to protect a community during and after a disaster (Bella Donna et al., 2017).

With AAD own investigation, in the current Central Seram there are 8 clinics/hospitals with 47 doctors/medical workers and 300 nursing workers. This represents that every 16,118 persons could have one clinic/hospital and out of 59 villages there will be 51 villages without clinic/hospital.

Drinking Water

Water is a necessity for all living things for their survival, besides that water is also a support for food production, for wetting irrigated and fishery lands. Water is one of the basic needs for human needs that is very basic and irreplaceable, both in domestic and non-domestic needs. Without water man cannot live. In bigger village areas, the clean water supply system is carried out with a piping and non-piping system. Only few villages in five districts have reservoir for water supply and basic piping system. Most village rely on groundwater, surface water, and rainwater. Based on Central Maluku data, Kota Masohi has 4201 families (estimated 45%) which has water supply. Teluk Elpaputih has 342 Families (14.4%), Amahai has 405 families (3.2%), Tehoru has 803 families (18%) have water supply. The use of clean water is not only limited to household needs, but also for public, social and economic facilities. So there is a common need for all villages to have safe and clean drinking water for common welfare.

Education

Educational background plays an essential role and can greatly affect the implementation and impacts for projects like the CSIR with a strong emphasis on training and capacity building in rural communities.

Understanding the educational background of community members in CSIR target sites can help to design appropriate training materials and activities which contribute to the capacity development of community members and forest committee members and enhance community enterprise development to improve community livelihoods.

Within the Central Seram Region, there are 104 elementary schools with 21,768 students/1210 teachers, 49 junior middle schools with 7421 students/749 teachers, 32 high schools with 7151 students/614 teachers in the Project zone. There is no continuous education yet.

The Employment Diagnostic Analysis in Maluku by the International Labour Organization (ILO) [16] found:

1. Although education attainment rates in Maluku are high, the quality and relevance of education is not satisfactory.
2. There is a lack of skills training, obsolete education facilities, and uneven distribution of training centres at the district level.

[16] https://www.ilo.org/media/335446/download

3. Insufficient investment in education and infrastructure.
4. Unemployment is highest among those with high education, indicating a mismatch between education and labour market needs.

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

The Project zone involves in Central Seram Region, Maluku Province, Indonesia of total area of 57,748 ha, and geographical coordination is -3.0893 ~ -3.4675 S, 128.8178 ~129.6464 E.

The Project zone contain 59 villages (Figure 2 down, the location of communities identified in Section 2.3.1)

The high conservation value (HCV) areas have been designed in Agarwood_Plantation Agarwood Restoration Plantation (Figure 2& 19 and identified in Sections 4.1.3 and 5.1.2).

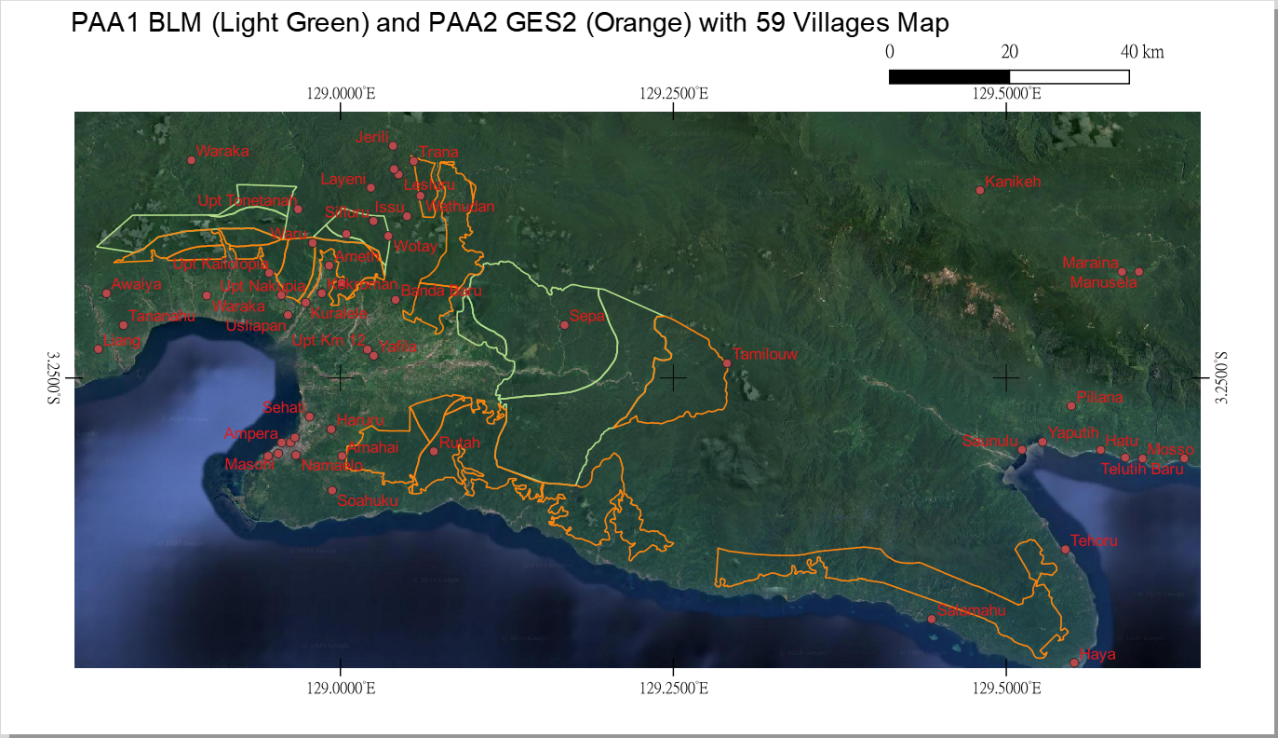


Figure 2-10: 59 Villages around the PAA1 BLM and PAA2 GES2.

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

Project Activities description and output, outcome and impact

Activity description	Expected climate, community, and/or biodiversity			Relevance to project's objectives
	Outputs	Outcomes	Impacts	

	(short term)	(medium term)	(long term)	
Establish and maintain infrastructure to efficiently manage the area	Training and equipping rangers, community watch-posts.	A team of well-trained rangers and community watch-posts perform the eco- monitors across the entire PA	The PA is well protected and managed in a comprehensive way. Deforestation and degradation in the PA are eliminated/ reduced.	Build and maintain the patrol infrastructure for PAAs by IFM logged to protect forest (LtPF) activities of Total_NER tCO2e in crediting period from 15 August 2022 to 14 August 2047.
Build a stronger enforcement of the law infrastructure and consensus by local authorities and cooperative.	Training the community for enforcement of the law	A participatory forest protection team with law enforcement is built for eco-protection across the PA.	The PA is well protected and managed in a comprehensive way. Deforestation, degradation and encroachment in the PA is eliminated/reduced.	Build and maintain the Law enforcement infrastructure to reduce forest destruction, wildlife poaching and land encroachment in the project zone.
Improved Sanitation/ Healthcare by drinking water system by AAD.	Build pilot Clean Water Reservoir filter system in targeted villages.	Build Celan Water Reservoir filter system in 28 villages to re-enforce confidence in the project.	The wellbeing of all 59 villages is directly improved. Confidence of the project fortified.	Improved Community Livelihoods of 59 villages
Established solar panel systems for 56 villages in the project zone to provide affordable and clean energy.	Build pilot solar panel system in targeted villages.	Build a Solar Panel system in 1/2 59 villages to re-enforce confidence in the project.	The wellbeing of all 59 villages is directly improved. Confidence of the project fortified.	Improved Community Livelihoods of affordable clean energy in 59 villages
Build eco-charcoal program to reduce bio-waste and improve livelihood	Build a pilot project of Eco-Charcoal using coconut shell in targeted villages.	Build an eco-charcoal system in 1/2 59 villages to re-enforce confidence in the project.	The wellbeing of all 59 villages is directly improved. Confidence of the project fortified.	Improved Community Livelihoods of affordable clean energy in 59 villages
Improved Healthcare by	Build a mobile dental/oral	Construct a school bases	The overall dental/oral health	Improved Community

Mobile dental service by AAD.	health service system.	dental/oral service and education system	improvement from school to community.	Livelihoods of 59 villages.
Training and employment in income generating activities by AAD, Cooperative and Technical Experts.	Build SIGS Sustainable Income Generation Scheme and training	Build 20 SIGS group Chicken/Goats raising. Relationships and trust are improved between AAD and the local community	Sustainable Income achieved and at the same time preserve the eco-system.	Improve community welfare by 20 Sustainable Income Generation Groups (SIGG), Creating local foods in meat/egg and milk with 20 SIGG,
Training and employment in income generating activities by AAD, Cooperative and Technical Experts	Build New SIGS training on other NTFP,	Add on 20 additional NTFP to further reduce dependency on extracting forest	Reduced risks through livelihood diversification	Implement Sustainable Income Generation Scheme by forming 20 Agarwood plantations and other NTFP generation groups.
Training in innovative agricultural/ business methods by AAD, Cooperative	Build 20 Agarwood Restoration Plantations with companion legume tree planting.	Enlarge employment and increasing motivation	Build cooperative based SIGS nosiness livelihoods	Promote and support local community development.
Protect the Native habitat of Agarwood and Shorea by Ranger and Watch-posts.	Training to identify Agarwood and Shorea native habitat and setup protection landmark.	Identify and protect native Agarwood and Shorea trees.	Set up HCV based Agarwood Shorea sanctuary in project zone	Maintain habitat for viable, abundant and diverse natural populations of High Conservation Value of Fauna and Flora
Restore High Conservation Value ecosystem by AAD, Cooperative.	Build 20 Agarwood Restoration Plantations	Plant 1,500,000 Agarwood trees,	Agarwood Shorea plantations as backup sanctuary in project zone	Reduce threats to rare, threatened, endangered and vulnerable Fauna and Flora

2.1.18 Sustainable Development Contributions (VCS, 3.17)

The Central Seram IFM Project will touch upon 12 sustainable development themes that the Regional Government of Indonesia has committed to attaining (Central Government of Indonesia – Ministry of Environment and Forestry, 2018). These themes and the provisions for reporting and monitoring are listed below.

Table 2: Summary of Project SDG contributions.

SDG number	Contribution description	Estimated Project Contribution by the End of Project Lifetime	SDG Target	SDG Indicators
SDG 1 **No Poverty**	The project will provide direct Employment and Training on Sustainable Income Generating Scheme to improve the poverty situation in the project zone.	About Full_Time_Employee full time employee will be employed when project reaches full operation capacity. 55% expected to have improved livelihoods. At least 2.64 million USD is estimated to be provided through mircro-finance [17] to the locals for sustainable income generating activities.	1.2	1.2.1. Proportion of population living below the national poverty line, by sex and age
SDG 2 **Zero Hunger**	The project will build Goat farms and chicken farms to supplement food sources.	SIGS Goat/Chicken farming participants will generate additional income for their household.	2.3	2.3.2 Average income of small-scale food producers, by sex and indigenous status.
		silvicultural area under sustainable Income Generation Scheme NTFP agriculture	2.4	2.4.1 Proportion of agricultural area under productive and sustainable agriculture.

[17] Micro-finance is provided by the local cooperation group Shar Eno Princess for SIGS activities. According to law, the cooperation group may not charge interest for this loan. For more details, refer to section 2.5.1 for more detail.

SDG 3 **Good Health and Well-Being**	The project will work with 116 schools to provide a mobile dental annual service for 13,524 students plus adjacent community members total estimated 15,000 people from 59 villages. Will expand to full capacity throughout project lifetime.	About 15,000 people receiving dental service annually by end of project lifetime.	3.8	3.8.1. Coverage of essential health services.
SDG 4 **Quality Education**	Provide capacity building trainings and technology skill education for Agarwood / Sesbania plantations as extended education.	About 15,000 people, including young people, are expected to have improved skills and/or knowledge resulting from training provided as part of project activities	4.4	4.4.1 Proportion of youth and adults with information and communications technology (ICT) skills, by type of skill.
SDG 5 **Gender Equality**	Ensure gender equality when choosing leader position for SIGS group	female leader position in SIGS group.	5.5	5.5.2 Proportion of women in managerial positions
SDG 6 **Clean Water and Sanitation**	Established water filtration systems for all villages in the project zone to provide clean water.	water filtration systems established in villages 100% of population in project zone using safely managed drinking water services	6.1	6.1.1 Proportion of population using safely managed drinking water services.
SDG 7 **Affordable and clean energy**	Established solar panel systems for all villages in the project zone to provide affordable and clean energy.	solar panel systems established in villages 100% of population in project zone with access to electricity	7.1	7.1.1 Proportion with access to electricity.
SDG 8 **Decent Work and Economic Growth**	This project will establish Agarwood and NTFP future/online eco-tourism to promote local economic development.	50% of GDP growth rate from NTFP/Eco-tourism local direct GDP Establishing Agarwood and NTFP future/online eco-tourism	8.9	8.9.1Tourism direct GDP as a proportion of total GDP and in growth rate

SDG 9 **Industry, Innovation and Infrastructure**	The project will establish Agarwood hand craft workshops and provide Micro-finance. The agarwood harvested will not originated from the agarwood planted in planting area, but will be from agarwood in customary land and is located withing PA but not within PAAs.	Establishing Agarwood hand craft workshops 100% Micro-finance provided for all SIGS activities that produces NTFP.	9.3	9.3.1 Proportion of small-scale industries in total industry value added 9.3.2 Proportion of small-scale industries with a loan or line of credit
SDG 13 **Climate Action**	Integrate climate change measures into national policies, strategies and planning	IFM LtFP: 57,548 Ha. 55,281 Ha of Project Accounting Area and estimated reduction of Total_NER tCO2e in 25 years .	13.2	13.2.1 Number of countries that have communicated the establishment or operationalization of an integrated policy/strategy/plan which increases their ability to adapt to the adverse impacts of climate change, and foster climate resilience and low greenhouse gas emissions development in a manner that does not threaten food production
SDG 15 **Life on Land**	The project will contribute to preserving the habitat for local flora and promote the implementation of sustainable management, halt (tdeforestation and help to restore degraded forests.	Agarw_Planta_Ha hectares will be restoration site for agarwood endangered species. Protect the 55,281 Ha of Project Area. In addition to the Agarw_Planta_Ha Ha Agarwood restoration increasing habitat for endangered species.	15.1	15.1.1 Forest area as a proportion of total land area
		100% completion of monthly illegal logging patrols in Seram Reserve	15.2	15.2.1 Progress towards sustainable forest management

		10 high conservation species habitat been protected in project area. Included Aquilaria malaccensis(CR), Aquilaria hirta (VU), Aquilaria cumingiana(VU), Aquilaria filaria (VU), and Gyrinops decipiens (EN), Gyrinops salicifolia (EN), Gyrinops moluccana (EN), Gyrinops versteegii (VU), *Shorea selanica* (CR) a nd *Shorea montigena* (CR).	15.5	15.5.1 Red List Index
SDG 17 **Partnerships for the Goals**	The project will provide Micro-finance to SIGS activities.	Micro-Finance Fund estimated, in accordance to PP's budgeting plan, to be provided for SIGS activities.	17.7	17.7.1 Total amount of approved funding for developing countries to promote the development, transfer, dissemination and diffusion of environmentally sound technologies

2.1.19 Implementation Schedule (CCB, G1.9)

Table 3: The Implementation schedule for the Central Seram IFM Project, showing key dates and milestones for the Project.

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

Identified Risk	Potential impact of risk on climate, community and/or biodiversity benefits	Actions needed and designed to mitigate the risk
Human induced risks	**1. Illegal Logging and Charcoal Production** Within the Project Accounting Area there are extractive activities, including illegal logging and the production of charcoal. These are additional threats of deforestation and degradation in the CSIR Project Accounting Area and pose a	Law enforcement and community members patrol the Project Accounting Area permanently and attempt to halt such activities. It has been recognized, however, that these law enforcement units are limited because of the size of the Project Accounting Area. The CSIR therefore provides financial, political and human capacity support to maintain and enhance law

significant risk to the Project's climate benefits.

Illegal logging activities are a major problem because the boundaries of forest areas were originally customary land controlled by the local customary institution. The data we get from the Ministry of Environment and Forestry is data on the production of logs and processed wood in the form of plywood, veneer, and sawn timber. The Central Bureau of Statistics reports that the production of logs from Maluku and Papua in 2019 reached 1.5 million.

Wood Products from Maluccu

Year	Plywood (m^3)	Veneer (m^3)	Sawn Timber(m^3)
2016	1,223.79		
2018	2,218.7	3,045.66	
2019	4,373.68	5,648.63	
2020	5,926.5	5,310.76	346.76

Source: Ministry of Environmental and Forestry (2021)

Table above shows that there are 3 (three) official wood product industries from Maluku, namely plywood, veneer, and sawn timber. The largest production is plywood and veneer. Meanwhile, sawn timber is small, only reaching 346.76 m3. This is because permit holders to use wood from natural forests sell logs in the form of logs to other areas to be processed into processed wood products.

Meanwhile, there are 4 cases of illegal logging on Seram Island according to data from (*48.* TECHNICAL REPORT 3: PERMANENCE AND LEAKAGE IDENTIFICATION FROM NATURAL AND HUMAN ACTIVITY, FORDIA

enforcement. This is achieved by SIGS ForestWise Silviculture of providing charcoal and employing more rangers, increasing ranger motivation and providing rangers with more equipment, training and agriculture technology.

	2021). The theft was carried out on wood from the Dipterocarpaceae family and a mixture and there was agarwood. The stolen wood is then sold to Java, Nusa Tenggara and also in the local market. Illegal Logging in Seram Island Year Species Volume Unit Location 2020 Dipterocarpaceae and mix 147.262 m3 SBT 2021 Agarwood 1920 kg 2019 Dipterocarpaceae and mix 205.9 m3 Maluku Tengah 2020 Dipterocarpaceae and mix 400 m3 Maluku Tengah	
	2. Agarwood Poaching As Agarwood present a high value in the market place and Maluku Province has 8 endangered species of Agarwood been reported including in Aquilaria malaccensis, Aquilaria hirta, Aquilaria cumingiana, Aquilaria filaria, and Gyrinops decipiens, Gyrinops salicifolia, Gyrinops moluccana and Gyrinops versteegii. Seram Island has Agarwood poaching of 1921Kg in 2021 (Table above), these are additional threats of deforestation and degradation in the CSIR Project Accounting Area and pose a significant risk to the Project's climate benefits. Law enforcement and community members patrol the Project Accounting Area permanently and attempt to halt such activities. It has been recognized, however, that these law enforcement units are limited because of the size of the Project Accounting Area and government funding.	The CSIR therefore provides financial, political and human capacity support to maintain and enhance law enforcement. This is achieved by employing more rangers, implementing SIGS new Agarwood plantation and microbial inoculation with more equipment, training and technology.
	3. Anthropogenic Fires Another human induced threat is frequent fires; these can occur	CSIR staff monitor the Project Accounting Area for the occurrence of fire, and work to reduce the risk of

	multiple times a year in the area. Many are set intentionally with the goal of clearing trees and brush for agriculture, or some may be the unintentional result of illegal activity, such as charcoal production.	fire. In addition, the Project aims to reduce illegal incursions of people into the Project Accounting Area, thus mitigating anthropogenic fire potential. Furthermore, the Project Proponent will monitor fire events and other potential contributions to reversals as part of their annual monitoring efforts and is required to report on and account for any major loss of carbon in the Project Accounting Area. The AAD has a Forest Patrol team in place which incorporates local Forestry Patrol jointly with Community watch-post Patrol Assistance in this project.
Natural Risks	The region in which the Project is located is not generally susceptible to severe or destructive natural events. The primary types of natural events that could occur would be geologic events, pests or disease, flooding or fire. The area is not prone to any geologic activity and poses little to no risk to the Project. As the Project Accounting Area is a native and biodiverse ecosystem the risk from pests or disease that result in significant emissions reversal is low. There can be minor seasonal flooding from the annual monsoons. However, the species of this area are all adapted to the hydrological cycles and are not liable to monsoonal flooding. The Project Accounting Area is low slope and medium mountainous and there is a medium risk of erosion or landslides. Due to the Project activities that protect forests the risk of erosion or landslides is minimized. The risk of	The primary mitigation for this risk is to maintain the forest and ensure through monitoring that the trees and ecosystem remain healthy and intact through routine patrol. The AAD has a Forest Patrol team in place which incorporates local Forestry Patrol jointly with Community watch-post Patrol Assistance in this project.

	fire has the most potential to cause damage to the forests of the Project Accounting Area. However, the risk of significant emissions reversal is low. The tropical rain forest type that is not prone to forest fires. There have been no catastrophic fires in forests of this type in this region. Therefore, natural events have low risks to the Project's benefits.	
Political Risks	In all countries, there exists a slight risk of shifting legislation or the potential of new policies that could potentially affect natural resource management and/or land tenure. There are original plans to convert forest to agriculture for food security and selective logging in Seram Island where the natural forest lands were cleared for agricultural for food security and industry development purposes. However, theses two possibilities have been stopped because of the CSIR . The further likelihood of such changes occurring in the Project Accounting Area is extremely small, because the Project Accounting Area is currently under government ownership and the Maluku Provincial UPTD KPHP Central Seram Forest Management Unit is one of the Proponent.	The original plan to convert the 19,207 Ha from Forest to Food commodity has been stopped by APD of PAA1. A 34,811 Ha selective logging has been stopped by APDD of PAA2. As a highly visible international IFM project, the likelihood that the Maluku Provincial Government would allow the CSIR Project Accounting Area to be converted is low. Additionally, as the intent is to nest this Project into a future jurisdictional/national program, the core fundamental of this project is in line with the Indonesian national goal of preserving more forest and improving living condition of villagers.
Policy risks	**1. Risk of reversal** Risk of project reversal due to community opposition is considered minimal, as they have openly and widely been consulted through numerous outreach and information-sharing meetings throughout project development.	As a project governance policy, all stakeholders are always able to seek further information or air grievances if desired. The Project will continue to engage the surrounding communities, provide education and support for community social services, and improved livelihood opportunities.

		All these factors build and enhance community support for the project and make them authentic stakeholders, thereby reducing the risk of opposition to the project and its goals.
	2. Insufficient Revenues The majority of IFM credits are currently sold on the voluntary market, posing a risk to recurring, sustainable income flow. If credits are not sold, there will be no revenue, and thus no monetary support for the Project over its 30-year lifetime, losing initial investments.	Nevertheless, the project proponent believes that the Project will be successful in attracting sufficient buyers of carbon credits. The Project has been developed as a cooperative effort between AAD and the CENTRAL SERAM FMU, it is one of the largest projects in Indonesia, making it an attractive Project to the greater Tropical Asian region. In addition, it is a vital forest resource to Indonesia and a model to develop sustainable Agarwood production. The intention of the Project Proponent is to nest the Project into the potential future Indonesian jurisdictional/national REDD+ scheme. In the future, this will allow for the sale of larger credit volumes, on a recurring, sustainable basis, to sovereign nations and large multi-national buyers in the international market created by the Paris Accord. Therefore, the project proponent believes that the risk of insufficient revenues to the Project's benefits is low.

2.1.21 Benefit Permanence (CCB, G1.11)

The CSIR Project activities are all designed to ensure the permanence of the climate, community and biodiversity (CCB) benefits beyond the Project's Lifetime. Community's Sustainable Income Generation Scheme (SIGS) groups will be established to transform local subsistence economies into a sustainable economy over the Project lifetime. The local cooperative will lead the SIGS groups in raising chicken/goat in the first stage will provide meat, egg and milk immediately to build local expertise, skill and business infrastructure using project finance. These income-generating activities will reduce the necessity for community members to deforest and degrade the PA. The education and patrol/watch-post

will link with the SIGS groups which will protect the Project Area into Agarwood natural sanctuary. These HCV agarwood natural sanctuary together with raising Agarwood resin as NTFP outside of Project Area will further enhance the community income and transform the CSIR protected forest into eco-tourism.

In addition, through the training of rangers and community watch-post to patrol over the PA and the enforcement of the law, the project will ensure the illegal logging, poaching and conversion are under control through a well- equipped, trained and motivated ranger/community watch-post staff who operate efficiently over the entire PA.

The requirement of resources to build the technical skill, expertise of the SIGS group and surrounding communities will be funded initially by AAD and later carbon credits. Over the 25 years of project life time, the SIGS group and eco-tourism will build a sustainable economy stepwise. By end of the project life time, the CSIR will be a self-sustainable to support the patrol/watch-post activities and ensure the permanence of the climate, community and biodiversity (CCB) benefits.

2.1.22 Financial Sustainability (CCB, G1.12)

The Central Seram IFM RestorationWise Project (CSIR) has a clear financial plan designed to ensure its successful implementation and the long-term sustainability of its climate, community, and biodiversity objectives. The project's financial structure relies on initial investment provided by the project proponent, supplemented by projected revenues from the sale of carbon credits.

Initial Funding & Proponent Commitment:

Asia Assets Developments Co., Ltd. (AAD), as the project proponent, possesses significant experience in project development and asset management. AAD is providing and securing the necessary upfront financial resources to cover all costs associated with project initiation, development (including technical studies and consultations), validation, and initial operational years until the project becomes self-sustaining through carbon revenue. AAD is fully committed to the project's success and has allocated internal resources to guarantee operational continuity during the pre-revenue phase. Furthermore, AAD has a demonstrated track record of successfully developing and managing projects within the Verified Carbon Standard framework, underscoring its capacity to navigate the carbon market and manage project finances effectively.

Long-Term Sustainability through Carbon Finance:

The long-term financial viability of the CSIR project is fundamentally dependent on the successful generation and sale of Verified Carbon Units (VCUs) under the VCS Program. Revenue generated from VCU sales is the primary mechanism intended to fund the

project's ongoing operational costs over its 30-year lifetime. These costs include, but are not limited to:

- Implementing and maintaining forest protection measures (e.g., patrols, monitoring).
- Carrying out required monitoring, reporting, and verification (MRV) activities for both carbon (VCS) and co-benefits (CCB).
- Supporting community development initiatives and benefit-sharing mechanisms as designed through stakeholder consultations (e.g., SIGS support, micro-finance via PT Asia Pasifik Asset Percayaan Indonesia, health/education activities).
- Funding project management, administrative overhead, and personnel costs.

Internal financial planning and modeling have been conducted to project these operational costs and estimate the level of carbon revenue required to ensure project sustainability and the delivery of anticipated co-benefits. This reliance on carbon finance underscores the project's additionality, as the comprehensive conservation and community development activities would not be financially feasible under the baseline scenario without this revenue stream.

Financial Management & Transparency:
AAD employs robust financial management practices and internal controls to ensure the effective, efficient, and transparent use of all project funds. This includes clear budgeting, expenditure tracking, and financial reporting procedures. Furthermore, AAD maintains a strong commitment to financial integrity and has incorporated anti-corruption mechanisms within its corporate governance and project management systems to prevent fraud, bribery, or mismanagement of funds. Detailed financial projections and documentation supporting the project's financial plan, including evidence of these management practices, are maintained and will be made available to the validation/verification body upon request.

This comprehensive financial strategy, combining strong proponent commitment and experience, secured initial funding, a clear plan for long-term operational funding through VCU sales, and a commitment to financial integrity, provides confidence in the project's financial sustainability and its ability to achieve its stated goals over the project lifetime

2.2 Without-project Land Use Scenario and Additionality

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

Conditions Prior to Project Initiation:

The Central Seram IFM RestorationWise Project (CSIR) officially commenced on **15 August, 2022**. The project area comprises two adjacent forestry concessions located in Central Maluku Regency, Maluku Province, Indonesia, totaling approximately **57,748 hectares**:

- **Site 1 (BLM - PAA1, ±24,550 Ha):** Held by PT. Bintang Lima Makmur (PT. BLM) under IUPHHK-HA No. SK.537/Menhut-II/2012 (valid 2012-2057). This site was legally designated for commercial logging (primarily HPT). PT. BLM had a detailed, government-approved Work Plan (RKUPHHK-HA 2016-2025, based on IHMB, approved via SK.16/UHP-1/2015 and revised via SK.10084/2019). This plan mandated selective logging (TPTI system, ≥50cm limit) across an effective production area of ±19,655 ha, projecting an average annual harvest of **681.5 ha** yielding **~30,861 m³** (File 3, Table 3.11). PT. BLM actively logged from 2016-2022
- **Site 2 (GES Unit II - PAA2, ±33,198 Ha):** Held by PT. Green Ekonomi Sejahtera (PT. GES) under a forestry concession license exact decree TBC, but license acknowledged in **GES2 Recommendation Letter.pdf**). This site was also legally designated for commercial logging. However, unlike BLM, detailed government-approved RKU/RKT documents specifying harvest plans for GES2 are not available. The MoEF recommendation letter supports the planned transition from logging to protection. Therefore, the likely baseline logging activity for GES2 is credibly estimated **by proxy** using BLM's approved plans and intensity (see Section 2.2.2 and 3.1.4 for detailed proxy justification and calculation), suggesting a planned annual harvest of approx. **923 ha** yielding approx. **41,850 m³** within its estimated effective production area (~26,558 ha). Similar to BLM, the post-2022 operational pause likely increased degradation risks prior to the project.

Combined Baseline Activity: Prior to AAD securing rights and initiating the CSIR project, the combined project area (~57,748 ha) faced a credible, legally sanctioned baseline scenario involving planned annual selective logging across approx. **1,605 hectares**, yielding approx. **72,711 m³** of commercial timber per year, alongside risks of uncontrolled degradation.

Both concessions are situated on State Forest Land legally designated primarily as Limited Production Forest (Hutan Produksi Terbatas - HPT) with some areas potentially designated as Production Forest (Hutan Produksi - HP), mandating forest management with commercial timber harvesting as the primary objective under Indonesian law prior to this project's intervention.

- **Operational Plans (BLM):** PT. BLM had a government-approved 10-year Work Plan (RKUPHHK-HA) for the 2016-2025 period, based on a 2015 Periodic Comprehensive Forest Inventory (IHMB) (Approved via MoF Decree No. SK.16/UHP-1/2015, subsequently revised via MoEF Decree No. SK.10084/MenLHK-PHPL/UHP/HPL.1/12/2019 - See **(RKUPHHK-HA PT.BINTANG LIMA MAKMUR**). This plan detailed the implementation of the Indonesian Selective Cutting and Planting (TPTI) silviculture system, with a harvesting limit of diameter ≥ 50 cm (appropriate for HPT). The plan projected an average annual harvest across the effective production area (approx. 19,655 ha, excluding protected/ineffective zones) of **681.5 hectares**, yielding approximately **30,861 m^3 of timber per year** for the 2016-2025 period (File 3, Table 3.11). PT. BLM conducted logging operations consistent with this plan between 2016 and 2019 (File 3, Table 2.2) but ceased field harvesting activities in early 2020, reportedly due to the impacts of the COVID-19 pandemic.
- **Operational Plans (GES Unit II - Proxy):** While specific, detailed RKU/RKT documents for the GES Unit II site comparable to BLM's are not available, its legal status as an IUPHHK-HA on adjacent HPT/HP land strongly indicates planned commercial logging under the TPTI system was the mandated and intended land use. The subsequent MoEF Recommendation Letter for GES Unit II (GES2 Recommendation Letter) regarding its transition to a conservation-focused PBPH MUK further supports this premise. Given the similarities in license type, timing, geography, forest type (predominantly logged-over secondary forest), and regulatory context, the planned activities and harvest intensity documented in PT. BLM's approved RKU serve as the most credible and justifiable proxy baseline for the GES Unit II site. Applying a similar ratio of effective production area (~85% of total area, approx. 28,218 ha for GES) and BLM's planned harvest intensity (681.5 ha/yr / 19,655 ha effective area) suggests a likely planned annual harvest of approximately **923 hectares**, yielding approx. **41,850 m^3 of timber per year** for the GES site under the baseline scenario. Like the BLM site, the cessation of active management post-2020 likely increased its vulnerability to degradation.

- **Combined Baseline Activity:** Therefore, prior to AAD securing rights and initiating the CSIR project, the combined project area faced a credible, legally sanctioned baseline scenario involving planned annual selective logging across approx. **1,605 hectares**, yielding approx. **72,711 m^3 of commercial timber per year**.

Ecosystem & Environmental Conditions: The project area consists primarily of tropical lowland and hill rainforest ecosystems, largely classified as secondary forest due to historical logging activities preceding the 2012 licenses. Dominant species include *Homalium foetidum, Canarium vulgare*, and *Diospyros oblonga* .The area encompasses varied topography, climate, and soils typical of Central Seram (See Section 2.1.14 and Appendices A1-A11 for general maps).

Historical Context & Land Use: The concessions have been subject to logging under previous permits before 2012. Surrounding communities practice subsistence agriculture (sago, tubers), cultivate cash crops (cloves, nutmeg), fish, hunt, and collect Non-Timber Forest Products (NTFPs), with potential interactions and access occurring within or near the concession boundaries.

Pre-Project Risks: The temporary cessation of logging operations by both PT. BLM and PT. GES post-2020, before the CSIR project start date, created a perceived management vacuum, increasing the risk of degradation from illegal logging and uncontrolled fires within the concessions, as noted in PT. BLM's documentation context.

Project Intent: The CSIR project, involving AAD securing management rights and implementing conservation activities from 15 Auguest 2022 onwards, was explicitly designed to halt planned logging and prevent further degradation, not to generate emissions for subsequent reduction.

Land Use Scenarios Without the Project:
In the absence of the CSIR project intervention, the following land-use scenarios were considered plausible for the project area:

1. **Continuation/Resumption of Planned Commercial Logging:** PT. BLM and PT. GES (or their successors) resume or continue logging operations as permitted under their IUPHHK-HA licenses and approved/proxied work plans.
2. **Degradation from Uncontrolled Activities:** A lapse in active management leads to increased illegal logging, agricultural encroachment, and potential fires, degrading the forest stock.

3. **Conversion to Other Land Uses:** Potential (though less likely in the short-term given land status) pressure for conversion to large-scale plantations (e.g., industrial timber, potentially oil palm) or other developments if zoning changed.
4. **Passive/Ineffective Conservation:** Unfunded conservation efforts without a mechanism like carbon finance, likely resulting in failure to prevent degradation (similar to Scenario 2).

Based on legal mandates, economic incentives, and barrier analysis (detailed in Sections 3.1.4 and 3.1.5), Scenario 1 (Continuation/Resumption of Planned Commercial Logging - using actual BLM plans and proxied GES plans) represents the most credible baseline scenario.

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

Based on the analysis of conditions prior to project initiation (Section 2.2.1) and evaluation of potential land-use alternatives, the **continuation or resumption of planned commercial logging**, as legally permitted under the IUPHHK-HA licenses held by PT. BLM and PT. GES, is determined to be the most likely without-project land use scenario for the entire ±57,748 ha project area.

This justification is based on the following credible and well-documented evidence:

1. **Legal Mandate and Documented Plans (BLM):** The BLM site (PAA1) held a valid IUPHHK-HA (SK.537/2012) and, critically, possessed detailed, government-approved work plans (RKUPHHK-HA 2016-2025) explicitly outlining annual logging targets (avg. 681.5 ha/yr, ~30,861 m^3/yr). This provides concrete evidence of the legally sanctioned and planned baseline activity for PAA1.
2. **Legal Mandate and Credible Proxy (GES2):** The GES2 site (PAA2) also held a forestry concession legally designated for timber production. While lacking the same detailed approved work plan documentation as BLM, its similar legal status, geographic context, and the MoEF recommendation letter acknowledging its transition *from* a presumed logging mandate make planned logging the most logical intended baseline use. Using BLM's documented plans and intensity as a proxy (resulting in estimated ~923 ha/yr, ~41,850 m^3/yr) provides the most credible and justifiable baseline estimation for PAA2 in the absence of specific GES2 plans (detailed proxy method in Section 3.1.4).
3. **Demonstrated Operational Intent and Economic Driver:** PT. BLM actively implemented its logging plan between 2016 and 2022 (File 3, Table 2.2),

demonstrating both the intent and capability to harvest timber commercially, which is the primary economic purpose of an IUPHHK-HA concession.

4. **Barriers to Alternative Scenarios:** Other potential scenarios are significantly less likely:
    - **Conservation without Carbon Finance:** Implementing effective, large-scale conservation across ±57,748 ha of production forest presents prohibitive financial barriers for commercial entities like PT. BLM or PT. GES. The substantial, ongoing costs of protection, monitoring, and community engagement lack a corresponding revenue stream without mechanisms like VCU sales. There is no evidence of alternative, secured long-term funding (e.g., major philanthropic grants or government buy-outs) being available or pursued for these specific concessions.
    - **Conversion to Plantations/Other Uses:** While theoretically possible, converting Production Forest (especially HPT) to large-scale plantations (e.g., oil palm, industrial timber) or mining requires complex, costly, and uncertain re-zoning and permitting processes beyond the existing IUPHHK-HA framework. This makes it a less immediate and less probable scenario compared to resuming the legally permitted logging activities.
    - **Degradation/Abandonment:** While illegal logging and degradation were risks, particularly during the operational pause, complete abandonment or solely passive degradation is less likely than the eventual resumption of logging by the license holders (or successors) seeking to realize the economic value of their permits. Planned logging remained the legally sanctioned and economically intended future for the area.

Therefore, considering the legally mandated land use designation, the existence of approved (or credibly proxied) operational plans, the demonstrated history of logging activity, the clear economic incentives for timber extraction, and the significant financial and regulatory barriers associated with alternative conservation or conversion scenarios, the continuation or resumption of planned commercial logging under the TPTI system represents the most credible, well-documented, and justifiable baseline scenario for the project area in the absence of the CSIR project. (This conclusion is further supported by the additionality analysis in Section 3.1.5).

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

The significant community and biodiversity benefits generated by the Central Seram IFM RestorationWise Project (CSIR) are demonstrably additional and would not occur under the baseline scenario of continued or resumed commercial logging across the ~57,748 ha project area. Without the project's specific interventions, participatory approach, and the crucial enabling factor of carbon finance, these positive outcomes would not be realized.

Community Additionality:

- **Contrast with Baseline Livelihoods & Engagement:** Under the baseline logging scenario (Section 2.2.1), community engagement by the concession holders (PT. BLM/PT. GES) would likely remain minimal and primarily extractive, focused on securing access or temporary labor. Employment opportunities during logging phases are typically temporary, offer low wages with limited skill development, provide little long-term security, and can sometimes introduce social disruption (as observed in other forestry contexts). Crucially, the commercial logging business model, governed by permits like IUPHHK-HA (File 3, SK.537/2012), provides **no inherent incentive or established mechanism** for the concession holder to invest significantly in diversifying local economies towards sustainability, enhancing climate resilience for vulnerable farmers and fishers, or promoting community-led enterprises.
- **Baseline Impacts on Resource Access:** Furthermore, logging operations, including road construction (~150 km planned in BLM's RKU - File 3) and harvesting across the extensive production area (~49,000 ha), could **restrict or degrade community access** to vital forest resources (NTFPs, hunting areas, clean water sources) used for subsistence and supplementary income (Section 4.1), potentially increasing hardship, especially for forest-dependent households and indigenous groups (like the Nuaulu) without structured compensation or alternatives being mandated or likely provided. Existing Indonesian laws governing IUPHHK-HA concessions **do not require** the comprehensive, participatory community development and equitable benefit-sharing framework planned by this CSIR project.

The CSIR project introduces specific community benefits that are **additional** because:

1. **Structured Empowerment & Participation:** The project mandates **Free, Prior, and Informed Consent (FPIC)**, transforming communities from passive subjects to active partners in decision-making. The establishment of a formal **Feedback and Grievance Redress Mechanism (FGRM)** (Section 2.3.15) provides accountability channels absent in the baseline.

2. **Sustainable Livelihood Development:** Crucially, the project initiates dedicated **Sustainable Income Generating Activities (SIGS)**, developed participatorily and facilitated through the local partner **PT Asia Pasifik Asset Percayaan Indonesia** (Section 2.1.8). These activities (detailed in Section 2.1.17 / Appendix 2), including support for climate-smart agriculture (CSA), sustainable Non-Timber Forest Product (NTFP) value chains (e.g., linking collection to processing/markets), and potentially other local enterprises (e.g., chicken/goat raising - Section 1.1), are designed to provide long-term, resilient income sources, directly contrasting with the limitations of baseline scenario opportunities.
3. **Targeted Development & Capacity Building:** The project includes specific investments in community-prioritized needs like **clean water systems** (Section 1.1), support for **health and education**, and dedicated **capacity building** (Section 2.3.17) – none of which are obligations or likely outcomes under a standard logging concession.
4. **Overcoming Barriers & Funding:** These positive community outcomes face significant financial and capacity barriers without the project. Implementing diverse programs requiring technical expertise, long-term support, and dedicated funding is beyond the scope and incentive structure of the baseline logging operations. **Carbon finance generated through VCU sales is the essential mechanism** enabling these additional community development activities and the establishment of an equitable benefit-sharing system.

Biodiversity Additionality:

The baseline scenario of commercial selective logging across ~49,000 ha of production forest inherently leads to significant negative biodiversity impacts not adequately mitigated by standard logging regulations alone:

- **Habitat Degradation & Fragmentation:** Continued logging operations, as planned in the baseline (File 3), would cause direct habitat loss, degradation of forest structure vital for specialist species, and extensive fragmentation from road networks, hindering wildlife movement and reducing core forest area. This directly threatens biodiversity in a region recognized as part of the Wallacea hotspot and containing identified HCVs, including habitat for endemic and RTE species (Section 5.1).
- **Increased Anthropogenic Pressure:** Logging roads inevitably increase human access, facilitating illegal logging and poaching, putting further pressure on

vulnerable species populations – pressures that under-resourced baseline management struggles to control effectively.

- **Lack of Conservation Focus:** The primary objective of the baseline is timber production. While environmental regulations exist, there is **no mandate or financial driver for the concession holder to proactively manage for biodiversity conservation**, implement targeted species recovery actions, or conduct comprehensive biodiversity monitoring across the large production landscape.

The CSIR project generates **additional** biodiversity benefits by:

1. **Preventing Planned Habitat Degradation:** The core additionality is **halting planned logging** across ~49,000 ha, preventing the direct destruction, degradation, and fragmentation associated with the baseline scenario.
2. **Implementing Active Threat Reduction:** The project specifically funds and deploys **dedicated forest patrols** (Section 2.1.17) aimed at controlling illegal logging and poaching, providing a level of active protection beyond standard concession security, which is often focused solely on timber assets. This is reinforced by community livelihood alternatives designed to reduce pressure on forest resources.
3. **Enabling Conservation Management:** Shifting the management objective allows for the protection of HCV areas and facilitates natural regeneration, creating conditions conducive to biodiversity recovery, which is not the focus of the baseline.
4. **Funding Biodiversity Monitoring:** The project incorporates **dedicated biodiversity monitoring** (Section 5.4), enabling adaptive management informed by conservation targets, an activity absent under the baseline scenario.

These biodiversity outcomes are additional because the baseline lacks the conservation mandate and, critically, the financial mechanism to cover the opportunity costs of foregoing timber revenue and the operational costs of large-scale protection and monitoring. **Carbon finance provides the necessary revenue stream** to make this shift from production to conservation viable.

The CSIR project's specific community development programs and biodiversity conservation actions are demonstrably additional. They address community needs and biodiversity threats exacerbated or unaddressed by the baseline logging scenario, overcome significant financial and institutional barriers, and are explicitly enabled by the

project structure and its reliance on carbon finance. These benefits would not be realized under the most likely without-project scenario, as detailed further in Sections 4.1 and 5.1.

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

Only the climate benefits (i.e., quantified GHG emission reductions and removals verified under the VCS Program and issued as VCUs) generated by the project are intended to be used as carbon offsets.

No distinct community or biodiversity benefits generated by the project are intended to be used, quantified, or claimed as separate offsets under any other crediting scheme. The community and biodiversity outcomes are co-benefits resulting from the project activities funded primarily through the climate mitigation (carbon offset) component, and their value is recognized through the CCB certification.

2.3 Safeguards and Stakeholder Engagement

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

Stakeholders for the Central Seram IFM RestorationWise Project (CSIR) were identified through a multi-stage process combining spatial analysis, government consultation, and direct community engagement, initiated prior to the project start date:

1. **Spatial Analysis & Document Review:** Initial identification involved analyzing the geographic boundaries of the two project sites (BLM ±24,550 ha and GES ±33,198 ha) using license maps (GES2_Map.pdf, RKUPHHK File 2 maps) and regional administrative data (BPS File 4). This identified the sub-districts (primarily Amahai, Teluk Elpaputih, Teon Nila Serua) and villages situated adjacent to or potentially overlapping with the concession areas. Relevant legal and planning documents (IUPHHK licenses, RKUPHHK, government regulations) were reviewed to understand the formal land status and administrative context.
2. **Participatory Workshops & Community Engagement:** Building on the initial analysis and government consultations, a series of participatory workshops, framed around Social and Biodiversity Impact Assessment (SBIA, a more comprehensive version of Participatory Rural Appraisal; PRA) principles, were conducted.
    - These workshops, brought together representatives from key villages identified in step 1 & 2.
    - Participants included formal village administration (Village Chiefs/Deputies, council members), customary leaders (Kepala Adat), representatives from different community segments (elders, youth, women), and individuals from various livelihood groups (farmers, fishers).

- Invitations and participant selection were facilitated through established local networks, involving village leadership and potentially the partner cooperative (PT Asia Pasifik Asset Percayaan Indonesia), ensuring cultural appropriateness and representative participation.
- During these workshops, participants collaboratively identified:
  - Key local community groups and their interests/concerns related to the forest and the proposed project.
  - Other actors influencing or affected by forest use (e.g., government agencies, other resource users).
  - Potential impacts (positive and negative) of the project on different stakeholder groups.

3. **Leveraging Existing Proponent Knowledge:** AAD's prior engagement in the region [mention previous work if applicable, as cited in Alex_To_Do, e.g., support for law enforcement since 2017] provided existing knowledge of local dynamics and key actors.
4. **Ongoing Identification:** The stakeholder list remains open. Further identification continues through the formal FPIC process, ongoing community liaison activities, and monitoring feedback received via the FGRM, allowing for the inclusion of any previously overlooked groups or emerging interests.

Table 4: Participants to the CSIR SBIA/PRA workshop and the institutions they represented

Stakeholder	Institution/ Responsible Person	# Representatives
Provincial Government of Indonesia	Director General, Forestry Bureau, Maluku Province.	1
	Director, West Regency, Forestry Bureau, Maluku Province.	1
	Director, East Regency, Forestry Bureau, Maluku Province.	1
Communities	Village Chief	4
	Customary community Leader	4
	Village Representatives	58
Academia	Bogor Agricultural University	1

Proponent	AAD CSIR Program	2

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

Key stakeholders identified include, but are not limited to:

- **Local Communities:** The project zone primarily interacts with communities within four key sub-districts (Kecamatan) of Central Maluku Regency: **Tehoru, Teluk Elpaputih, Kota Masohi, and Amahai**. Based on project data derived from local sources, the specific villages (Desa/Kelurahan) included are:
    - *Tehoru (10 villages):* Salamahu, Haya, Tehoru, Saunulu, Yaputih, Piliiana, Hatu, Hatumete, Mosso, Telutih Baru.
    - *Teluk Elpaputih (4 villages):* Sahulau, Liang, Tananahu, Waraka.
    - *Kota Masohi (5 villages):* Letwaru, Lesane, Ampera, Hamaelo, Namasina.
    - *Amahai (15 villages):* Banda Baru, Yafila, Hollo, Makariki, Sehati, Haruru, Amahai, Soahuku, Rutah, Sepa, Tamilouw, Nua Nea, Yainuelo, Nuweletetu, Hatuhenu.

      The total estimated population across these **34 villages** is approximately **120,051**. Average monthly incomes vary by sub-district, ranging from approx. **1,250,000 RP** in Tehoru to **2,000,000 RP** in Kota Masohi and Amahai, with an overall weighted average of approx. **1,700,000 RP**. These figures suggest many households may be near or below national poverty lines, highlighting the relevance of the project's community development goals. Livelihoods remain diverse, commonly including subsistence and cash crop farming (sago, tubers, cloves, nutmeg), fishing, NTFP collection, and some government/private employment, particularly closer to Masohi (Further details in Section 4.1).
- **Indigenous Peoples (IP):** Specifically, the **Nuaulu** people residing in Nua Nea and Simalouw (within Amahai sub-district's administrative area) and potentially the **Manusela** people near the project's northern boundary (North Seram area). These groups have distinct cultural identities, customary rights, and often rely heavily on forest resources for subsistence. Their unique rights and perspectives require specific attention through the FPIC process.
- **AAD (Project Proponent):** Responsible for project design, implementation, funding, MRV, and overall management. Interest lies in successful conservation outcomes, generation of carbon credits, and positive stakeholder relationships.
- **Government Agencies:**

- Ministry of Environment and Forestry (MoEF): National authority for forestry licensing and regulation.
- Maluku Provincial Forestry Department: Regional oversight, potential partners in implementation/monitoring.
- Sub-district and Village Governments: Local administration, crucial for communication, coordination, and implementation of community activities.

- **Customary Institutions:** Traditional leaders (e.g., Raja Negeri, Kepala Adat, Kepala Mata Rumah) within Negeri/Desa Adat structures, holding customary authority over land and community matters.
- Potential partners or monitors.
- **PT. Bintang Lima Makmur:** The previous license holder, relevant for historical context and baseline information.
- **PT. Green Ekonomi Sejahtera**

(A detailed Stakeholder Description Table will be compiled in Appendix 1)

Table 5: Communities included in the Project Accounting Area for the CSIR

Nº	County	Village	Average Income (RP)	Total population
1	Tehoru	Namasula, Salamahu, Waya Udara, Haya, Asalolo, Pasalolo, Tehoru, Saunulu Yaputih, Piliiana, Hatu, Hatumete, Mosso, Telutih Baru	1,250,000	17,851
2	Teluk Elpaputih	Kelapadua, Nari, Sukalopu, Eleuw, Sahulau, Liang, Tananahu, Waraka	1,500,000	9,477
3	Teon Nila Serua	Nuweletetu, Nakupia, Tonetana, Waru, Usilapan, Layani, Kuralele, Kokroman, Lesluru, Jerili, Trana, Wotay, Isu, Watludan, Yafila,	1,500,000	14,606
4	Kota Masohi	Letwaru, Lesane, Ampera, Masohi, Hamaelo, Namasina, Sugiarto	2,000,000	36,533
5	Amahai	Banda Baru, Yafila, Hollo, Makariki, Sehati, Haruru, Amahai, Soahuku, Rutah, Sepa, Tamilouw, Nua Nea, Yainuelo, Nuweletetu, Hatuhenu	2,000,000	50,479

			1,700,000	128,946

Figure 4: Map of the CSIR PAA1, PAA2 and PARA1 with 59 surrounding Villages

The following list of community groups and specific stakeholders was derived from the stakeholder analysis performed during the SOCIAL AND BIODIVERSITY IMPACT ASSESSMENT (SBIA/PRA) workshops

Table 6**:** Stakeholder Assessments

Stakeholder	Rights, interest, and overall relevance to the project
Project Proponent	Holder of tenure and carbon units rights and enforcer of project.
Technical Consultant	Project consultant, responsible for the drafting of PDD and provide consultation services in the structural development of project.
Local and Provincial Forest Bureau	Supervising body for this project.
Local Cooperatives	Representative for the local communities. Provide lessons and trainings, micro-finance, and direct employment.
Local Residents	Residents who may possibly have their lifestyle or rights affected by project activities.

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

Full project documentation will be made accessible throughout the project lifetime via:

- **Verra Registry:** Publicly available project documents (PD, monitoring reports, validation/verification reports) will be uploaded to the Verra Project Hub.
- **Project Website:** www.asiaassetsdev.com where key documents and updates will be posted.
- **Local Access:** Hard copies of key documents (especially summaries in Bahasa Indonesia) will be made available upon request at [Designated project field office location(s) - TBD] and potentially deposited at relevant Sub-district and/or Village offices within the project zone.

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

Summary project information will be actively disseminated using culturally appropriate methods:

- **Initial Information:** Project summaries (objectives, activities, location, proponent, basic carbon/CCB concepts, contact information) translated into Bahasa Indonesia will be prepared in accessible formats (e.g., simple brochures, posters). These will be distributed during initial consultations and made available in village offices/community centers.
- **Monitoring Results:** Summaries of monitoring reports (key findings on carbon performance, community impacts, biodiversity status) will be prepared in Bahasa Indonesia and shared through community meetings, posters in villages, and potentially via local radio or other relevant local media. The project website will also host these summaries.
- **Language:** All summary materials and key consultations will be primarily in Bahasa Indonesia, the national language widely understood in the region. Translation or facilitation into local dialects will be provided if necessary during specific community meetings.

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

Initial informational meetings have been conducted om **20 June, 2022** with key government stakeholders and informally with representatives from some accessible communities to introduce AAD and the project concept (transition from logging to conservation). These meetings confirmed initial interest and support.

Formal, widely publicized informational meetings and consultations will be a core part of the FPIC process. Notice of meetings will be provided well in advance through official channels (letters to government/village heads) and local communication methods (village announcements, notice boards, liaison officers) to ensure broad awareness and opportunity for participation.

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

While the project's primary impacts are expected to be positive, potential risks *resulting from project activities* are identified and mitigated (refer also to Appendix 3):

- **Exclusion Risk:** Project protection activities (patrols, restricted access to certain areas) could potentially limit communities' access to resources they traditionally used, negatively impacting livelihoods, especially for vulnerable/forest-dependent groups.
    - *Mitigation:* Detailed participatory mapping of customary use areas during FPIC; designing protection zones in consultation with communities; developing viable and accessible alternative livelihood programs; clear communication about project boundaries and rules; functioning FGRM.

- **Benefit Inequality:** Project benefits (e.g., employment, program support) may be captured by local elites or more accessible groups, marginalizing women, IPs, or poorer households.
    - *Mitigation:* Proactive targeting of vulnerable groups in project design; transparent criteria for employment and program participation; gender-sensitive planning; specific outreach to IP communities; monitoring benefit distribution; FGRM.
- **Expectation Management:** High community expectations regarding project benefits (jobs, financial aid) may not be fully met, leading to disappointment or conflict.
    - *Mitigation:* Clear, realistic communication about project scope, timelines, available resources, and benefit-sharing mechanisms during FPIC and ongoing consultations; managing expectations transparently; FGRM.
- **Safety & Security Risks:** Project staff (especially patrols) or community members involved in project activities could face safety risks (e.g., difficult terrain, wildlife encounters, potential confrontation with illegal actors). Increased project presence could potentially introduce social friction or safety concerns, particularly for women/girls.
    - *Mitigation:* Provision of appropriate training, safety equipment (PPE), and communication tools for project staff/patrols; development of clear operational safety protocols (SOPs); code of conduct for project staff emphasizing respect for local communities and gender sensitivity; collaboration with local authorities on security issues; accessible reporting channel within FGRM for safety/conduct concerns.
- **Pollutants/Waste:** Project operations (base camps, vehicle use, potential nursery activities) could generate waste or minor pollution.
    - *Mitigation:* Implementation of waste management plan (reduce, reuse, recycle principles for domestic waste); proper handling/disposal procedures for any hazardous materials (e.g., fuel, oil); minimizing environmental footprint of any necessary infrastructure.

The project commits to the principle of 'no net harm' and will actively monitor and manage these risks throughout its lifetime, adapting strategies as needed based on monitoring results and stakeholder feedback.

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

Information regarding potential costs (e.g., opportunity cost of restricted forest access), risks (e.g., participation risks, potential negative impacts as per 2.3.6), and benefits (e.g.,

employment, livelihood support, ecosystem services, capacity building) has been and will continue to be shared with communities in a transparent, timely, and culturally appropriate manner. This occurs primarily through:

- **FPIC Consultations:** Dedicated meetings where project details, potential impacts (positive and negative), proposed mitigation measures, and benefit-sharing plans are discussed openly using clear language (Bahasa Indonesia, local facilitation if needed) and visual aids.
- **Information Materials:** Dissemination of summary documents (brochures, posters) outlining key project aspects.
- **Ongoing Dialogue:** Regular communication via project staff/liaison officers and accessible feedback channels (FGRM).

This information is provided *before* communities are asked to provide formal consent, allowing ample time for internal discussion, questions, and informed decision-making regarding participation. Community feedback gathered during this process is used to refine project design and mitigation measures.

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

Communities and other stakeholders will be informed about the VCS and CCB validation and verification processes, including their purpose, timelines, and the role of the independent auditor (VVB):

- **Measures Taken**: Specific announcements and explanations will be provided during community meetings and consultations preceding the audit activities. Information will also be disseminated via village leadership and local project contacts.
- **Communication Methods**: Verbal explanations (in Bahasa Indonesia, with local facilitation if needed), simple written summaries or posters outlining the audit process, and contact information for the project team for further questions.

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

Notification: Communities and relevant stakeholders will be notified of the planned VVB site visit schedule at least [e.g., two-three weeks] in advance, through village heads and project liaison staff.

Facilitation of Communication: The project will facilitate direct and independent communication between the VVB and stakeholders. This includes:

- Organizing meetings where the VVB can speak directly with community members (including separate focus groups for women, IPs, or other specific groups if requested by the VVB or community).

- Ensuring VVB auditors can travel freely within the project zone to meet stakeholders without undue influence from project staff (though logistical support will be provided).
- Providing contact information (e.g., VVB public contact, project FGRM channel which can forward concerns) should stakeholders wish to communicate confidentially outside of planned meetings.
- Emphasizing to communities their right to speak freely and raise any concerns with the auditors.

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

Stakeholder consultations are foundational to the project design and ongoing implementation.

- **Initial Phase:** Informal consultations (as mentioned in 2.3.5) helped gauge initial interest and identify key local concerns (e.g., related to PT. BLM's and GES's legacy, community needs, forest access). This informed the preliminary project concept.
- **FPIC Process:** A formal, documented FPIC process is being implemented [or will commence shortly] involving all identified communities, IP groups, and customary rights holders. This involves multiple rounds of information sharing and consultation meetings, conducted in a culturally sensitive manner (respecting local protocols, timing, language needs) and ensuring representation of diverse groups (women, youth, elders, different livelihoods). The aim is to achieve documented consent for project activities and agreement on benefit-sharing and grievance mechanisms.
- **Government & Other Stakeholders:** Ongoing consultations are held with relevant government agencies (Provincial Forestry Department) to ensure alignment, collaboration, and compliance.
- **Impact on Design:** Stakeholder input gathered to date has emphasized the importance of clear communication, respect for customary areas, tangible livelihood benefits, and local employment. Project design incorporates these elements, for example, by prioritizing local hiring for patrols and ensuring community development activities are designed based on local needs identified during consultations.

(Table for documenting specific comments and responses will be populated during and after formal consultations and the public comment period).

Date of stakeholder consultation	20 June 2022
Stakeholder engagement process	The stakeholder engagement process for the CSIR project prioritized direct communication and participation, respecting local customs and social structures within the Central Maluku communities. Key steps included: **Initial Outreach & Identification**: AAD, working with local contacts and partners, identified key community leaders (formal and customary) and representative groups within the villages potentially affected by the BLM and GES2 concession areas (listed in Section 2.3.2). **Culturally Appropriate Communication**: Initial contact and invitations were made through appropriate local channels, respecting village leadership structures. Information was prepared in Bahasa Indonesia. **Centralized FPIC Consultation Meeting**: A significant Free, Prior, and Informed Consent (FPIC) consultation meeting was held on **20 June, 2022** Representatives from the majority of the villages within the project zone (Section 2.3.2) were invited and attended, alongside representatives from AAD, parnters, and relevant local authorities. **Meeting Content & Structure**: The meeting included: - A clear presentation by AAD on the project's background (transition from planned logging by BLM/GES2 to conservation), objectives (climate, community, biodiversity), planned activities (forest protection, SIGS, community support programs), anticipated timeline, and the VCS/CCB framework. - Explanation of potential benefits (e.g., employment, livelihood diversification, infrastructure support like water systems), costs (e.g., potential changes in forest access), and risks. - An open discussion and Q&A session facilitated in Bahasa Indonesia, allowing participants to raise concerns, ask questions (particularly regarding land use, resource access, benefit sharing, and participation), and provide initial feedback. - Discussions were conducted respectfully, following local meeting customs where appropriate. Ongoing Engagement: This central meeting serves as a foundation. Further, more localized consultations and engagements are planned as the project progresses, particularly for the detailed co-design of community-specific activities (like SIGS) and the finalization of benefit-sharing agreements, ensuring adherence to the ongoing nature of the FPIC process. The FGRM provides a continuous channel for input.
Consultation outcome	The primary outcome was a shared understanding of the project's shift from logging to conservation and initial community feedback on the concept. Participants expressed general support for the project, particularly its potential to provide alternative income sources, protect forest resources important for ecosystem services (water)

	and livelihoods (NTFPs), and offer employment opportunities. Key discussion themes included: * Land Tenure & Access: Concerns regarding how project boundaries would interact with customary land use and access rights for farming, hunting, and NTFP collection. * Livelihood Impacts: Questions about the potential loss of income from restricted forest access (logging, hunting) and strong interest in the types and feasibility of alternative livelihood programs proposed. * Benefit Sharing: Desire for transparency and equity in how project benefits (especially financial ones from carbon credits) would be distributed and managed locally. * Participation: Emphasis on the need for continued community involvement in decision-making throughout the project. Consent for the overall project concept was provisionally positive, pending detailed FPIC agreements on specific activities and benefit sharing. Key environmental and social issues identified by the community as project priorities align with the project's focal issues: reducing forest degradation (illegal logging, encroachment), preventing biodiversity loss (poaching of key species), and addressing poor community livelihoods (lack of stable income, limited access to services like clean water and economic opportunities).
Stakeholder input	Community input received during these initial consultations and ongoing dialogue significantly influenced the project design: * Emphasis on Livelihoods: Strong community interest led to prioritizing the development of diverse and sustainable alternative livelihood options (e.g., CSA, sustainable NTFPs) as a core project component, facilitated through the local PT Asia Pasifik Asset Percayaan Indonesia. • FPIC & Participation: The clear need for community involvement resulted in embedding FPIC as a central process and planning for ongoing participatory mechanisms • Tenure & Access: Concerns about access led to the explicit inclusion of participatory mapping of customary use areas within the FPIC process, with a commitment to negotiate agreed access protocols or alternatives where restrictions are necessary. • Benefit Sharing Structure: The desire for local control and transparency influenced the decision to partner with the local partner PT Asia Pasifik Asset Percayaan Indonesia as a key channel for managing and distributing certain community benefits, including micro-finance. • Local Employment: Explicitly prioritizing local hiring for patrols and other project roles directly addresses community requests for job opportunities. The project continues to

	solicit and integrate stakeholder feedback through the ongoing FPIC process and the established FGRM for adaptive management.

Table 10**:** Public Comments and Response

Summary of comment received	When comment was received	Actions taken
TBD	TBD	TBD

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

The project establishes a plan for continuous communication and consultation throughout its lifetime:

- **Regular Meetings**: Periodic meetings (e.g., annually or biennially) will be held in key villages or representative forums to provide project updates, discuss monitoring results, and gather feedback.
- **Liaison Staff**: Dedicated project field staff/community liaison officers will maintain regular contact with communities.
- **FGRM**: The Feedback and Grievance Redress Mechanism provides a formal channel for ongoing input and concerns.
- **Participatory Monitoring**: Involving community members in monitoring activities (e.g., patrols, biodiversity monitoring) provides continuous feedback opportunities.
- **Adaptive Management**: Project management will regularly review stakeholder feedback and monitoring results. This information will be used to make necessary adjustments to project activities, implementation strategies, benefit distribution, or risk mitigation measures, ensuring the project remains relevant, effective, and responsive to stakeholder needs and changing conditions. Decisions on significant adaptations will involve consultation with affected stakeholders.

2.3.12 Stakeholder Consultation Channels (CCB, G3.5)

Consultations are conducted directly with communities or through their legitimate representatives, identified through a combination of formal structures and customary recognition:

- **Formal Representatives**: Village Heads (Kepala Desa/Negeri), Village Consultative Councils (BPD/Saniri), Sub-district Heads (Camat).

- **Customary Representatives**: Traditional Leaders (Raja Negeri, Kepala Adat, Kepala Mata Rumah) where applicable and recognized by the community.
- **Community Groups**: Direct engagement with representatives of specific groups (women's groups, youth groups, farmer/fisher associations, IP representatives).
- **Information Sharing**: Adequate information sharing is ensured through multiple channels (meetings, documents, local announcements) in accessible language (Bahasa Indonesia), providing sufficient detail and time for stakeholders to understand implications before decisions are made. Records of consultations (minutes, attendance lists, agreements) are maintained to document the process.

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

In order to ensure effective participation of CSIR communities it was important to hold meetings and workshops during time periods where stakeholders could attend. As such, all meetings and workshops were held during the day and at times when other work did not interfere with full community participation. Invitations were extended to community leaders, local government officials and commune leaders within a respectful timeframe and in such a manner that each stakeholder could respond. This included via written invitations, and phone calls. All communication was conducted in Indonesian, a language every participant speaks, thus enabling participants to fully understand enabling their full participation.

The project enables effective stakeholder participation through:

- **FPIC**: Provides the primary mechanism for communities to influence initial project design and provide consent.
- **Participatory Planning**: Community development activities are designed based on needs identified with communities. Community members will be involved in planning and implementing relevant activities (e.g., nursery management, reforestation, patrol routes).
- **Employment & Capacity Building**: Prioritizing local employment (Section 2.3.18) and providing relevant training (Section 2.3.17) empowers local individuals to actively participate in implementation.
- **Cultural & Gender Sensitivity**: Consultation methods respect local customs and schedules. Specific efforts are made to create safe spaces for women and marginalized groups to participate and voice opinions (e.g., separate focus groups, timing meetings appropriately, ensuring female facilitators are available). Project staff receive training on cultural sensitivity and gender equity.

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

AAD and all entities involved in the project are committed to upholding principles of non-discrimination and preventing sexual harassment:

- **Policy**: A clear anti-discrimination and anti-harassment policy, compliant with Indonesian Law (e.g., Law No. 13/2003 on Employment, Law No. 39/1999 on Human Rights) and international standards (e.g., ILO conventions), applies to all project staff, contractors, and partners. Discrimination based on gender, ethnicity, religion, age, disability, sexual orientation, or any other status is prohibited.
- **Training**: Project staff receive mandatory training on the anti-discrimination/anti-harassment policy, cultural sensitivity, gender equity, and respectful community engagement.
- **Recruitment & Operations**: Employment practices ensure equal opportunity (Section 2.3.18). Project activities are designed to be inclusive and avoid reinforcing existing inequalities.
- **Monitoring & Reporting**: Adherence to the policy is monitored. The FGRM provides a confidential channel for reporting any instances of discrimination or harassment, which will be investigated promptly and impartially, with appropriate disciplinary action taken if warranted.

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

Development process	The project strives to minimize the possibility of conflicts and grievances by maintaining close linkages between and working proactively with communities and stakeholders throughout the Project Accounting Area. The Project additionally has an open-door policy, encouraging community members, stakeholders and employees to visit the Project Office, which is located at [TBD], and discuss any issues or feedback directly with project staff. The AAD Seram office also allows comments and feedback which are followed up upon by project staff. A project email has also been disseminated to communities. If conflicts or grievances arise, the CSIR has a feedback and grievance redress policy and process, the purpose of which is to provide an efficient, fair and accessible mechanism for resolving complaints and conflicts, and ensure that the process is transparent and comprehensive. The project feedback and grievance redress process has been publicized to communities and a copy provided to the project validator. The full grievance policy has been submitted to the validator and is available to anyone upon request. In summary, community members and project stakeholders are encouraged to submit grievances, comments or feedback to

	the Project Office through several channels, with all communication methods receiving the same level of response. The primary method for communication will be through the Project Office or Sub-office which is located at [TBD]
Grievance redress procedure	**Process of receiving and hearing:** Any comment can be submitted via the following open channel: 1. AAD's website at www.asiaassetsdev.com 2. Central Seram AAD office 3. Community leaders and officials also act as a communication channel between PP and the local community. **Process of responding and attempting to resolve grievances:** Any comment received will be answered within 21 days, unless it is a public comment posted on Verra, as it requires an update on the project description document to answer. Stage 1: An attempt to further understand the incident and the measures that could be taken will first be conducted digitally, via phone or mail. A formal written response will be provided after the interaction in a manner that is culturally appropriate. A meeting between the party submitting the grievance incident and PP will be arranged, if necessary, to resolve the conflict. All grievance reports received and meeting minutes will be made publicly available at the PT Asia Pasifik Asset Percayaan Indonesia office. The meeting will be conducted in a cultural appropriate manner, considering traditional conflict resolution methods such as traditional peace-making ceremonies (pela gandong). Village leaders and head of FMU will be consulted to incorporate the appropriate traditional conflict resolution methods used by the communities. Stage 2: Any grievances that are not resolved by amicable negotiations, shall be referred to mediation by a neutral third party that is agreed by both parties. The neutral third party could include Bogar Agricultural University or the Maluku Provincial Forestry Department. Stage 3: Any grievances that are not resolved through mediation shall be referred either to a) arbitration, to the extent allowed by the laws of the relevant jurisdiction or b) court of Jakarta, Republic of Indonesia, without prejudice to a party's ability to submit the grievance to a competent supranational adjudicatory body, if any.

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

The FGRM will be publicized through:

- Community meetings during FPIC and project implementation.
- Posters and information sheets (in Bahasa Indonesia) displayed in village offices and community centers, including contact details for lodging grievances.
- Explanation by project liaison officers during regular village visits.
- Information on the project website.

Grievances received and their resolution status will be documented internally. Summaries of grievances (anonymized where appropriate) and responses will be made publicly available periodically (e.g., annually via website/community meetings) to ensure transparency, while respecting confidentiality.

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

The CSIR project is committed to building local capacity by providing comprehensive orientation and ongoing training for all project personnel, with a particular focus on employees recruited from communities within the project zone (Section 2.3.18). This training is designed not only to equip workers with the necessary skills for effective project implementation but also to foster locally useful knowledge and competencies that enhance long-term employability and support sustainable development in the region.

Training components include:

1. **Project Induction & Orientation:** All new personnel receive a thorough introduction covering:
    - The CSIR project's background, objectives (climate, community, biodiversity), and activities (IFM LtPF, SIGS, community support).
    - Relevant VCS and CCB standards and requirements.
    - AAD's operational policies, including the Code of Conduct, Anti-Discrimination and Anti-Harassment Policy (Section 2.3.14), and Occupational Health and Safety (OHS) procedures (Section 2.3.19).
    - The project's Feedback and Grievance Redress Mechanism (FGRM) (Section 2.3.15).
    - Basic principles of forest conservation, biodiversity protection, and sustainable development relevant to Central Seram.

2. **Role-Specific Technical Training:** Tailored training is provided based on job responsibilities. Examples include:
    - **Forest Patrol Teams:** Practical skills in navigation (map reading, GPS use), patrol planning and execution protocols, identification and recording of threats (illegal logging signs, encroachment indicators, poaching signs like snares), basic biodiversity observation, community interaction and conflict de-escalation techniques, relevant forestry and conservation regulations, first aid, and potentially the use of data collection tools like SMART (Spatial Monitoring and Reporting Tool).
    - **Community Liaison & SIGS Support Staff:** Training in effective communication and facilitation skills, participatory rural appraisal (PRA) techniques, understanding the specific Sustainable Income Generating Schemes (SIGS) being supported (e.g., Climate-Smart Agriculture techniques, sustainable NTFP harvesting/processing, small livestock management), basic monitoring of community program progress, explaining the FGRM process, and coordinating with the PT APAPI on micro-finance or collective marketing elements.
    - **Nursery & Restoration Support Staff (relevant for PARA1 & community planting):** Techniques for native seed collection, storage, and germination; nursery management practices (soil mix, watering, pest control without harmful chemicals); seedling propagation and handling; appropriate site preparation and planting techniques for local conditions; basic monitoring of seedling survival and growth.
    - **Monitoring Support Staff (Carbon/Biodiversity):** If local staff are involved, training may include standardized methods for forest inventory plot measurement (DBH, tree ID), biodiversity survey techniques (e.g., line transects, point counts if applicable), accurate data recording, and use of monitoring equipment.
3. **Capacity Building & Knowledge Transfer:**
    - **Focus on Transferable Skills:** Training emphasizes skills applicable beyond the project, such as sustainable agriculture practices, basic financial literacy (linked to SIGS/micro-finance), organizational skills (via partner involvement), and improved environmental awareness.
    - **Ongoing Learning:** Training is not a one-off event; refresher courses and opportunities for skill advancement will be provided throughout the project lifetime.

- **Knowledge Retention:** To mitigate knowledge loss due to staff turnover, the project relies on:
  - Development and use of clear Standard Operating Procedures (SOPs) for key activities.
  - On-the-job mentoring by experienced supervisors and technical staff.
  - Maintaining comprehensive project records and documentation accessible to relevant personnel.
  - Encouraging participation from a broad base within the community to develop a wider pool of skilled individuals.

This structured approach to training aims to ensure effective project implementation while building lasting capacity within the local communities, contributing to the project's long-term sustainability and positive impact. Training opportunities are provided equitably, with specific efforts to include women and members of vulnerable groups (Section 2.3.18, GL2.4).

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

The CSIR project prioritizes maximizing direct employment opportunities for residents of the communities within the project zone (identified in Section 2.3.2) as a key strategy for delivering local benefits and ensuring project sustainability. AAD recognizes the invaluable local knowledge and familiarity community members possess regarding the landscape, social dynamics, and biodiversity.

Local Hiring Preference:
For all project positions, ranging from field staff (e.g., forest patrols, nursery workers for PARA1 activities, SIGS facilitators) to administrative support and potentially supervisory roles, **preference will be given to qualified residents from local communities**. Where local and non-local candidates possess comparable qualifications and experience for a role, the local candidate will be prioritized. The project aims to fill the majority of its operational positions with local personnel.

Equal Opportunity and Non-Discrimination:
All recruitment and employment practices adhere strictly to the project's Equal Opportunity Policy (referencing Section 2.3.14) and Indonesian labor laws. Selection is based on merit, skills, and experience relevant to the position, ensuring **equal opportunity regardless of gender, ethnicity, religion, age, or other status**. Specific

efforts are made to encourage applications from **women and members of identified vulnerable or marginalized groups** within the communities. The project commits to **equal pay for equal work** and safe working conditions for all employees.

Recruitment and Selection Process:

- **Advertisement:** Job vacancies are advertised publicly and accessibly within the project zone using appropriate local channels, such as postings on village notice boards, announcements via village heads and customary leaders, and dissemination through our partner network.
- **Application & Selection:** Interested local residents can submit applications through designated channels. The selection process involves application review against clear job requirements, followed by interviews conducted by a panel typically including the AAD Field Manager and the relevant technical lead. Where appropriate and agreed, a representative from the PT APAPI or the community may be invited to observe or participate in the selection process to enhance transparency.
- **Feedback:** Unsuccessful candidates, particularly those from local communities, will be provided with constructive feedback regarding their application where feasible, aiming to assist them in future opportunities.

Capacity Building for Employment:
Recognizing that local candidates may sometimes require additional skills, the project commits to providing necessary orientation and role-specific training (as detailed in Section 2.3.17) to successful local hires. Where qualified local candidates are not immediately available for certain specialized roles, the project may hire externally while concurrently implementing a plan to train local counterparts for future succession.

This approach ensures fair access to employment benefits, leverages local capacity, and integrates the community directly into the project's implementation and long-term success.

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

An assessment identifies key occupational safety risks for project workers, particularly field staff:

- **Physical Hazards:** Slips/trips/falls on difficult forest terrain, injuries from falling branches, potential wildlife encounters (e.g., snakes, wild boar), risks associated with using tools (e.g., machetes), vehicle/boat transport accidents.
- **Environmental Hazards:** Exposure to weather extremes, potential vector-borne diseases (e.g., malaria, dengue).
- **Security Hazards:** Potential confrontation with illegal loggers or poachers.

Mitigation Measures:

- **Compliance:** Adherence to all relevant Indonesian labor laws regarding Occupational Health and Safety (OHS).
- **Training:** Mandatory safety training for all field staff covering risk identification, safe work procedures, first aid, emergency response, and safe use of equipment.
- **PPE:** Provision and mandatory use of appropriate Personal Protective Equipment (e.g., sturdy boots, long clothing, gloves, helmets where needed, potentially insect repellent).
- **Equipment & Communication:** Ensuring tools are well-maintained; providing communication devices (e.g., satellite phones/radios) for remote teams; equipping field posts with comprehensive first aid kits.
- **Protocols:** Development of SOPs for high-risk activities (e.g., patrols in remote areas, boat travel), including check-in/check-out procedures and emergency evacuation plans.
- **Working Hours & Conditions:** Ensuring reasonable working hours and conditions to prevent fatigue.
- **Health Support:** Access to basic medical support and clear procedures for handling workplace injuries or health emergencies.
- **Security:** Patrols conducted in teams; coordination with local authorities for security backup if needed; conflict de-escalation training.

Workers will be thoroughly informed of these risks and mitigation measures during induction and ongoing safety briefings.

2.4 Management Capacity

2.4.1 Project Governance Structures (CCB, G4.1)

The Central Seram IFM RestorationWise Project (CSIR) involves several key entities with distinct roles and responsibilities:

- **Asia Assets Developments Co., Ltd. (AAD):** Main project proponent, responsible for overall project management, securing financing, coordinating among partners, ensuring compliance with VCS/CCB standards, and holding carbon rights.
- **PT. Bintang Lima Makmur (BLM):** Original concession holder for Site 1 (PAA1), collaborates with AAD under agreement for the implementation of conservation activities and transfer of carbon rights for their concession area.
- **PT. Green Ekonomi Sejahtera (GES):** Concession holder for Site 2 (PAA2), collaborates with AAD under agreement (in process) for the implementation of conservation activities and transfer of carbon rights for their concession area.
- **PT Asia Pasifik Asset Percayaan Indonesia (APAPI):** Local implementing party appointed by AAD.
- **Sinetics Accreditation International Taiwan, Ltd.:** Technical advisor, responsible for supporting Project Description development, carbon accounting methodology application, and providing technical consultation on VCS/CCB requirements.
- **UPTD KPHP Central Seram Forest Management Unit:** Field-level government forestry authority, collaborates on forest protection activities (e.g., patrols), monitoring, and community engagement within the state forest area.
- **Maluku Provincial Forestry Department (Dinas Kehutanan Provinsi Maluku):** Provincial-level government authority supervising the KPHP and providing regulatory oversight and guidance for forestry activities within the province.
- **Ministry of Environment and Forestry (MoEF), Republic of Indonesia:** National-level government authority responsible for overarching forestry policy, licensing (including PBPH/MUK), national carbon regulations (NEK, SRN PPI), and final approval of forestry-related project activities. Acts as the ultimate supervising body.

Detailed responsibilities for project management and implementation personnel within AAD and partner organizations are maintained internally. Collaboration and coordination mechanisms are established between these entities to ensure effective project execution.

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

Successful implementation requires a diverse set of technical skills, including:

- **Forest Management:** Expertise in tropical forest ecology, sustainable forest management principles (even if for conservation), silviculture (for understanding baseline/regrowth and potential restoration), forest inventory techniques.
- **Carbon Accounting (VCS):** Deep understanding of VM0010 methodology, carbon stock measurement (field inventory, potentially remote sensing/LiDAR), GHG emission/removal calculations, MRV protocols, uncertainty analysis, non-permanence risk assessment.
- **Biodiversity Assessment & Monitoring (CCB):** Skills in conducting field surveys for flora and fauna, species identification (particularly Maluku endemics/RTE species), habitat assessment, HCV identification, biodiversity monitoring techniques (e.g., transects, plots, camera trapping, SMART patrols), conservation planning.
- **Community Engagement & Social Science (CCB):** Expertise in participatory rural appraisal (PRA), socio-economic surveys, FPIC facilitation, conflict resolution, community development program design and implementation, gender analysis, cultural sensitivity, FGRM management, social impact monitoring.
- **GIS & Remote Sensing:** Proficiency in using GIS software (e.g., ArcGIS, QGIS) for mapping (boundaries, strata, land cover, HCVs), spatial analysis, and utilizing satellite imagery (Landsat, Sentinel, potentially RADAR/LiDAR) for monitoring land cover change, deforestation/degradation alerts, and potentially biomass estimation support.
- **Project Management:** Skills in planning, budgeting, financial management, team coordination, logistics, reporting, adaptive management, and stakeholder relations.
- **Legal & Policy:** Understanding of Indonesian forestry law, environmental regulations, carbon project policies, land tenure issues, and international standards (VCS/CCB).

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

A) Project Management Leads

A) Project Management Leads

Asia Assets Developments Co., Ltd:

As a company that has been dedicated to asset management and development activities since 2012, with its strong advising staff, including Dr. Stephen Shen, who was the former Director General of the Environmental Protection Administration (EPA) of Taiwan for 6

years, the highest ranking governmental position equivalent to the head of the Minister of Environment, AAD is capable of managing and implementing the project.

Alex Chi – Managing Director– AAD – CSIR Project Lead

Joined AAD in 2013 and has been the managing director of AAD and the CSIR project since 2020.Responsible for communications with local authorities and governmental representatives.

Dr. Stephen Shen (Shen Shih hung) – Advisor– AAD – CSIR Project Lead

Dr. Shen Shi-Hung is a highly accomplished expert in the field of environmental and chemical engineering. He earned his bachelor's, master's, and doctoral degrees from the National Taiwan University. Throughout his career, Dr. Shen has held various leadership positions in government agencies, including the Director General of the Environmental Protection Administration (EPA) of Taiwan. He has also taught as a lecturer and associate professor at universities in Taiwan.

Dr. Shen's vast experience and expertise in environmental and chemical engineering make him a valuable advisor for the VCS project. With his extensive knowledge in environmental policy and regulation, he can provide valuable insights and guidance to ensure that the project complies with relevant laws and regulations. His leadership and management skills can also help the team navigate complex environmental issues and effectively communicate with stakeholders.

- Bachelor's, master's, and doctoral degrees in chemical engineering from National Taiwan University
- Former Director General of the Environmental Protection Administration (EPA) of Taiwan
- Held various leadership positions in government agencies, including the Chief of Air Quality Protection and Noise Control Division, Director of Environmental Inspection, and Director of Water Quality Protection Division
- Lecturer and Associate Professor at universities in Taiwan
- Expertise in environmental policy and regulation, chemical engineering, air and water quality management, and environmental inspection and enforcement.

Dr. Lee, Chien Ming – Advisor– AAD – CSIR Project Lead

Dr. Lee, Chien Ming is a professor at Graduate Institute of Natural Resources and Environmental Management, National Taipei University, in Taiwan. He specializes in forest ecology and management, with a particular focus on the restoration of degraded forests and the conservation of biodiversity. He has extensive experience working with forest management agencies and NGOs in Taiwan, as well as in other countries throughout Asia.

As an advisor for AAD, Dr. Lee provides expertise on forest restoration and conservation strategies, as well as guidance on how to balance economic development with environmental protection. He could also assist with capacity building for local communities

and stakeholders, including training on sustainable forest management practices and the identification and monitoring of key indicators of forest health and biodiversity.

- PhD in Economics from National Chung Hsing University
- Professor at the Graduate Institute of Natural Resources and Environmental Management, National Taipei University
- Assistant Professor at the Department of Economics, National Tsing Hua University
- Assistant Professor at the Department of International Trade, Chung Yuan Christian University
- Deputy Director at the Institute of Corporate and Economic Research, Taiwan Institute of Economic Research (TIER)

B) Project Management Partnerships/Team Development

Dr. Kai-Hsien Chen – President –Carbon – CSIR MRV
Dr. Chen is a Taiwan leader in Forest Protection project. He serves as an Adjunct Associate Professor in Department of Horticulture and Landscape Architecture, National Taiwan University where he taught plant analytical chemistry on natural components analysis. He also serves as the Director of Taiwan Agarwood Association and has been studied Agarwood chemical fingerprinting for more than 10 years. He has engaged with Tropical Fruit tree carbon footprint project for 3 years and is drafting a protocol for carbon credit program for Taiwan Tropical Fruit Tree Landscape. He also chairs the Secretariat for Taiwan EPA environmental Accredited Laboratories Scheme for more than 20 years.

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

Recognizing the specific technical demands of an IFM carbon project with CCB components, AAD complements its core management capacity through strategic partnerships and team development:

- **Technical Consultancy:** AAD has partnered with [Indonesian Partner] which possesses demonstrated expertise in VCS/CCB project development, carbon accounting (specifically IFM methodologies), biodiversity assessment, social impact analysis, and MRV system design in the Indonesian context. This partnership provides critical technical guidance and quality assurance throughout project design and implementation. [Reference specific expertise from Table 2-18 if applicable]
- **Local Collaboration:** The project actively seeks collaboration with local government agencies (KPH, BKSDA) for activities like joint patrols and enforcement, leveraging their local knowledge and authority. Partnerships with local universities or CSOs [TBD] specializing in conservation or community

development in Maluku will be explored for research, monitoring support, and community program delivery.

- **Recruitment Strategy:** AAD is committed to building internal capacity. Key technical lead positions ([e.g., Carbon Lead, Field Operations Manager]) [Are being recruited / Have been filled] with individuals possessing relevant experience in forestry, conservation, or carbon projects. Ongoing training (Section 2.3.17) and professional development opportunities will be provided to project staff.

All relevant project management experience is present in the current CSIR partners. The CSIR management team has full relevant experience to support the project.

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

AAD, as the Project Proponent and implementing organization, possesses the financial stability and commitment necessary to support the project throughout its lifetime. Initial project development and operational costs are secured through AAD's corporate investment ensuring activities can proceed independent of immediate carbon revenue. The long-term financial health is further supported by the projected revenues from VCU sales, as detailed in the project's financial analysis (Section 2.1.22). Documentation supporting AAD's financial capacity and project-specific financial planning is available for review by the validation/verification body.

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

AAD is committed to operating with the highest standards of integrity and transparency, strictly prohibiting corruption and unethical behavior in all project activities.

- **Policies & Compliance**: AAD adheres to a strict code of conduct and anti-corruption policy, compliant with Indonesian law and international best practices (e.g., anti-bribery, anti-fraud). All project staff, partners, and contractors are required to comply with this policy.
- **Financial Controls**: Robust financial management procedures are implemented, including segregation of duties, clear authorization processes for expenditures, regular internal reviews, and [mention external audits if applicable], to prevent embezzlement or financial mismanagement. Procurement processes are designed to be transparent and competitive.
- **Training & Awareness**: Project staff receive training on the code of conduct, anti-corruption policies, and ethical responsibilities.
- **Transparency & Reporting**: Project operations, financial flows related to benefit sharing, and grievance records will be managed transparently (as detailed in relevant sections). The FGRM (Section 2.3.15) serves as a channel for stakeholders to report

any suspected unethical behavior or corruption related to the project without fear of reprisal. All credible allegations will be investigated thoroughly.

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

No commercially sensitive information has been excluded from the public version of the PD.

2.5 Legal Status and Property Rights

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

The Central Seram IFM RestorationWise Project (CSIR) is designed and implemented in full compliance with all applicable national, provincial (Maluku), and local (Central Maluku Regency) laws, statutes, and regulatory frameworks of the Republic of Indonesia. The project proponent, AAD, ensures adherence to these legal requirements throughout the project lifetime. Key relevant legal instruments include:

A. National Laws (Undang-Undang - UU):

- **UU No. 41/1999 concerning Forestry (as amended by UU 11/2020):** Provides the foundational framework for forest management.
    - *Key Provisions:* Defines state control over forests (Art 4); categorizes forest functions including Production Forest (HP/HPT) where the project operates (Art 6); mandates sustainable and environmentally sound forest management principles (Art 21); acknowledges community involvement and customary rights (Art 68-70, amended aspects).
- **UU No. 32/2009 concerning Environmental Protection and Management (as amended by UU 11/2020):** Sets requirements for environmental protection.
    - *Key Provisions:* Mandates environmental protection principles (Art 3); requires environmental impact assessments (AMDAL) or management efforts (UKL-UPL) for activities with potential impacts (Part Four); includes provisions for community participation in environmental protection (Art 70).
- **UU No. 5/1990 concerning Conservation of Living Natural Resources and Their Ecosystems:** Governs biodiversity conservation.
    - *Key Provisions:* Establishes principles for conservation and sustainable use; provides the basis for protecting specific species and ecosystems (relevant to CCB aspects).
- **UU No. 11/2020 concerning Job Creation (Omnibus Law):** Significantly amended provisions within Forestry, Environmental, and other laws, aiming to streamline

licensing and investment, including frameworks enabling Multi-Forestry Business (MUK).

- **UU No. 23/2014 concerning Regional Government:** Defines authorities of provincial/district governments.
    - *Key Provisions:* Outlines regional government roles in natural resource management, environmental supervision, and permit issuance coordination (relevant Articles e.g., 11, 12, 14).
- **UU No. 16/2016 concerning Ratification of the Paris Agreement:** Formalizes Indonesia's international climate commitments.
- **UU No. 39/1999 concerning Human Rights:** Guarantees fundamental rights.
    - *Key Provisions:* Underpins requirements for respecting community rights, ensuring non-discrimination, and providing access to remedy (relevant to FPIC, FGRM, CCB G5).
- **UU No. 25/1992 concerning Cooperatives:** Provides legal basis for partner PT Asia Pasifik Asset Percayaan Indonesia.
    - *Key Provisions:* Allows cooperatives to hire employees (Art 17), conduct business activities (Art 41), provide member benefits (Art 42), and engage in education/training (Art 4, Art 57).

B. Government Regulations (Peraturan Pemerintah - PP):

- **PP No. 23/2021 concerning Forestry Management:** Implements forestry provisions of UU 11/2020.
    - *Key Provisions:* Details the licensing process for Forest Utilization Business Permits (PBPH - Chapter II); elaborates on Multi-Forestry Business (MUK) including Environmental Service Utilization (e.g., carbon sequestration/storage - Chapter III, Part 7, esp. Art 176, 188); outlines forest protection requirements (Chapter V).
- **PP No. 22/2021 concerning Implementation of Environmental Protection and Management:** Details environmental approval processes (AMDAL/UKL-UPL) under the risk-based approach introduced by UU 11/2020.

C. Presidential Regulations (Peraturan Presiden - Perpres):

- **Perpres No. 98/2021 concerning Implementation of Carbon Economic Value (Nilai Ekonomi Karbon - NEK):** Establishes the national carbon pricing framework.
    - *Key Provisions:* Defines NEK mechanisms including carbon trading (Art 5); mandates the National Registry System for Climate Change Control (SRN

PPI) for recording mitigation actions and carbon units (Art 48-53); sets basis for domestic and potentially international carbon trading linked to NDC achievement.

D. Ministry of Environment and Forestry (MoEF) Regulations (Permen LHK):

- **Permen LHK No. 8/2021 concerning Forest Management and Preparation of Forest Management Plans...:** Provides technical details for PBPH operations.
    - *Key Provisions:* Specifies requirements for preparing Work Plans (RKU/RKT) under PBPH, including those focused on environmental service utilization (carbon).
- **Permen LHK No. 7/2021 concerning Forestry Planning, Changes in Forest Area Designation...:** Governs forest area administration.
- **Permen LHK No. 21/2022 concerning Guidance for Implementation of Carbon Economic Value:** Provides further detail on implementing NEK activities under Perpres 98/2021.
- **Permen LHK No. 7/2023 concerning Procedures for Carbon Trading:** Outlines specific procedures for carbon trading within Indonesia's system.
    - *Key Provisions:* Confirms eligibility for carbon projects under PBPH (Art 6); details requirements for project document validation (DRM), verification (LTV), SRN PPI registration, and potential benefit sharing considerations (Chapter II, III, IV).
- **Permen LHK No. P.32/2016 concerning Forest and Land Fire Control:** Relevant to fire prevention activities.
- *(Contextual)* Permen LHK No. P.70-P.73/2017 concerning SRN, MRV, GHG Inventory: Established the initial national framework.

E. Specific Project-Related Decrees & Approvals:

- **MoF Decree No. SK.537/Menhut-II/2012:** Granting the initial IUPHHK-HA licenses for the concession areas subsequently managed under this project (initially held by PT. BLM).
- **MoEF Decree No. SK.687/MenLHK/Setjen/HPL.0/9/2021:** Approving the PBPH license conversion specifically *for PT. BLM (PAA1)*.
- **MoEF Recommendation Letters (Surat Arahan) for PT. GES (PAA2):** Supporting the PBPH MUK Logged to Protected Forest (LtPF) activity for the GES2 site
- **Approved Work Plans (RKU/RKT) for PT. BLM:** Including MoEF approval SK.16/UHP-1/2015 and subsequent revision approval SK.10084/2019, which

document the planned baseline logging activities *for the BLM site (PAA1)* and serve as the basis for the **proxy baseline estimation for the GES2 site (PAA2)** (due to lack of specific approved GES2 RKU documentation).

Compliance Assurance:

AAD ensures project activities strictly adhere to all conditions within its management rights agreements, permits (including PBPH MUK requirements), and all applicable laws. Compliance is maintained through regular operational checks, internal audits, legal counsel review, adherence to SRN PPI registration and reporting, and cooperation with relevant government oversight agencies (MoEF, KPH, BKSDA).

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

The project adheres to all Indonesian laws and regulations concerning labor and workers' rights, ensuring fair treatment, safe working conditions, and awareness of rights for all employees and contracted workers. Key legislation includes:

- Law No. 13/2003 on Manpower (as amended by Law No. 11/2020).
- Law No. 1/1970 on Work Safety.
- Law No. 21/2000 on Trade Unions.
- Government Regulation No. 35/2021 (Fixed-Term Contracts, Outsourcing, Working Hours, Termination).
- Government Regulation No. 36/2021 (Wages).
- Relevant regulations regarding social security (BPJS Ketenagakerjaan) and health insurance (BPJS Kesehatan, e.g., Presidential Regulation No. 82/2018).

Assurance: The project ensures compliance by: providing formal employment contracts, paying wages at or above minimum standards, adhering to regulations on working hours and leave, providing mandatory social security and health insurance, implementing OHS measures (Section 2.3.19), upholding freedom of association, prohibiting child labor and forced labor, and informing all workers of their rights during induction and through accessible workplace postings.

2.5.3 Human Rights (VCS, 3.19)

The project recognizes, respects, and promotes human rights in line with the Indonesian Constitution, national laws (e.g., Law No. 39/1999 on Human Rights), and applicable international principles including the UN Declaration on the Rights of Indigenous Peoples (UNDRIP) and relevant ILO Conventions. Particular attention is paid to the rights of local communities and indigenous peoples within the project zone:

- **Recognition of Rights:** Acknowledges the existence of diverse communities, including the indigenous Nuaulu people, and their rights to culture, identity, customary practices, and participation in decisions affecting them.
- **FPIC:** Committed to implementing a robust FPIC process (see Section 2.5.7) for activities impacting community lands, resources, or livelihoods.
- **Non-Discrimination:** Upholds principles of non-discrimination in all project activities and employment practices (Section 2.3.14).
- **Grievance Mechanism:** Provides an accessible FGRM (Section 2.3.15) for stakeholders to raise concerns, including potential human rights impacts.
- **Cultural Heritage:** Commits to identifying and protecting sites of cultural significance through participatory mapping and consultation (Section 2.5.4).
- **No Forced Displacement:** Project activities will not cause involuntary physical or economic displacement (Section 2.5.9).

Adherence to International and National Legal Frameworks:

Indonesia Law:

The 1945 Constitution of Indonesia (UUD 1945):

This is the foundation of all laws in Indonesia and includes provisions for human rights, particularly after the amendments following the Reform era.

Law No. 39 of 1999 on Human Rights:

This comprehensive law defines and outlines various human rights protections in Indonesia, including rights related to life, family, self-development, justice, freedom, and social welfare.

Law No. 11 of 2005 on the Ratification of the International Covenant on Economic, Social and Cultural Rights:

This law incorporates international standards on economic, social, and cultural rights into Indonesian law.

Law No. 12 of 2005 on the Ratification of the International Covenant on Civil and Political Rights:

This law incorporates international standards on civil and political rights into Indonesian law.

Law No. 7 of 1984 on the Ratification of the Convention on the Elimination of All Forms of Discrimination against Women:

This law addresses women's rights and gender equality in Indonesia.

Law No. 40 of 2008 on the Elimination of Racial and Ethnic Discrimination:

This law addresses issues of racial and ethnic discrimination in Indonesia.

International Laws and Conventions:

United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP)

ILO Convention 169 on Indigenous and Tribal Peoples

Universal Declaration of Human Rights

Project Design and Implementation:

a) Free, Prior, and Informed Consent (FPIC):

The project ensures that all activities are conducted with the free, prior, and informed consent of the local indigenous communities, as mandated by UNDRIP and ILO Convention 169. This process involves:

Comprehensive community consultations

Transparent information sharing

Respect for traditional decision-making processes

b) Land Rights and Resource Management:

The project recognizes and respects the customary land rights of indigenous peoples, as outlined in Article 26 of UNDRIP.

It operates under the social forestry management agreement, which aligns with Indonesia's recent regulations (e.g., Ministry of Environment and Forestry Regulation No. 7/2023) that allow carbon rights development without requiring a Forest Rights Certificate (PBPH).

c) Cultural Preservation and Traditional Knowledge:

The project incorporates local traditional knowledge in forest conservation efforts, respecting Articles 11 and 31 of UNDRIP.

It supports the cultivation of agarwood, a culturally significant plant, promoting both economic development and cultural preservation.

d) Economic Empowerment and Benefit Sharing:

The project provides local employment opportunities, microloans, and supports agarwood cultivation, aligning with Article 21 of UNDRIP on the right to economic development.

A fair benefit-sharing mechanism ensures that the local communities receive equitable returns from the carbon credits generated.

Institutional Safeguards:

To ensure the protection of human rights throughout the project lifecycle, the following institutional safeguards have been established:

a) Grievance Mechanism:

A transparent and accessible grievance mechanism allows community members to raise concerns or complaints, ensuring their voices are heard and addressed promptly.

b) Participatory Monitoring and Evaluation:

Local community members are involved in monitoring project activities and evaluating outcomes, promoting transparency and accountability.

c) Capacity Building Programs:

Training programs are provided to enhance local skills in forest management, sustainable agriculture, and carbon monitoring, empowering the community to actively participate in and benefit from the project.

d) Gender Equality and Inclusion:

The project ensures equal participation and benefit-sharing for women and marginalized groups within the community, in line with Article 22 of UNDRIP.

f) Adaptive Management:

Regular reviews and stakeholder consultations allow for project adjustments to better meet community needs and rights.

By implementing these measures, the project not only complies with international and national legal frameworks but also actively promotes the rights and well-being of the indigenous and local communities in Seram Island.

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

The project zone includes areas utilized by local communities and is adjacent to or encompasses areas traditionally associated with indigenous groups, notably the Nuaulu people (residing in Nua Nea, Simalouw) and potentially Manusela people near the northern boundary.

- Identification: The project acknowledges the presence of these groups and potentially others identified during FPIC. Participatory mapping and consultations will be used to identify specific territories, resource use areas, and sites of cultural or spiritual significance (e.g., sacred groves, ancestral sites, ritual locations) within or near the project area.
- Preservation & Protection: The project commits to avoiding negative impacts on identified cultural heritage sites. Measures will include:
    - Excluding highly sensitive sites from intrusive project activities.
    - Establishing buffer zones around important sites if necessary, in agreement with the communities.
    - Ensuring project activities (e.g., patrols, monitoring) are conducted in a culturally respectful manner.
    - Supporting community efforts to document and maintain their cultural heritage and traditional ecological knowledge, where requested and appropriate.

- Engagement: Specific engagement protocols will be developed for interacting with IP communities, respecting their customary decision-making processes and leadership structures, as part of the FPIC process.

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

Land tenure within the project zone is complex, involving both state-controlled land and areas under customary access and use:

- Statutory Rights: The primary legal right within the Project Area (±24,550 ha) is the state-granted forestry license (IUPHHK-HA SK.537/Menhut-II/2012), the control of which is now held by AAD. This designates the land as State Forest Land.
- Customary Rights & Access: Many local communities, including the indigenous Nuaulu, have historical and ongoing customary claims and practices within or overlapping the concession area. This includes rights to access forest resources (timber for domestic use, NTFPs, hunting grounds), cultivate specific areas (gardens, sago groves), and potentially recognized customary land areas (tanah adat) or sacred sites. The user notes highlight reliance on farming, hunting, and gathering in several villages adjacent to or potentially within the concession.
- Mapping: A key activity under the FPIC process will be participatory mapping with communities to delineate areas of:
  - Village administrative boundaries.
  - Customary tenure claims (tanah adat).
  - Current community resource use (farming, fishing, hunting, NTFP collection).
  - Sacred or culturally significant sites.
  - This mapping will inform project planning, activity implementation (e.g., patrol routes, placement of any infrastructure), and potential benefit-sharing or co-management arrangements.

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

The project is committed to recognizing and respecting all legitimate property rights within the project zone:

- **Statutory Rights:** AAD exercises its control derived from the forestry license in compliance with Indonesian law and the terms of the license (as potentially modified for conservation focus).
- **Customary Rights:** The project explicitly recognizes the existence of customary rights and access by local communities and IPs, even within the state-designated concession area. The project will:
  - **Not extinguish** legitimate customary rights through its activities.

- Use participatory mapping and FPIC to understand and document these rights.
- Design project activities (e.g., patrol boundaries, conservation zones) to avoid infringing on critical customary use areas or sacred sites, wherever feasible and agreed upon.
- Seek agreements with communities regarding resource access and management within the project area, potentially exploring co-management or clearly defined access protocols for specific non-destructive uses (e.g., NTFP collection in designated zones), consistent with conservation objectives.

- **Securing Rights:** While the project cannot grant formal statutory title for customary lands (which is a government process), it will support communities in documenting their claims through participatory mapping and dialogue, which can aid in future recognition processes with the government. The project will ensure its own operational boundaries and activities are clearly defined and communicated to avoid unintended encroachment or conflict.

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

The project has conducted stakeholder engagements with local communities living on the periphery of the project to inform them about the project and explain that the project will in no way encroach on private or community property.

Description of process for obtaining consent	A formal FPIC process is being implemented, adhering to international best practices and CCB/VCS requirements. Key steps include: 1) Identification: Identifying all potentially affected communities, IP groups, and customary rights holders (ongoing). 2) Information Disclosure: Providing comprehensive, accessible, and culturally appropriate information about the project (goals, activities, proponent, timelines, potential impacts/benefits/risks, FGRM, benefit sharing concepts) in Bahasa Indonesia (and local facilitation if needed), well in advance of seeking consent. 3) Consultation & Participation: Facilitating open, two-way consultations within communities, allowing sufficient time for internal deliberation, questions, and expression of concerns, ensuring representation of women, IPs, and vulnerable groups.

	4) Consent/Agreement: Seeking documented consent (or withholding of consent) from communities through their legitimate representatives or customary decision-making processes regarding project implementation and key agreements (e.g., benefit sharing). 5) Documentation: Maintaining thorough records of all FPIC activities (meetings, attendees, information shared, concerns raised, agreements reached). FPIC is treated as an ongoing process, not a one-off event.
Outcome of FPIC process	The intended outcome is a transparent agreement between AAD and each affected community/rights-holder group, documenting their informed consent to project activities within their respective areas of interest, outlining agreed mitigation measures, benefit-sharing arrangements, and roles/responsibilities. Assurance: The project explicitly guarantees it will not involve involuntary resettlement or relocation of people or activities. It will not encroach upon lands vital for subsistence or culture without explicit, informed consent and fair compensation/alternatives agreed upon through the FPIC process. Customary rights and significant sites identified during FPIC will be respected and integrated into project management plans. [Details of specific agreements will be documented as FPIC progresses]

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

Process used to design the benefit sharing plan	The benefit sharing mechanism (BSM) is being co-designed with communities through the FPIC process. Initial consultations explore community priorities and preferred benefit types (e.g., direct employment, support for community infrastructure, funding for sustainable livelihood projects, capacity building). The design process emphasizes transparency regarding projected carbon revenues, project operational costs, and the portion available for benefit sharing, ensuring communities understand the financial context. Different options for benefit distribution (e.g., direct village funds, support for specific community projects, individual payments for specific roles like patrols) are being discussed to ensure equity and alignment with local preferences and governance structures.
Summary of the benefit sharing plan	The final Benefit Sharing Mechanism (BSM), to be co-developed and agreed upon with communities through the FPIC process, will detail the types, delivery methods, and governance for benefits derived from the project, particularly those funded by carbon revenues. Key components anticipated in the BSM include: Direct Employment Opportunities: Prioritizing local residents for paid positions within the project, such as forest patrols, community liaison

	roles, and potentially roles supporting SIGS or PARA1 activities (Section 2.3.18). Support for Community Development Initiatives: Utilizing a portion of project resources (derived primarily from carbon revenue) to fund community-prioritized projects and programs identified during consultations. Examples include support for establishing Sustainable Income Generating Schemes (SIGS) (e.g., climate-smart agriculture, sustainable NTFPs, small livestock) facilitated via the PT APAPI, investments in community infrastructure (like the planned clean water systems), and support for local health and education needs. The specific allocation and governance mechanisms for managing these funds/programs at the community level will be determined through participatory agreement. Capacity Building and Training: Providing access to relevant training programs aimed at enhancing skills for project participation and broader sustainable livelihoods (Section 2.3.17). The overall BSM will be designed to ensure benefits are distributed transparently and equitably, with specific consideration for reaching marginalized and vulnerable groups, and contribute to the long-term sustainable development of the project zone communities.
Approval and dissemination of benefit sharing plan	As documented in the contract between AAD and provincial government. The contract is available in the head office of the FMU and Cooperation group. The BSM will be formally agreed upon as part of the FPIC process, with documented consent from community representatives. The agreed plan will be translated into Bahasa Indonesia and disseminated widely through community meetings, village notice boards, and potentially simplified summaries. It will be made readily accessible for community members to review. Implementation and fund disbursement will be monitored, with regular reporting back to communities on benefits delivered.

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

The project guarantees that its activities will not lead to the involuntary removal or relocation of people from their lands or territories. It also guarantees that project activities will not force people to relocate activities essential to their culture or livelihood without their FPIC. Through the participatory mapping and consultation process, areas critical for subsistence, cultural practices, or customary tenure will be identified and respected within project planning and implementation. Any potential restriction on access or use will only occur with the explicit FPIC of the affected rights holders and will include agreed-upon compensation or alternative measures.

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

Potential illegal activities affecting the project zone include illegal logging, agricultural encroachment, poaching, and uncontrolled fires (potentially linked to land clearing).

- **Measures to Reduce Illegal Activities:**
  - **Presence & Deterrence:** Regular forest patrols by trained project staff and potentially community partners act as a deterrent.
  - **Monitoring:** Use of SMART patrol technology and potentially remote sensing alerts (e.g., GLAD alerts) to detect incursions early.
  - **Community Engagement:** Building local support for conservation through benefit sharing and awareness programs reduces local incentive for illegal activities and can foster community-based reporting/guardianship. Providing viable alternative livelihoods reduces economic pressure driving illegal resource extraction.
  - **Collaboration & Enforcement:** Reporting detected illegal activities to KPH, BKSDA, and police for appropriate legal action. Collaboration on joint patrols enhances enforcement capacity.
- **Prohibition of Illicit Labor Practices:** The project strictly prohibits the use of human trafficking, forced labor, and child labor in all its operations and contracts, in compliance with Indonesian law and international standards. This is enforced through hiring policies, contractual clauses with third parties, staff training, and the grievance mechanism.

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

Past Disputes: To the best of current knowledge, there are no major ongoing, unresolved conflicts directly related to tenure or resource rights within the specific project area that would be prejudiced by project activities.

Potential Future Disputes: The project acknowledges that tenure complexities and resource pressures could lead to future disputes.

Mitigation Measures: The project commits to neutrality regarding any pre-existing disputes it is not directly involved in. The robust FPIC process aims to proactively identify and address potential conflicts related to project activities. The FGRM (Section 2.3.15) provides a dedicated mechanism for peacefully resolving any disputes.

As there are no on-going disputes, there is no potential for the project to prejudice them through its activities.

2.5.12 Approvals (CCB, G5.7)

The project requires and will obtain/maintain approvals from relevant authorities:

- **Government:**
  - Underlying forestry license (IUPHHK-HA SK.537/Menhut-II/2012).
  - Approval of RKUPHHK-HA (baseline documentation).
  - Compliance with provincial/district regulations.
- **Community/Customary:** Documented consent obtained through the FPIC process from affected communities and legitimate customary authorities serves as approval at the local level.

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

2.5.13.1 No Double Issuance

Is the project receiving or seeking credit for reductions and removals from a project activity under another GHG program, or any other form of community, social, or biodiversity unit or credit?

☐ Yes ☒ No

No, this project is only registered with Verra under the VCS methodology and is in no way receiving or seeking credit for reductions and removals in another GHG program or any of the other mentioned form.

2.5.13.2 Registration in Other GHG Programs

Is the project registered or seeking registration under any other GHG programs?

☐ Yes ☒ No

No, this project is only registered with Verra under the VCS methodology and is in no way receiving or seeking credit for reductions and removals in any other GHG program.

2.5.13.3 Projects Rejected by Other GHG Programs

Has the project been rejected by any other GHG programs?

☐ Yes ☒ No

No, this project is only registered with Verra under the VCS methodology and has not yet been rejected by any other GHG programs.

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

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

Are project reductions and removals or project activities also included in an emissions trading program or binding emission limit? See the *VCS Program Definitions* for definitions of emissions trading program and binding emission limit.

☐ Yes ☒ No

Although the regulation in Indonesia regarding voluntary carbon credit is not fully constructed yet, there are no regulation preventing the registration of projects on voluntary carbon credit issuing platform. Furthermore, this project is not registered through any compliance carbon projects within Indonesia or anywhere in the world besides on VCS. In conclusion, no, project reductions and removals or project activities are not also included in an emissions trading program or binding emission limit.

2.5.14.2 No Double Claiming with Other Forms of Environmental Credit

Has the project activity sought, received, or is planning to receive credit from another GHG-related environmental credit system? See the *VCS Program Definitions* for definition of GHG-related environmental credit system.

☐ Yes ☒ No

No, this project is only registered with Verra under the VCS methodology and has not sought, received, or is planning to receive credit from another GHG-related environmental credit system.

2.5.14.3 Supply Chain (Scope 3) Emissions

Do the project activities affect the emissions footprint of any product(s) (goods or services) that are part of a supply chain?

☐ Yes ☒ No

If yes:

Is the project proponent(s) or authorized representative a buyer or seller of the product(s) (goods or services) that are part of a supply chain?

NA

If yes:

Has the project proponent(s) or authorized representative posted a public statement on their website saying, “Carbon credits may be issued through Verified Carbon Standard

project [project ID] for the greenhouse gas emission reductions or removals associated with [project proponent or authorized representative organization name(s)] [name of product(s) whose emissions footprint is changed by the project activities]."?

NA

The Central Seram's marketable commodities primarily revolve around subsistence agricultural products such as cassava, sweet potatoes, cocoa, coconut products, and spices like clove and nutmeg (44. Raharjo Simon 2017). Cassava and sweet potato are grown as subsistence crops and as sources of carbohydrates, generally with small acreages ranging from 100 m^2 to 0.5 ha of the total farmers' cultivated lands (0.25 to 2 ha). Either cassava or sweet potato is not harvested at once, but as needed for family consumption or for sale at a small scale. The chicken and goats raised also for house hold and local market as well.

The other potential supply chain emission of Central Seram of Agricultural direct emission includes: the synthetic fertilizer usage is none because of subsistence agriculture nature, very limit of post-harvest handling because insufficient of infrastructure. The supply chain analysis for these products presents a short distance of local transportation if there is any. At the start of the Project, there is no Agarwood products. The final products of the agarwood production aspect of this project is mostly handcrafted and manufactured through the same way as traditional products within the same supply chain so in conclusion, no the project activity does not affect the emission footprints of any products that are part of a supply chain.

2.6 Additional Information Relevant to the Project

2.6.1 Leakage Management (VCS, 3.11, 3.15)

Leakage risks associated with the CSIR project activities are assessed according to the requirements of the applied VCS methodology (VM0010 v1.4).

Activity Shifting Leakage:

The project proponent, Asia Assets Developments Co., Ltd. (AAD), does not own or operate other forestry concessions in Indonesia or the region. Therefore, leakage due to the direct shifting of planned logging activities by AAD to other areas under its control is **not possible** and is considered zero. Potential displacement of activities by third parties (e.g., former logging contractors or personnel associated with PT. BLM or PT. GES) is addressed indirectly through the assessment of market leakage. Furthermore, the project's community engagement and alternative livelihood components (SIGS) aim to reduce local economic pressure that might otherwise drive displaced activities.

Market Leakage:

The project involves ceasing planned commercial timber harvesting activities within the BLM (PAA1) and GES2 (PAA2) concessions. The estimated combined average annual harvest volume avoided under the baseline scenario is approximately **72,711 m^3** (based on BLM's approved RKU - File 3, and proxy estimates for GES2 - Section 2.2.1). While VM0010 Section 8.3.2 and Box 2 outline a default procedure for calculating a market leakage factor (LFME) based on comparing project timber characteristics (PMPi) to national averages (PMLFT) – a calculation which, similar to other Indonesian IFM projects, might yield a default LFME of 0.2 or higher – this project justifies applying **LFME = 0** based on the **insignificance** of the avoided harvest volume relative to the scale of the relevant national timber market.

- **Justification for Insignificance:** The avoided annual harvest of approx. 72,711 m^3 constitutes a very small fraction of Indonesia's total annual production of logs from natural forests, which typically runs into many millions of cubic meters. This project's contribution to the national supply is considered negligible and its removal from the market is highly unlikely to induce a measurable increase in harvesting pressure elsewhere within Indonesia's vast timber production landscape. Market demand is more likely influenced by larger economic factors, substitution with plantation timber, or imports, rather than the cessation of harvesting in this specific, relatively modest volume concession area.
- **Conservativeness:** While acknowledging the standard Box 2 calculation might result in a non-zero LFME, applying LFME = 0 is justified here on the grounds of the demonstrably insignificant market impact. This approach ensures that leakage is appropriately considered within the project's specific context.

Therefore, leakage emissions due to market effects are considered negligible and are accounted for as zero (GHG_{LK} = 0) in the net GHG emission reduction calculations (Section 3.2.4). The project includes community-focused activities (SIGS) which, while primarily aimed at local benefits, may also indirectly mitigate potential leakage pressures by providing alternative income sources.

Table 7: Brief Overview of leakage mitigation strategies in the Central Serams IFM Project.

Leakage Management Activity	Description

Improved and Intensified Agriculture	Training will be provided to the communities on the methods and best practices involved in conservation agriculture. This program will aim to increase yields on existing farms and decrease the rate of land conversion. It will also build and support produce storage facilities and value-added technologies to take advantage of market price fluctuations and aid in achieving high sale prices.
Employment of a Ranger Force	This Project will hire and equip a ranger force that provides direct protection of the land from conversion. This force acts as a deterrent to the conversion of the Project Accounting Area but also a powerful outreach tool to the local communities, providing assistance with wildlife issues and information.
Tree Nurseries	The Project will establish multiple tree nurseries in key locations. The nurseries buy seedlings from community members who participate in an out-growing scheme. The seedlings are nurtured in greenhouses, before being planted in degraded areas and on area farms.
Education	The Project will provide several programs to improve the access to and quality of education for youth in the communities. This includes providing school scholarships and the construction of actual school buildings.
Alternative-Income Generation	The Project has built a core on Sustainable Income Generating Scheme to help develop new income generating activities for members of the communities in the Project Accounting Area. This SIGS not only restore Agarwood HCV natural habitat a variety of individual activities such as promoting and supporting beekeeping, crafts and jewellery, and
Micro-finance schemes	The Project will use best-practice in micro-finance to enhance community member's access to capital and markets. This will include micro-loans, micro insurance and other small and medium development practices (SME).
Eco-Charcoal Training	Sinetics Accreditation International will utilize its extensive experience in the establishment and operation of an eco-charcoal program to train local community members. These community members will then be supported in the establishment of their own eco- charcoal programs.

2.6.2 Further Information

CSIR project is not located within a jurisdiction covered by a jurisdictional REDD+ program. Until now, there are two jurisdictional REDD+ program at provincial level signed by the national government (Ministry of Environment and Forestry, MoEF) under the national REDD+ program. Both jurisdictional REDD+ programs are funded by the World Bank, namely the East Kalimantan Province (East Kalimantan Jurisdictional Emission Reductions Program, EK JERP35) and the Jambi Province (Bio Carbon Fund Integrated Sustainable Forest Landscape, BioCF ISFL36).

At national level, Indonesia has received Result-based Payment (RBP) for emission reduction within period 2014 – 2016 from Green Climate Fund (GCF) for USD 103.8 million, and period 2016 –2017 from Indonesia-Norway Partnership for USD 56 million (https://ppid.menlhk.go.id/berita/siaran-pers/7638/menlhk-indonesia-menjadi-contoh-internasional-dalam-redd-dan-rbp-emisi-karbon) . Other than those programs, there are no other jurisdictional REDD+ program has been signed or implemented in Indonesia. Hence, CSIR Project that is located in Maluku Province and started in year 2022, is not covered by a jurisdictional REDD+ program.

3 CLIMATE

3.1 Application of Methodology

3.1.1 Title and Reference of Methodology (VCS, 3.1)

Type (methodology, tool, module)	Reference ID (if applicable)	Title	Version
Methodology	VM0010	VM0010 Methodology for Improved Forest Management: Conversion from Logged to Protected Forest	1.4
Tool	VT0001	Tool for the Demonstration and Assessment of Additionality in VCS Agriculture, Forestry and Other Land Use (AFOLU) Project Activities	3.0
Tool		AFOLU Non-Permanence Risk Tool	4.2

3.1.2 Applicability of Methodology (VCS, 3.1)

Reference ID/Title	Applicability condition	Justification of conformance
VM0010	1) Forest management in the baseline scenario must be planned timber harvest	Condition met. Under the baseline scenario, the project area is designated for timber production with timber harvesting plan (RKU and RKT) and subjected to continued selective logging stipulated in the legal right to harvest.
	2) Under the project scenario, forest use is limited to activities that do not result in commercial timber harvest or forest degradation.	Condition met. The project activities include elimination of commercial timber harvesting, and no timber harvest or forest degradation will be undertaken in the project scenario. Areas

	country for a minimum of 10 years prior to the project start date.	used by the local community for daily activities will be excluded from the Project Area.
	3) Planned timber harvest must be estimated using forest inventory methods that determine allowable offtake as volume of timber (m^3 ha^{-1})	Condition met. The merchantable volume of timber per unit area that is potentially available for harvest and the resulting allowable offtake is specified in the RKU and RKT documents. The planned harvest rates in the RKU and RKT are specified in terms of m^3 ha^{-1} (est. volume) and has been estimated using field plot data (IHMB).
	4) The boundaries of the forest land must be clearly defined and documented	Condition met. The boundaries of the Project Area are based on the boundaries of the PBPH documents (SK and RKU), excluding the non- forest areas. The boundaries are clearly defined using Landsat and/or other high-resolution satellite imagery to determine forest type and QGIS to demarcate boundaries. Spatial files of Project boundaries will be provided to the auditor/VVB
	5) Baseline condition cannot include conversion to managed plantations	Condition met. The allocated PBPH is a sustainable timber harvesting license which does not sanction conversion to managed plantation
	6) Baseline scenario, project scenario and project case cannot include wetland or peatland	Condition met. There are no peatlands or wetlands in the project area based on the forest carbon and biodiversity inventory on IHBM Periodic Comprehensive Forest Inventory 2016 to 2025.

	7) The legal right to harvest must be issued by a relevant government body. Legal allocation of rights to a forest timber resource must be provided with a plan for forest management.	PT. Bintang Lima Makmur holds logging concession permit (IUPHHK-HA) in 2013 which granted through Decree of Minister of Environment and Forestry (MoEF) Number SK.774/Menhut- II/2013 since 8th November 2013, which then updated into forest utilization business permit (Perizinan Berusaha Pemanfaatan Hutan/PBPH) through the Decree of Minister of Environment and Forestry Number SK.687/MenLHK/Setjen/HPL.0/9/2021. Together with the RKU and RKT, these documents also describe volumes to be expected to harvest and includes the map of the concession, including the planned timber- harvesting blocks.

	8) Intent to harvest must be provided by the project proponent. This can be done through a valid and verifiable Government–approved timber management plan for harvesting the Project Area.	The intent to harvest is represented by the designation of the area by the Indonesia MoEF as a productive timber area (HP and HPT) and logging concession area. The Indonesia MoEF decree No. SK.2088/MenLHK-PHPL/UHP/HPL.1/5/2016 concerning the Approval of Working Plan on Timber Forest Product in Natural Forest on Production Forest Based on the Periodic Comprehensive Forest Inventory 2016-2025 Period for PT BINTANG LIMA MAKMUR Maluku Province is a valid and verifiable government-approved timber management plan for harvesting the Project Area which shall demonstrate intent to harvest prior to the date of all evidence in pursuit of carbon finance/ consideration of IFM.
		The **PAA1** (24,550 Ha) of PT. Bintang Lima Makmur PBPH**,** Reference Area use the IHMB report of PT. Bintang Lima Makmu. **PAA2** (33,198 Ha) of PT. Green Economy Sejahtera Unit 2**,** Reference Area use the Forest timber concession IHMB report of PT. Bintang Lima Makmu.

	12. If logging is included in the baseline scenario and a market-effects leakage area is required as per section 8.3, then the project proponent has access to (or monitoring data from) the market-effects leakage area if measurement is needed (see section 8.3.3).	The CSIR Project is a IFM LtFP. type baseline. The market effect leakage is basically domestic or in island consumption. Which can be monitored in local market if it is needed.
	13. This methodology is applicable to all geographies, however if SOC is a selected carbon pool and the default value from section 6.19.2 is selected then the project must be located in a tropical ecosystem.	Soil organic carbon (SOC) is not included in the project.
	14. If livestock are being grazed within the project area in the project scenario, there must be no manure management taking place, as emissions from N_2O as a result of manure management are not quantified or addressed in this methodology.	The small-scale chicken/goat raising are within Project area but outside of the PAAs and located in the villages. These livestock grazing activities are free range style feeding and there is no manure management.
VT0001	1. AFOLU activities the same or similar to the proposed project activity on the land within the proposed project boundary performed with or without being registered as the VCS AFOLU project shall not lead to violation of any applicable law even if the law is not enforced.	The project activities lead no violation of applicable law. The AFOLU activities that took place before the project start (planned timber harvesting) and the planned project activities (protected forest). The detail is stated in 3.1.2 and 3.1.5.
	2. The use of this tool to determine additionality requires the baseline methodology to provide for a stepwise approach	The additionality of the project was performed using the tool "VT0001 Tool for Demonstration and

	justifying the determination of the most plausible baseline scenario. Project proponent(s)proposing new baseline methodologies shall ensure consistency between the determination of a baseline scenario and the determination of additionality of a project activity	Assessment of Additionality in VCS Agriculture, Forestry and Other Land Use AFOLU project Activities", Version 3.0. in the section 3.1.5.2 demonstrates the step1. Identification of alternative land use scenarios to the proposed VCS AFOLU project activity. Step 2. Investment analysis. Step 3. Barrier analysis. Step 4. Common Practice Analysis.
AFOLU Non-Permanence Risk Tool	This tool has no internal applicability conditions.	The project can use this tool to calculate AFOLU Non-Permanence Risk Rating.

3.1.3 Project Boundary (VCS, 3.12)

Spatial boundaries

Below is a description of the spatial boundaries of the project considering the types of areas used in the methodology, Figure 6 presents a map with the applicable boundaries.

Project zone

The Project zone involves in Central Seram Region, Maluku Province, Indonesia of total area of 57,748 ha, and geographical coordination is -3.0893 ~ -3.4675 S, 128.8178 ~129.6464 E.

Project accounting areas

The PA was divided into 2 PAAs as follows:

PAA1

PAA1: PT. Bintang Lima Makmur PBPH is located on the south side of the Central Seram District slow slope and low altitude area of 24,550 Ha forest. The project activity is from Log to Protect Forest of Improved Forest Management. The Forest Function Classe is Limited Production Forest (HPT). All area has been forest 10 years prior to project start.

PAA2

PAA2: PBPH PT. Green Ekonomi Sejahtera Unit 2 is located on the south side of Central Seram District slow slope of 33198 Ha forest. The project activities from Log to Protect Forest of Improved Forest Management. The Forest Function Class is Convertable Production Forest (HPK). All area has been forest 10 years prior to project start.

Figure 6-1: Spatial boundaries for PAA1, PAA2, and Project Agarwood Restoration Area (PARA1; not for carbon credit). Include reference area (pink border)

For more details of the PAAs check Delineating Project Accounting Areas within Section 3.1.4

Reference Areas

The project has three reference areas, one for each PAA. For more details of the selection and the delimitation, see section 3.1.4.4. Determine Historical Conversion.

Figure, 6-2: PAA1 Reference Area, PAA2 Reference Area Reference Area.

Activity-shifting leakage area

To select the activity-shifting leakage area, a 20 km buffer was established at the border of the PA. This distance was selected considering the areas most likely to be used by the agents. These areas are at least as accessible as the PA and have similar conditions in terms of topography and land cover. For more details see section 3.2.3.1. Delineating the activity-shifting leakage area.

Market leakage area

As explained in section Determining emissions from market leakage, the project does not account emissions from market leakage.

Table 8: Temporal Boundaries:

Project Start Date:	15 August 2022
Project Crediting Period:	15 August 2022- 14 August 20547
Length of the Project Crediting Period:	25 years
Baseline Re-evaluation	As per VCS requirements, for the duration of the project it is necessary to reassess the baseline every 10 years. Then, the baseline re-evaluation will be performed during the first verification claiming credits from a monitoring peiord after 16 March 2032.
First Anticipated Monitoring Period	The first anticipated monitoring period will be from 15 March 2022 to 31 December 2025.
Anticipated Subsequent Monitoring Period	The subsequent monitoring reports are anticipated in a two years interval, but subject to change.

Gases and Carbon Pools

Carbon dioxide (CO_2) was determined to be the primary source of greenhouse gas emissions in the project, given the threat of deforestation and conversion from the drivers listed in the baseline scenario. Methane (CH_4) and nitrous oxide (N_2O) are conservatively excluded from the project.

Table 9: A list of the greenhouse gases considered

Source		Gas	Included?	Justification/Explanation
Baseline and Project	Combustion of fossil fuels (in vehicles, machinery and equipment)	CO_2	Excluded	Tested insignificant based on CDM Tool for testing significance of GHG emissions in A/R CDM project activities https://cdm.unfccc.int/methodologies/ARmethodologies/tools/ar-am-tool-04-v1.pdf
		CH_4	Excluded	Tested insignificant based on CDM Tool for testing significance of GHG emissions in A/R CDM project activities https://cdm.unfccc.int/methodologies/ARmethodologies/tools/ar-am-tool-04-v1.pdf
		N_2O	Excluded	Tested insignificant based on CDM Tool for testing significance of GHG emissions in A/R CDM project activities https://cdm.unfccc.int/methodologies/ARmethodologies/tools/ar-am-tool-04-v1.pdf
	Removal of herbaceous vegetation	CO_2	Excluded	Based on CDM EB decision reflected in paragraph 11 of the report of the 23rd session of the board: https://cdm.unfccc.int/Panels/ar/023/ar_023_rep.pdf
		CH_4	Excluded	Based on CDM EB decision reflected in paragraph 11 of the report of the 23rd session of the board: https://cdm.unfccc.int/Panels/ar/023/ar_023_rep.pdf
		N_2O	Excluded	Based on CDM EB decision reflected in paragraph 11 of the report of the 23rd session of the board: https://cdm.unfccc.int/Panels/ar/023/ar_023_rep.pdf
	Burning of Biomass	CO_2	Excluded	Potential emissions are negligible per methodology VM0010
		CH_4	Included	Included as CO_2 equivalent emissions
		N_2O	Excluded	Potential emissions are negligible
	Nitrogen based fertilizer	N_2O	Excluded	Potential emissions are negligible. Following the VCS update to the *Tool for AFOLU Methodological Issues and Guidance for AFOLU Projects*, emissions via the use of fertilizer are considered insignificant and are not considered here.

Table 10: Required and optional carbon pools for forest project accounting areas and justifications

Carbon Pools	Included?	Justification/Explanation of choice
Aboveground trees	Included	The stock change in the above ground tree biomass must be estimated
Above ground non-tree	Excluded	Exclusion is always conservative when forests remain as forest
Belowground	Excluded	Unlikely to change significantly in forests remaining as forests, and is difficult to measure, thus omission is conservative.
Deadwood (logging slash)	Included in the baseline	The dead wood (logging slash) carbon pool is expected to be larger in the baseline than in the project scenario, and therefore this pool must be included
Dead wood (naturally accumulated)	Excluded	Following IPCC guidelines4, it is assumed that carbon stocks in the naturally occurring dead wood pool (both standing and lying) are equivalent in both the project and baseline scenario, and therefore this pool is conservatively excluded. It is not conservative to account for this pool in the baseline scenario only
Harvested wood products	Included	Will be significant and greater in the baseline compared to the project scenario
Litter	Excluded	Insignificant and exclusion is conservative
Soil organic carbon	Excluded	Exclusion is always conservative when forests remain as forest

3.1.4 Baseline Scenario (VCS, 3.13)

The baseline scenario as identified as the Improved Forest Management from Log to Protect Forest (LtFP) using VM0010 Methodology for Improved Forest Management V 1.4 refers to VCS tool VT0001 for the Demonstration and Assessment of Additionality in Agricultural, Forestry and Other Land Use (AFOLU). Below is a description of the steps to determine the baseline scenario according to the methodology and tool.

3.1.1.1. Step 1. Identification of alternative land use scenarios to the proposed IFM project

Sub-step 1a) Identify and list all credible alternative land use scenarios

According to VM0010 Methodology for Improved Forest Management (Version 1.3) project activities are referred for guidance on identifying realistic and credible alternative land uses. The identified land use scenarios shall at least include: i) Continuation of pre-project land use, ii) project activity within the land of project boundary performed as non-registered the VCS AFOLU project, iii) if applicable, activities similar to the proposed project activity on at

least part of the land within the project boundary of the proposed VCS AFOLU project at a rate resulting from legal requirements or extrapolation of observed similar activities in the g geographical area with similar socioeconomic and ecological conditions to the proposed VCS AFOLU project activity occurring in the period beginning ten years prior to the project *start date. The following scenarios (outcome sub-step 1a) could occur on the land within the proposed project boundary in the absence of the AFOLU project activity:*

Table 3-5. Plausible alternative scenarios

Scenario		Description
1	Expansion of hydrocarbon exploration	Increased hydrocarbon activities could further degrade the forest and lead to higher emissions. Under this scenario, the project area is converted to the exploration and exploitation of oil mining (see Figure 2-10)
2	All project area is subject to Forest Management practice which involves planned timber harvest for commercial (continued logging)	The area could continue to be logged, as it was legally permitted under the IUPHHK-HA and PBPH license. The project area is designated for timber production with timber harvesting plan continued selective logging stipulated in the legal right to harvest
3	Establishment of industrial plantation forest (Hutan Tanaman Industri/HTI)	The PBPH license accommodates Forestry Multi-Businesses (MUK) which also cover the establishment of industrial plantation forest. Conversion into an Industrial Plantation Forest, which would involve clearing the land for monoculture plantations, will lead to significant deforestation.
4	Degradation due to lack of management	Without proper management, the forest could further degrade due to illegal logging (see Figure 2-10), forest fires (see Figure 3-4), and flooding.
5	Conservation project without being registered as VCS AFOLU project	The project area could be acquired by a conservation organization with long-term philanthropic funding and converted into an ecosystem restoration project.
6	Increased stone and sand mining in riparian zones	In the absence of the project, mining activities in riparian areas (see Figure 2-10) could expand, leading to further environmental degradation and disruption of ecosystem services.

Sub-step 1b) Checking the consistency of credible land use scenarios with enforced mandatory applicable laws and regulations

As it stated earlier, the project area was designated as the production forest (timber harvesting) before starting the project activity, scenarios ii and iii identified in sub-step 1a are legally permissible under the current laws and regulations of the Ministry of

Environment and Forestry. Albeit the potential hydrocarbon exploration (scenario i) within the project area has a potential as it revealed by Ministry of Energy and Mineral Resources of Indonesia, this scenario requires new permit as changing the status from forest logging to mining. Thus, the outcome of this sub- step 1b includes all the scenarios identified in the table above.

Sub-step 1c) Select the most plausible baseline scenario

Given the historical context and the current legal framework, a combination of continued logging, potential HTI establishment, and expanded hydrocarbon and mining activities represents the most likely baseline scenario. These activities, combined with the area's vulnerability to flooding, forest fires, and illegal logging, make a strong case that, without the project, the land would experience significant environmental degradation. As the baseline contains six scenarios, further stepwise analyses are required to justify the selection and determination of the most plausible scenarios. Thus, all scenarios are included to identify the barrier analysis. To determine the most likely baseline scenario and show additionality of the project activity, a barrier analysis (Step 3 VT0001) was applied.

3.1.4.2 Step 3. Barrier analysis

According to VM0010 Methodology for Improved Forest Management (Version 1.3) , identifying realistic and credible alternative land uses as a result of sub-step 1b and 1c. A barrier analysis was conducted to identify realistic and credible barriers that prevent implementation of these land use scenarios, following the procedures in Step 3 of VT0001 Tool for the Demonstration and Assessment of Additionality in VCS AFOLU project activities.

Sub-step 3a) Identification of barriers

Table 3-6. Identification of barriers

Scenario		Barriers
1	Legal/regulatory barrier	Complexlegal frameworks that require navigating multiple permits or approvals. The transition from a logging concession to a protected forest requires significant legal and regulatory changes, including securing PBPH and MUK permits.
2	Ecological barrier	Degradation of natural resources, such as soil and water, could pose challenges for project success. Moreover, the area's vulnerability to flooding and forest fires presents significant challenges to maintaining forest integrity and carbon stocks.
3	Market barrier	The absence of strong market incentives for forest conservation, coupled with the financial attractiveness of logging, industrial plantation, and mining activities, creates substantial barriers. Additionally, Price fluctuations in commodities (e.g., timber, oil) can affect the financial viability of conservation initiatives.
4	Operational barrier	The presence of illegal logging activities and the expansion of mining in riparian zones would make forest protection more challenging.
5	Social barrier	Resistance from local communities or indigenous groups who depend on the forest for their livelihoods could create conflicts and delays in development of several land use scenarios. Differing land use interests or concerns over livelihoods may lead to differing perspectives from local communities or stakeholders. Land ownership or use conflicts, particularly in areas involving indigenous or marginalized populations, requiring careful management.
6	Financial barrier	Challenges in securing sufficient financing, particularly for lar ge-scale or long-term conservation projects. In addition, there are lower financial returns compared to alternative land uses, making it less attractive to potential investors.
7	Institutional barrier	The need for strong governance and institutional capacity to support sustainable land management practices. Ongoing collaboration with government entities to align policy incentives with conservation and sustainable land use goals.

Sub-step 3b) Show that the identified barriers would not prevent the implementation of at least one of the alternative land use scenarios

Table 3-7. Plausible scenario against identified barriers

Scenario		Barriers
1	Expansion of hydrocarbon exploration	This scenario faces institutional, technological, and ecological barriers. For the institutional barriers, the permit of land use within the project area will change the policies and laws since the PT BLM AND PT GES2 holds the license with a legal right to conduct harvesting timber products. To explore hydrocarbons, companies must obtain an Exploration Permit from the Ministry of Energy and Mineral Resources (MEMR). If the land is categorized as state forest, approval from the Ministry of Environment and Forestry (MoEF) is also required. If the exploration or exploitation activities are to be conducted in state forest land, the company must obtain a Forest Area Utilization Permit (IPPKH) from the MoEF. This permit allows the temporary use of forest land for non-forestry purposes, such as hydrocarbon exploration and exploitation. The IPPKH is subject to certain conditions, such as payment of forest area utilization fees and reforestation obligations. After successful exploration, if the company wishes to proceed with exploitation (production), it must obtain a Production Permit (IUP Operasi Produksi) from MEMR. This permit authorizes the company to extract and produce hydrocarbons. The company must also seek an extension or renewal of the IPPKH from MoEF to continue using the forest land for production purposes. The company must comply with all relevant forestry and environmental laws during exploration and exploitation activities. This includes implementing measures to minimize environmental impact, conducting regular monitoring, and fulfilling an y reforestation or land rehabilitation obligations. Regular audits and inspections by government authorities will take place to ensure compliancewith these regulations. At the end of the production period, the company is responsible for rehabilitating the land to restore it to

		its original condition or to a condition agreed upon with the government. Finally, the IPPKH is revoked, and the land is returned to the state, usually under a reforestation or conservation program. Moreover, the exploration of oil requires technology investment to consider the potential of the amount of oil within the project area. It is projected that the exploration of hydrocarbons leads to the degradation of soil and unfavorable course of ecological succession, resulting in catastrophic natural and/or human-induced events (e.g. landslides, fire, etc.). Strict environmental regulations might limit the extent or expansion of hydrocarbon activities, especially if there are protected areas or sensitive ecosystems within the project site. Volatility in global oil prices could make hydrocarbon exploration less financially viable, particularly in marginal or newly developed areas.
2	All project area is subject to Forest Management practice which involves planned timber harvest for commercial (continued logging)	This land use scenario does not faces any significant barriers. As the AAD holds the legal license as a logging concession (refers to Section 2.2 Without-project Land Use) including the volume and area planned. Historical records of prior harvesting activities by PT BLM also took place in 2018 to 2019. Unfortunately, due to Covid-19 pandemic, no timber harvesting activities occurred since early 2020.
3	Establishment of industrial plantation forest (Hutan Tanaman Industri/HTI)	The conversion of natural forest to monoculture plantations can lead to soil degradation, loss of biodiversity, and disruption of water cycles, which might raise opposition from environmental groups or local communities. Resistance from local communities or indigenous groups who depend on the forest for their livelihoods could create conflicts and delays in HTI development.
4	Degradation due to lack of management	Lack of funding and resources for effective forest management can lead to widespread illegal logging, forest fires, and other forms of degradation. The area's vulnerability to natural disasters such as flooding and fires could exacerbate degradation, making it difficult to maintain forest cover and biodiversity. However, economic barriers exist in keeping the area as unprotected forest and further degrading the forest area, as it would not contribute

		to state revenues or provide benefits to local communities.
5	Conservation project without being registered as VCS AFOLU project	There are investment barriers that would prevent the project's implementation if it were not registered as a VCS AFOLU project. Without carbon finance revenues, the project, operated by a private entity, would not generate any income. Securing long-term philanthropic funding for large-scale conservation projects can be challenging, as such funding sources are often limited and highly competitive. As demonstrated in (Appendix 19), the SCIR project's only revenue comes from the sale of VCUs. Without VCS AFOLU registration, alternative financing sources, such as philanthropic funding for conservation, would be required. However, such funding is not commonly available for a project of the CSIR Project's scale and duration. Additionally, collaborating with government entities and conservation organizations is a must to enhance the capacity to implement and sustain long-term conservation efforts.
6	Increased stone and sand mining in riparian zones	Mining activities can lead to significant environmental degradation, including the destruction of riparian habitats, water pollution, and increased sedimentation in rivers, which can cause long-term ecological damage. Environmental regulations may restrict or prohibit mining activities in riparian zones, particularly in areas that are crucial for maintaining water quality and ecosystem services. Opposition from local communities and environmental organizations due to the environmental impacts of mining could lead to conflicts, protests, or legal challenges that delay or prevent mining activities.

3.1.5 Additionality (VCS, 3.14)

In compliance with the methodology's requirements, the project's additionality is demonstrated utilizing the most current version of the VCS tool VT0001 designed for the demonstration and assessment of additionality in AFOLU project activities. Following the VT0001, the project's eligibility, including the legal rights and intent to harvest, has been

thoroughly reviewed. Since no barriers prevent this scenario, continued commercial logging is deemed the most likely baseline scenario. By halting this logging, the project takes a substantial step forward. It actively enhances carbon sequestration, protects biodiversity, and delivers social benefits, moving decisively from the baseline scenario towards genuine environmental sustainability. Hence, the project is deemed additional.

Furthermore, the alternative land use scenarios to the proposed project is explained in Chapter

3.1.4. Baseline Scenario, and the steps following the additionality methods are detailed below:

3.1.5.1 Regulatory Surplus (VCS, 3.14)

Is the project located in an UNFCCC Annex 1 or Non-Annex 1 country?

☐ Annex 1 country ☒ Non-Annex 1 country

Are the project activities mandated by any law, statute, or other regulatory framework?

☐ Yes ☒ No

If the project is located inside a Non-Annex 1 country and the project activities are mandated by a law, statute, or other regulatory framework, are such laws, statutes, or regulatory frameworks systematically enforced?

☐ Yes ☒ No

For the baseline scenario proposed, the planned agriculture conversion and harvesting of forest scenario is acting under **Law No. 23 of 2014 on Regional Governance** [18] This law concerns the governance of local governments in Indonesia. It clearly defines the distribution of power between the central government and local governments, including provincial, city, and regency levels. Specifically, in forestry and environmental management, this law grants local governments (including regency-level governments) certain authorities, such as managing local forest resources, issuing related permits, and supervising environmental protection measures. Mores specifically articles 11 and 12 lists the rights of the regional governmental agency's right.

Environmental Protection and Management Law (Law No. 32 of 2009)

This law aims to protect and manage Indonesia's environmental resources, covering water resources, forest resources, air quality, and more. It includes regulations on Environmental

[18] https://faolex.fao.org/docs/pdf/ins160168.pdf

Impact Assessment (AMDAL), corporate environmental responsibilities, and the government's role in environmental protection.

Law No. 41/1999 on Forestry:[19]
This is the primary forestry law in Indonesia.

Key points include:

- All forests within Indonesia, including natural resources within, are under state control for people's maximum welfare.
- Defines forest categories: state forests and privately owned forests.
- Provides the legal basis for social forestry schemes like community forests (HKm) and village forests.

This law provides the overall framework for forest management in Indonesia, which would apply to our REDD project zone on Seram Island.

As the conversion is acting within the right granted by the law, project activities stopping the baseline activities are not mandated by a law, statute, or other regulatory framework.

Please refer to 2.5.1 for more details.

For the proposed baseline scenario regarding unplanned agriculture conversion, it is the duty of the government to prevent unplanned deforestation and degradation, however, the lack of resource from the local enforcing body results in a steady loss of forest cover due to unplanned deforestation, as shown in historical data. Therefore, although the project activities regarding the protection of forest affected by unplanned agriculture conversion is mandated by a law, statute, or other regulatory framework, the regulations/rules are not systematically enforced.

3.1.5.2 Additionality Methods (VCS, 3.14)

The additionality of the project was performed using the tool "VT0001 Tool for Demonstration and Assessment of Additionality in VCS Agriculture, Forestry and Other Land Use AFOLU project Activities", Version 3.0. Below are the steps that were followed to assess the additionality and determine the baseline of the project

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

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

[19] https://jdih.kemenkeu.go.id/fulltext/1999/41tahun~1999uupenj.htm

a) Identify realistic and credible alternative land-use scenarios to the proposed IFM project activity.

i. Continuation of the pre-project land use at the risk of lost forest land to commercial development:

The most likely alternative land-use scenario to the planned CSIR is the continuation and proliferation of the historically observed unplanned deforestation, degradation and conversion of forest. And under the pressure of national food security and population pressure, the large area of forest in the Project Accounting Area will be turned into a non-forest condition.

Under Indonesian law community members are allowed sustainable use of forest products (though not inside the Core and Conservation Zones of Protected Area i.e. the entirety of the Project Accounting Area), and illegally as forest is converted to agriculture. This stems from lax enforcement of property tenure and resource planning, coupled with the communities' economic need for resources and land but the deforestation is still smaller scale as compared with the regional development.

There are divergent visions of desirable development between levels of government, between sectors of government, and between government and civil society. The head of investment in central Seram district (Badan Koordinasi Penanamam Modal, BKPM) has a vision for Seram as a hub of industrial growth for eastern Indonesia. This aligns with the national strategy for accelerated economic development, (previously known as MP3EI, now accommodated for under Widodo's administration under the principles of Nawa Cita) (Indonesia's Kementerian Koordinator Bidang Perekonomian Republik, 2011). The head of the BKPM envisaged growth driven by mining, oil and gas, oil palm and other estate crops, and industrial fishing; he insisted that '**any investment is good investment**' and his office was clearly focused on development benefits and not environmental impacts. He believed that existing customary land tenure and ownership arrangements are an obstacle to large-scale investment. He saw the national park as an obstacle to infrastructure development and restricting space for more industrial activity. He also saw lack of coordination among government sectoral agencies as an obstacle to doing business in Maluku.

With a strong intention from certain governing sectors but the incapability to carry out a sustainable model, without project activity, the Project zone poses risks of unsustainable development activities with minimal benefits to the native residents. Currently there are 4 large scale investments on Seram Island outside of Project zone:

1. Oil and Gas Production by CITIC (Est. production of 4500 barrels of oil per day)

2. Cacoa Plantation by OLAM (5000 ha plantation)

3. Prawn Farm by Chinese Investors (Currently closed due to disease problems)

4. Oil Palm Plantation by PT Nusa Ina. (Two blocks, totaling 40,000 ha between East and West Sawai)

While the **national park office** recognizes that the communities around the park boundaries are poor and seek opportunities for integrated conservation and development partnerships. The community seeks stronger engagement from the government to clarify rules, boundaries, and potential involvement. The investments mentioned above are not delivering expected local benefits and are raising environmental concerns among the communities. When visiting villages closer to the cacao plantations, it is learnt that farmers have concerns over the future of their cacao trees. Despite their proximity to the large- scale production, they received very little government or company support in the form of agricultural extension services.

In 2016, the Forestry Department, UPTD KPH Western Seram, the proponent, submitted a reporting proposal **06/SK/DISHUT-MAR/01/2016** on the Potential Use of Forest Areas for Agricultural Sector Development. Its aim is to cope with the national food security and regional development. The study plan includes converting 20,000 Ha of forest into cassava, corn and other food crops (not for the forest land to be converted into oil palm plantation) at the same time openning up a 35,000 Ha of logging concession. (see Annex 4 - Report on the Results of the Study on the Potential Use of Forest Areas for Agricultural Sector Development).

Without CSIR project activities, the big land of forest is always at risks to be commercial developed as the biodiversity of Seram Island will be threatened and the benefits that communities receive from development activities could be minimal.

ii. Project activity on the land within the project boundary performed without being registered as the VCS AFOLU project;

AAD, a project partner in the CSIR , has been performing conservation activities within the project boundary since 2022.
However, Central Seram conservation and protection activities have been sustained by a AAD's single major funding source, with smaller amounts coming from grants, income or other sources. AAD's major source of funds has been depleted, and they are no longer able to financially support the Project activity without new funding sources, such as carbon. AAD's existing activities include enforcement of forest boundaries and reduction of illegal logging and forestland clearing activities as well as community- based eco-tourism and agriculture programs. In the past few years, a lack of consistent funding has limited the scope of these activities. Furthermore, the area has not historically attracted significant attention from conservation NGOs, and donor funding has been unsustainable and inconsistent over the long term, which has limited the expansion Project activities to the scale required to stop ecosystem conversion. Funds from the sale of emissions reductions garnered by the IFM Project will be instrumental in the development of an independent, long-term sustainable revenue stream. This will in turn support Project activities that protect the Project Accounting Area and expand Central Seram reach to additional communities.
Without being registered as the VCS AFOLU project, the AAD will soon running out of fund. The development plant of converting 20,000 Ha of forest into farmland and 35,000 Ha of commercial logging will be materialized in the long run. This of course will benefit the

National Food Security, improve local employment but at the cost of lost 55,000 Ha of forest and change of local ecosystem, loss of native endangered agarwood and animal species.

iii. Activities like the proposed Project activity on at least part of the land within the project boundary of the proposed VCS AFOLU project at a rate from legal requirements;

The entirety of the Project Accounting Area is owned by the Regional Government of Maluku, Indonesia and administered by the Regional Government of Maluku, one of the Project Proponent. The land within the Project Accounting Area is under legal protection with a legal requirement to perform activities similar to the proposed project activities, i.e. conserve the forest and protect it from deforestation and degradation activities. Prior to the declaration of the Central Seram Regency FMU6 in May 2016, the majority of the Project Accounting Area was non-protected permanent forest reserve managed by the FMU6. And while much of the wider Central Seram Landscape, and the rest of the Project Accounting Area, has been protected under national legislation and managed for conservation purposes over a longer period it has still undergone significant forest degradation and deforestation over the last 10 years. This is largely due to a lack of funding for Regional Government of FMU, who used to manage the site, limiting their ability to enforce the forest boundaries and patrol the areas to stop the unsustainable activities that lead to forest degradation and deforestation. The primary source of revenue for the protection of the forest has been AAD's funding and the general budget allocation of the Regional Government of Maluku through the national budget. All areas under the Regional Government of Maluku's jurisdiction (5,243,217.6 hectares by 2020 of Primary dry land Forest, Secondary dry land Forest, Primary Mangrove Forest, Primary Swamp Forest, Secondary Mangrove Forest, Secondary Swamp Forest and Plantation forest, MoEF 2022) must compete for the limited funds available to support their protection, leaving most underfunded.

AAD has initiated this CSIR project with regional FMU6. In applying the VCS AFOLU project, a Sustainable Income Generating Scheme (SIGS) has been synthesized by the inspiration of VCS methodology and CCB protocols. Out of the Project zone of 143,20 0 Ha, 19,20 7 Ha forest has a project activity of Avoid Planned Deforestation to Farmland as PAA1. The 34,811 Ha forest has a project activity of Avoid Planned Deforestation and Unplanned Degradation of Commercial Logging as PAA2. Another 34,806 Ha has a project activity of Avoid Unplanned Deforestation and Degradation as

The CSIR not only preserve and restore the forest, improve local employment, preserve and restore the local ecosystem and Improve community welfare, education and health.

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

For scenario 1, the continuation of pre-project land use of the planned agriculture conversion and harvesting of forest scenario is acting under **Law No. 23 of 2014 on Regional**

Governance [20] This law concerns the governance of local governments in Indonesia. It clearly defines the distribution of power between the central government and local governments, including provincial, city, and regency levels. Specifically, in forestry and environmental management, this law grants local governments (including regency-level governments) certain authorities, such as managing local forest resources, issuing related permits, and supervising environmental protection measures. Mores specifically articles 11 and 12 lists the rights of the regional governmental agency's right. As the conversion is acting within the right granted by the law, project activities stopping the baseline activities are not mandated by a law, statute, or other regulatory framework.

For the proposed baseline scenario regarding unplanned agriculture conversion, it is the duty of the government to prevent unplanned deforestation and degradation, however, the lack of resource from the local enforcing body results in a steady loss of forest cover due to unplanned deforestation, as shown in historical data, proving that it is baseline scenario that is likely to occur.

Most alternative land use scenarios listed in sub-step 1a represent illegal land use, with the major exception of sustainable harvesting of trees by local communities to be used as building materials. However, local expert knowledge and historical satellite imagery showed that greater than 28% of the land area has been converted to agriculture or for development in Project zone as illustrated in next table:

From: Central Seram FMU6 Forest Function Class and Land Cover Map in 2018 (65)

This study shown that conversion to agriculture is a prevalent scenario in this area, and further demonstrates that land use laws and regulations need to take a different approach.

For scenario 2, as outlined in the **Law No. 23 of 2014 on Regional Governance**, it is the duty of local governments to manage local forest resources and supervise environmental protection mearures. Although through the barrier analysis, it is shown that without the benefits of VCU from VCS AFOLU project, the proposed scenario will face financial hardships that could result in the failure of the project, the proposed scenario is reasonable and in accordance with regulations.

For scenario 3, as outlined in MoEF Regulation No.7 of 2023, section 2 article 6, The implementation of carbon trading includes:

"Permanent production forest areas, convertible production forest areas, and protected forest utilization blocks must have PBPH (Forest Utilization Business Permit), social forestry management agreements, or **management rights**."

And in article 7:

[20] https://faolex.fao.org/docs/pdf/ins160168.pdf

"Forest areas with PBPH, social forestry management agreements, or **management rights can engage in emission trading or carbon offsetting**."

Therefore, the proposed scenario 3 is in accordance with regulations.

Sub-step 1c. Selection of the baseline scenario:

By FPIC SBIA/PRA with the local communities, the VCS AFOLU framework together with CCB protocols provide an inspiring framework for selecting the most plausible baseline scenario. For the project, this was determined to take the scenarios 1 as the baseline scenario, and scenario 2 and 3 are not a plausible alternative baseline scenario as following barriers analysis.

Step 2. Investment analysis

Sub-step 2a. Determine appropriate analysis method

The CSIR , a VCS AFOLU project, generates no financial or economic benefits other than VCS-related income derived from the sale of carbon credits. Therefore, barrier analysis applies.

Sub-step 2b. Apply simple cost analysis

As the barrier analysis was chosen, simple cost analysis was not performed.

Step 3. Barrier analysis

Sub-step 3a. Identify barriers that would prevent the implementation of the type of proposed project activity

A barrier analysis was performed instead of an investment analysis. The barrier analysis demonstrates that there are significant barriers that prevent the type of proposed project activities from being implemented without income from the sale of GHG credits.

A barrier analysis demonstrates that there are several significant barriers to implementing the proposed project activities in Central Seram without financial support from the sale of carbon credits. These barriers prevent effective land-use management and conservation activities while allowing unsustainable practices like deforestation and land conversion to continue. The sale of GHG credits is essential for overcoming these barriers.

3a.1. Financial Barriers:

Without carbon credit financing, the project faces significant financial challenges. Effective protection and management of large forest areas require considerable financial resources. These resources are necessary for forest monitoring, law enforcement, and alternative livelihood programs for local communities. In Central Seram, funding shortfalls are particularly acute due to a lack of government financial support, and the project zone is vast and remote, increasing operational costs. The sale of carbon credits would provide the necessary funding to prevent illegal logging and unsustainable agricultural expansion.

In Indonesia, financial shortfalls in conservation projects have historically led to deforestation and land conversion. The lack of consistent funding has meant that forest

management units (FMUs) often struggle to enforce regulations, making it challenging to protect these areas from agricultural encroachment, timber extraction, and other illegal activities. According to data from the Central Statistics Agency (BPS) of Indonesia, the average monthly income per capita in Indonesia was around 1.493 million IDR (approximately 94.52 US dollars) in 2024, that is significantly lower compared to the average in Jakarta, which is 2.692 million IDR or the national average of 1.807 million IDR. It demonstrates that a financial barrier exists for local communities to perform project activity without the involvement of all the PPs.

3a.2. Institutional and Governance Barriers:

In the Central Seram area, weak governance structures and limited enforcement of environmental regulations create institutional barriers to implementing conservation initiatives. While there are legal frameworks in place, such as the 2019 Indonesian Forest Law, enforcement is inconsistent, especially in remote regions like Central Seram. Local forestry authorities are often underfunded and understaffed, making it difficult to monitor and manage forest areas effectively. This is evident from Indonesia's reliance on international initiatives like REDD+ and the Green Climate Fund (GCF) to fund these operations. For example, from 2014 to 2016, Indonesia avoided over 20 million tons of carbon emissions, but this was largely dependent on the financing structures supporting decentralized forest management systems. As stated in a report by UNDP, "between 2014 and 2016 [Indonesia] avoided 20.3 million tons of carbon emissions, the Green Climate Fund (GCF) in August 2020 approved a US$103.8 million payment for REDD+. The vast majority of this, some US$93.4 million, will support and expand decentralized sustainable forest governance, including its Social Forestry Programme. https://www.climateandforests-undp.org/news-and-stories/indonesias-social-forestry-programme-supports-livelihoods-and-climate-action

3a.3. Social and Cultural Barriers:

Local communities in Central Seram, many of whom rely on shifting agriculture and forest resources for their livelihoods, face significant socio-economic challenges. The lack of awareness about sustainable land use and the benefits of conservation leads to resistance from local communities regarding the protection of forests. Education and community outreach programs funded by carbon credits are crucial for shifting these long-standing practices toward sustainable alternatives.

3a.4. Market Barriers:

The expansion of agricultural land in the Central Seram region is often driven by external market forces. Cash crops such as palm oil and other commodities have increasing demand, incentivizing farmers to clear more forested land for agricultural use. Without the financial resources from carbon credits to provide alternative economic activities, the project zone would likely continue to see conversion into agricultural plots, leading to further degradation.

Sub-step 3b. Show that the identified barriers would not prevent the implementation of at least one of the alternative land-use scenarios

The barriers identified in sub-step 3a would not prevent the continuation of alternative land-

use scenarios, such as scenario 1: Continuation of the pre-project land use at the risk of lost forest land to commercial development; as these activities are driven by existing economic incentives and are not subject to the same financial, institutional, or cultural barriers. Without carbon finance, these unsustainable land-use practices are likely to continue, resulting in further deforestation, degradation, and loss of biodiversity. Additionally, the demand for agricultural land would continue to drive deforestation, as communities rely on these practices for their livelihoods.

By demonstrating the critical need for carbon financing to overcome these barriers, your project would highlight how the sale of carbon credits is essential for sustainable forest management and conservation efforts in Central Seram.

Step 4. Common Practice Analysis

While some of the Project Activities in the CSIR have been attempted, or in some cases implemented by the Project Proponent in portions of the Project Accounting Area, notably forest patrols and protection, were funded by AAD. AAD's forest protection activities have been extremely successful at protecting the Project Accounting Area. However, the cost of the activities is unsustainable for AAD to continue in the absence of a new, consistent source of funding. The CSIR aims to utilize the revenue from emission reduction sales to provide a sustainable, consistent source of funding with which to maintain ADD's protection activities and increase the number and size of project activities and their geographic influence. The CSIR will operate Project activities throughout the entirety of the Project Accounting Area, and work to engage communities and address the agents and drivers of deforestation and degradation across this incredibly important landscape.

Although forest protection against unsanctioned harvesting is against the law, the lack of funding and support from governmental agencies makes protecting the forest without the funding from VER sales inefficient and unsuccessful. From 2019 to 2021, there are 4 cases been identified by the local government including the illegal logging of Agarwood 1,920Kg (56).

Table 14; Illegal Logging in Seram Island

Year	Species	Volume	Unit	Location
2020	Dipterocarpaceae and mix	147.262	m3	SBT
2021	Agarwood	1920	kg	
2019	Dipterocarpaceae and mix	205.9	m3	Maluku Tengah
2020	Dipterocarpaceae and mix	400	m3	Maluku Tengah

Data Source: [56]: Technical Report 3: Permanence and Leakage Identification from Human Activities. 2021. P3.

There are 5 existing REDD+ projects in Indonesia; only one is operating on lands under the jurisdiction of the KPHP Tasik Besar Serkap (KPHP TBS), Riau Province-Indonesia and

Guangdong Province, China (PRESERVING PEAT SWAMP FOREST ECOSYSTEM THROUGH REDD+ ACTIVITY IN KAMPAR PENINSULA RIAU-INDONESIA). Four of these projects represent Peat land forested land in Indonesia, and one is by the project consists of 10 'Village Forests'. All are still in the early stages of their operation. In the case of the CSIR , the funding provided by VER sales will be used to continue a proven and successful forest protection program with a sustainable source of funding, and provide viable economic alternatives for local communities, reducing their need for unsustainable extraction of natural resources.

For requirement 2.4.2 and 2.4.3:

Similar Activity Comparison

Gunung Leuser National Park represents a comparable forest protection initiative in Indonesia with the following similarities:

- Geographic context: Located in Indonesia
- Regulatory framework: Operating under Indonesian forestry laws
- Conservation purpose: Protection of forest ecosystems and biodiversity

Scale Comparison

Gunung Leuser National Park covers 1,092,692[21] hectares across North Sumatra and Aceh provinces, making it comparable in scale to the CSIR project zone (143,330 hectares).

Essential Distinctions

1. Government Support and Resources[22]
   Gunung Leuser receives significant advantages that are not available to the CSIR project activity:
   - Annual government budget of IDR 30.6 billion (as of 2017)
   - Direct UNESCO World Heritage site funding and support
   - Multiple international NGO partnerships providing additional resources

2. Operational Support[23]
   Gunung Leuser benefits from:
   - Eight Wildlife Protection Teams conducting regular patrols
   - International donor funding of $400,000 for ranger protection
   - Established research stations and monitoring systems

3. Financial Sustainability[24]
   Unlike the CSIR project, Gunung Leuser has:
   - Government budget allocation, though insufficient (IDR 36,20 8/ha)

[21] https://asean.chm-cbd.net/protected-areas/gunung-leuser-national-park-core-sumatras-tropical-rainforest-heritage
[22] https://biodiversitylinks.org/library/resources/lessons-learned-technical-brief-multi-layered-conservation-management-in-leuser-landscape/@@download/file/Multi-layered%20Conservation%20Management.pdf
[23] https://globalconservation.org/news/leuser-ecosystem-protection-2022-23-progress-with-breaking-news
[24] https://biodiversitylinks.org/library/resources/lessons-learned-technical-brief-multi-layered-conservation-management-in-leuser-landscape/@@download/file/Multi-layered%20Conservation%20Management.pdf

- International conservation grants
- Multiple NGO partnerships providing operational support

The reason between the distinction from Gunung Leuser and CSIR is that Gunung Leuser is a national park, therefore it can receive additional supports. There are no cases of success project within Indonesia that operates similar activity as CSIR and are not registered under any GHG reduction programme.

These distinctions demonstrate that while Gunung Leuser represents a similar activity, it operates with significant governmental and international support that is not available to the CSIR project, making the identified barriers not apply to this similar activity, making carbon credit revenue essential for the project's implementation and success

3.1.6 Methodology Deviations (VCS, 3.20)

The CSIR does not deviate from the VCS methodology VM0010.

3.2 Quantification of Estimated GHG Emission Reductions and Removals

3.2.1 Baseline Emissions (VCS, 3.15)

3.2.1.1 VM0010 Section 6.1 Selection of the baseline

Please refer to Section 3.1.4 and 3.1.5 above.

Allometric Equations

The project uses Allometric equation from "National Forest Reference Level for Deforestation, Forest Degradation and Enhancement of Forest Carbon Stock 2022 submission to UNFCCC" by The Republic of Indonesia. As there is no wetland in the Project Accounting Area, therefore the equation from reference table Annex 4.3. explicated for Maluku province was used as follows:

The D stands for diameter at breast height. The G stands for Wood Density according to the tree species. If no wood density found, the default value 0.57 g/cm^3 was used based on a wood density average for Tropical Asia by Reyes et al. (77).

Table Annex 4.3. Allometric equation used in FRL

Forest Type	Reference	Allometric Equations using D and ρ variables
Mangrove Forest	Chave et al, 2005	$AGB = Exp\ [-1.349 + 1.98\ Ln\ D + 0.207\ (Ln\ D)^3 - 0.0281\ (Ln\ D)^3] \times \rho$
Other forest	Manuri *et al.*, 2017	Sumatera- Kalimantan $AGB=0,167D^{2,560}G^{0,889}$ Jawa – Bali – Nusa Tenggara – Sulawesi - Maluku $AGB=0,151D^{2,560}G^{0,889}$ Papua $AGB=0,206D^{2,560}G^{0,889}$

The Allometric equation used according to the Indonesia National Standard for Maluku Province and is used the monitoring calculation.

3.2.1.2 VM0010 Section 6.2 Modelling of the baseline scenario

PT BLM concession which spans approximately ±24,550 hectares, PT GES2 concession which spans approximately ±33,198 hectares both located in the Central Seram. These areas are administratively under the Tehoru, Teluk Elpaputih, Teon Nila Serua, Kota Masohi, Amahai Sub -districts, BCentral Seram District, Maluku Province. PT BLM holds forest utilization business permit (Perizinan Berusaha Pemanfaatan Hutan/PBPH) since September 2021 through the Decree of Minister of Environment and Forest ry Number SK.687/MenLHK/Setjen/ HPL.0/9/2021. This is an updated license from logging concession permit (IUPHHK-HA) in 2013 which granted through Decree of Minister of Environment and Forestry Number SK.774/Menhut-II/2013. PT BLM has been granted the approval on Work Plan for The Utilisation of Timber Forest Products in Natural Forest Within Production Forest Based on Periodic Comprehensive Forest Inventory (IHMB) for the period 2016 to 2025 based on Indonesia MoEF decree SK.2088/MenLHK-PHPL/UHP/HPL.1/5/2016. These licenses and decree act as government-proven records for forest management license with more than 5 years preceding the project start date and that the management practices have surpassed the legal requirement.

Step 1: Forest Volume Inventory

The method used for vegetation data collection follows the Indonesian National Standard (SNI) 7724:2011 (SNI7724, 2011a) and IHMB (Ministry of Forestry Regulation of the Republic of Indonesia No P.33/Menhut-II/2009, 2009) with some modifications. Forest carbon assessment is conducted using a two-kilometer transect line, each containing five nested plots sized 125 meters x 20 meters (see Figure 3-1). The placement of the transect line is clustered/stratified based on land cover classes and randomly placed within every land

cover class. The estimation on sampling plot needed for the carbon assessment is calculated using "IMPLEMENTATION OF PERIODIC COMPLETE FOREST INVENTORY (IHMB) FOREST PRODUCT UTILIZATION BUSINESS IN PRODUCTION FORESTS MAIN REPORT: Chapter 2 Sample Plot Methodology". CSIR estimates the number of plots within the range of 10% error, 95% confidence interval. A total of 309 sampling plots (0.25 ha each) were conducted to fulfil the requirements.

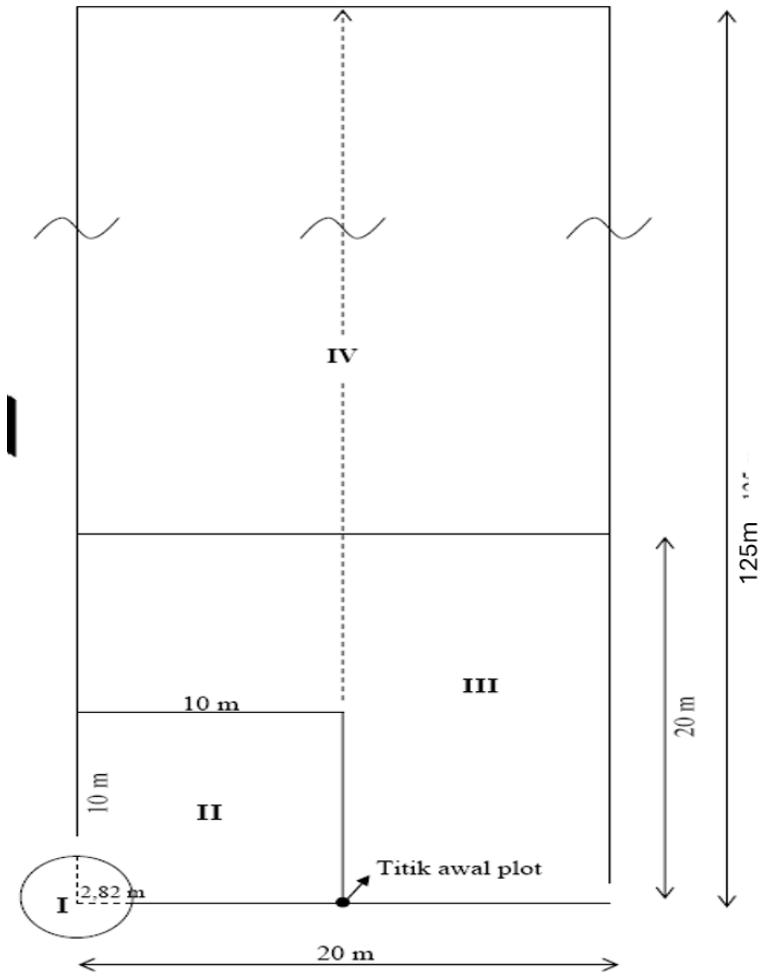


Figure 3-1 Nested sampling plot for biomass estimation

There are four plot sizes used for three vegetation growth types based on diameter at breast- height (DBH): 125 m x 20 m plot for tree level (DBH≥30cm), 20 m x 20 m plot for pole level (15cm≥DBH>30cm), and 10 m x 10 m plot for sapling level (5cm≥DBH>15cm), and 2.82m radius. Within each sub- plot, the parameters recorded are tree species, DBH per individual tree according to its DBH class, and tree height. Coordinates for each plot are recorded using Garmin™ GPS type 65s at the starting point of the plot. Each recorded tree is marked with numbered aluminum sheets which are carefully nailed into each tree. Leaves, branches, fruits, and flowers of each tree species are collected to create the herbarium. Each herbarium specimen is photographed for further identification purposes. Initial plant species identification is done in the field. To confirm

the identified plant species, the herbarium specimens and collected photos are cross verified using plant identification key guidebooks and matched with the available plant photo database and existing herbarium specimens. To complete the vegetation species list, conservation status, density, and obtain comprehensive habitat descriptions in the study area, exploratory observations are also conducted around the nested plots and observer-transversed paths. This vegetation data is also used to verify secondary data collected on ecosystem types (Eco floristics). Specimen nomenclature and taxonomy follow the Angiosperm Phylogeny Group IV (Stevens, 2017). A more detailed description is available for validation in the Standard Operational Procedure. The sampling plots distribution is shown in Figure 3-2 below.

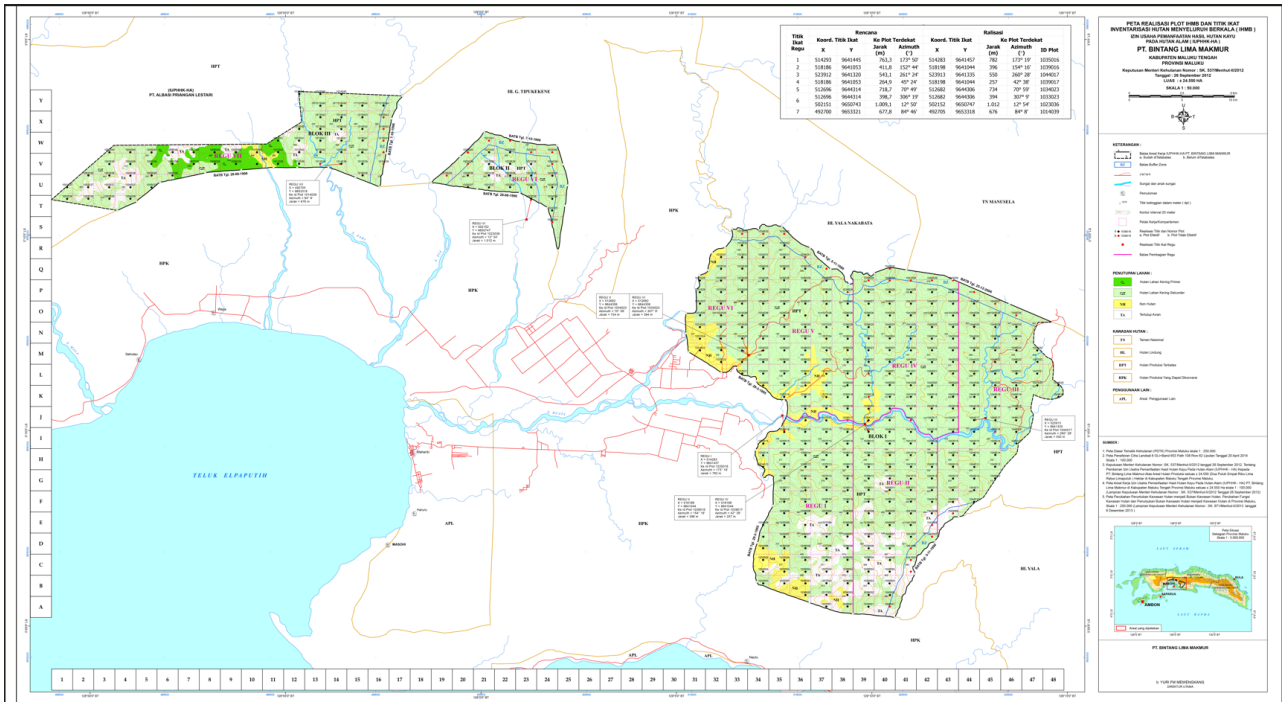


Figure 3-2 Map of the sampling plots location in CSIR project area

Forest carbon estimation is carried out using a non-destructive sampling approach. Wood density values are obtained from the Global Wood Density Database (Chave, et al., 2009), where the default IPCC value of 0.66 g/cm3 is used for tree species not found in the database list. From the measured DBH, species identification, species wood density and tree heights, we then use the allometric equations available and compare based on the highest correlations to choose the most suitable allometric for the biomass analysis. CSIR compared four allometric equations including (Brown, 1997), (Ketterings, 2001), (Chave, 2014) and (Manuri, 2017) in Table 3-8 below.

Table 3-8 Allometric equation comparation for SCIR

Source	Allometric Equation	R^2 value	Data Attributes

(Brown, 1997)	$W = 0.118 D^{2.53}$	0.9	Global data are used (tropical Africa, tropical America, and tropical Asian countries). Not limited to forests, but also covers most tree-dominated terrain. Including closed forest, open forest, woodland, woody savanna, woodland, line tree planting, home garden, hedge, etc. It should only be used for closed forests because the original database used to develop this method was based on closed forests. The main data required for this method is the volume of inventoried free trunk bark with a minimum diameter of 10 cm at breast height or above the root (if higher) of a minimum diameter of 10 cm, (i.e. from the stump or root to the crown point or first main branch).
(Ketterings, 2001)	$B = 0.11 \rho D^{2+0.62}$	0.95	Data were obtained in a Sumatran mixed secondary forest dominated by human-introduced latex-producing Hevea brasiliensis, natural wood species, and fruit species. The soils in this area are very acidic (pH 4-4.5) and average annual rainfall is close to 3,000 mm; there are 7-9 months of rainy season per year (monthly rainfall > 200 mm) and less than 2 months of dry season per year (monthly rainfall < 130 mm). The selected trees were 5-50 cm in diameter and 0-34 m in height.
(Chave, 2014)	$AGB_{est} = 0.0673 (\rho D^2 H)^{0.976}$	0.357 (RSE)	The global dataset uses a spatial resolution of approximately 5 km along the equator. The data were obtained through analysis of a global database of directly harvested trees in primary forests or secondary woody vegetation, excluding plantations and agroforestry systems at 58 sites (published and unpublished sources) in tropical forests, subtropical forests and woodland savannas. A total of 4,004 trees were analyzed, with trunk diameters ranging from 5 to 212 cm.
(Manuri, 2017) DGH1	$AGB = 0.088 (D^2GH)^{0.954}$	0.949	Dataset collected from a wide range of natural lowland forest succession and degradation levels through direct measurements and an in-depth literature search. Ranges from lowland forests within the Indo-Malay Archipelago, including the major island groups (i.e. Peninsular Malaysia, Sumatra,

			Borneo, Java, Nusa Tenggara, Maluku and Papua). A total of 1,463 destructive sampling data from direct measurements and literature were compiled from 22 independent studies at 43 different sites. Approximately 30% of the data set comes from Chave et al. (2014), where n = 425. Trees with D less than 5 cm were excluded due to their small contribution to the landscape-level carbon budget and high residual variation, and a total of 1,300 samples were ultimately collected through direct measurements and literature review. The latitude and longitude of the study site ranges from 10.31°S to 4.039°N and 98.79°E to 140.50°E. The altitude of the study sites ranges from 16 to 1000 m, and the mean annual precipitation ranges from 1,375 to 3,992 mm. Research was limited to natural lowland forests on mineral soils. Therefore, montane forests, peat swamp forests, mangroves and plantations were excluded from this study. This allometric formula is also used to calculate all forest types (except mangroves) in Indonesia's second forest reference level submission to the United Nations Framework Convention on Climate Change in Java, Bali, Nusa Tenggara, Sulawesi and Maluku (Republic of Indonesia, 2022).

Table Annex 4.3. Allometric equation used in FRL

Forest Type	Reference	Allometric Equations using D and ρ variables
Mangrove Forest	Chave et al, 2005	$AGB = Exp\ [-1.349 + 1.98\ Ln\ D + 0.207\ (Ln\ D)^3 - 0.0281\ (Ln\ D)^3] \times \rho$
Other forest	Manuri *et al.*, 2017	Sumatera- Kalimantan $AGB=0{,}167D^{2{,}560}G^{0{,}889}$ Jawa – Bali – Nusa Tenggara – Sulawesi - Maluku $AGB=0{,}151D^{2{,}560}G^{0{,}889}$ Papua $AGB=0{,}206D^{2{,}560}G^{0{,}889}$

Note:

- *W or B or AGB_{est} or AGB is aboveground biomass (kg)*

- *ρ or G is wood density (g/cm^3)*
- *D is DBH (cm)*
- *H is height (m)*
- *Based on the R^2 value and the data attributes from each allometric equations, we then conclude to use (Manuri, 2017) allometric for biomass estimation.*
- *Allometrci equation used in Indonesia NFL submitted to UNFCCC 2022*

The volume of each tree and species is calculated using Approach 5 of the Indonesia Monograph for Allometric Models to Estimate Tree Biomass in Forest Ecosystems in Indonesia (Krisnawati, et al., 2012).

$$V = 0.25\pi \times \left(\frac{DBH}{100}\right)^2 \times H \times F \qquad (Approach\ 5\ Krisnawati\ et\ al., 2012)$$

V	tree volume, m3
DBH	tree diameter at breast-height, cm
H	tree height, m
F	tree form factor, dimensionless

The tree form factor value, known as "*angka bentuk pohon*" (F), is 0.81. This figure is derived from actual timber harvested by PT BLM in 2018 and 2019, comparing the mean tree diameter at the bottom (*Diameter Pangkal, DP*) and the mean tree diameter at the top (*Diameter Ujung, DU*).

Merchantable timber volume at the plot level is calculated by summing the timber volume of all trees exceeding the defined cutting limits: a minimum diameter at breast height (DBH) of 50 cm. Moreover, this calculation only includes all species listed in the Indonesia Ministry of Forestry Decree on the Grouping of Timber Species as a Basis for Imposing Forestry Fees (Kep-Menhut-163-2003). Based on the FAO Global Forest Resources Assessment 2020 for Indonesia, the growing stock level for the Maluku province in Secondary Dryland Forest (*Hutan Lahan Kering Sekunder)* is 60.25 m^3 ha^{-1}. According to the IPCC 2006 INV GLs AFOLU Chapter 4 Table 4.5, the biomass conversion and expansion factor applicable to wood removal (BCEFR) is a 1.89-ton dry mass m^{-3}.

Step 2: Demarcation of All Non-Harvest Areas

The non-harvest areas specified within the Business License for the Utilization of Timber Forest Products in Natural Forests (Izin Usaha Pemanfaatan Hasil Hutan Kayu Dalam Hutan, IUPHHK) for PT BLM AND PT GES2, for the period from 2016 to 2025, are categorized as follows:

1. Protection Zones: These areas are designated for environmental conservation and include:

- A Buffer Zone of 4,031 ha, which is intended to reduce the impacts of logging activities on adjacent ecosystems.
- A Riparian Zone spanning 1,234 ha, which is essential for protecting water bodies and maintaining aquatic habitats.
- A Germplasm Conservation Area of 315 ha, dedicated to the preservation of plant genetic resources.
- A Wildlife Conservation Area covering 300 ha, which aims to protect habitats critical for various wildlife species.

2. Non-Effective Production Areas: These areas are set aside for purposes other than timber extraction and include:

- A Seed Garden of 600 ha, used for growing and preserving tree seeds.
- Permanent Sampling Plots of 600 ha, designated for research and monitoring of forest conditions.
- Facilities and Infrastructure occupying 809 ha, which encompasses various support structures necessary for operations.

These non-harvest areas constitute 10.7% (7,337 ha) of the total PT BLM concession area, which measures 24550 ha.

Step 3: Annual Operating Areas

Table 3-9. The annual operating areas within CSIR Project Area.

Project Year	Annual Land Parcel Code	HPT (ha)			HPK (ha)		
		VF	LOA	Total	VF	LOA	Total
1	I	0	977	977	0	0	0
2	II	0	600	600	0	0	0
3	III	0	631	631	0	0	0
4	IV	0	670	670	0	445	445
5	V	124	670	794	0	1,525	1,525
6	VI	200	733	933	0	1,525	1,525
7	VII	0	770	770	0	1,525	1,525
8	VIII	0	770	770	0	1,525	1,525
9	IX	0	770	770	0	1,525	1,525
10	X	0	770	770	0	1,525	1,525
11	XI	0	770	770	0	1,525	1,525
12	XII	0	770	770	0	1,525	1,525

13	XIII	0	770	770	0	1,525	1,525
14	XIV	0	770	770	0	1,525	1,525
15	XV	0	770	770	0	1,525	1,525
16	XVI	0	770	770	0	1,525	1,525
17	XVII	0	770	770	0	1,525	1,525
18	XVIII	0	770	770	0	1,525	1,525
19	XIX	0	770	770	0	1,525	1,525
20	XX	0	770	770	0	1,525	1,525
21	XXI	0	770	770	0	1,525	1,525
22	XXII	0	770	770	0	1,525	1,525
23	XXIII	0	770	770	0	1,525	1,525
24	XXIV	0	770	770	0	1,525	1,525
25	XXV	0	770	770	0	1,525	1,525
26	XXVI	0	420	420	0	728	728
Total		324	19,331	19,655	0	33,198	33,198

Step 4: Design and Presentation of Forestry Infrastructure

Forest Area Opening (*Pembukaan Wilayah Hutan, PWH*) involved creating infrastructure for timber production and forest management during the management period. Its goal was to build roads, bridges, culverts, and landings to facilitate timber transport and improve forest oversight. Existing functional infrastructure was maintained and further developed, while new infrastructure was planned and built as needed. The construction of roads, bridges, and culverts was essential for transporting timber and managing the forest. These roads were also crucial for post-logging management, forest protection, and general supervision. Main and branch roads were kept in good condition to meet their intended functions. This PWH includes:

Road Density / Intensity PWH

IPWH measured the ratio of road length (in meters) to the area of a production unit (in ha). Economically, optimal IPWH occurred when the cost of road construction equalled the cost of maintenance. Key factors included timber volume, desired road quality, and construction costs. On average, 300 meters of road was needed for a 100-ha logging area. With an efficiency factor of 6 for hilly terrain, the calculated road density was 20 meters per ha. Consequently, the IPWH intensity was 20 meters per ha, with 8 meters per ha allocated to main roads and 12 meters per ha to branch roads.

Road Construction activities

Road construction encompassed planning, road tracing, measurement, and mapping, along with the building and hardening of roads, including the construction of bridges, culverts, and ditches.

Main roads were designed for year-round use and required hardening, while branch and spur roads generally did not, except in areas prone to landslides or steep slopes.

The construction process involved several stages: first, the road route was marked, followed by the clearing of vegetation and debris. Topsoil, typically 10-20 cm thick, was removed from the roadbed. The roadbed was then shaped through excavation and filling, graded and leveled to smooth the surface, and initially compacted. For main roads, stones were collected for surfacing, and hardening materials were handled, spread, and leveled. A final compaction was performed to complete the roadbed.

Additional infrastructure included bridges, culverts, ditches, and road signage. The planned road density was 20 meters per ha, with 8 meters per ha for main roads and 12 meters per ha for branch roads. Spur roads were planned to have up to 22 meters per ha. Existing roads were utilized and improved as needed, with new construction completed at least six months before logging. The 10- year road construction planning (2016-2025) was detailed in table below.

Table 3-10. The 10-year road construction (RKU 2016 – 2025).

Year	Activity Area		Road Length (Km)		
	Code	Size (Ha)	Main	Branch	Total
2016	I	977	7,82	11,72	19,54
2017	II	700	5,60	8,40	14,00
2018	III	631	5,05	7,57	12,62
2019	IV	581	4,65	6,97	11,62
2020	V	1422	11,38	17,06	28,44
2021	VI	569	4,55	6,83	11,38
2022	VII	577	4,62	6,92	11,54
2023	VIII	658	5,26	7,90	13,16
2024	IX	692	5,54	8,30	13,84
2025	X	724	5,79	8,69	14,48
	Total	**7.531**	**60,25**	**90,37**	**150,62**

Construction of Base Camps, TPn/TPK, and Log ponds

The construction of operational control centers for forest management, including base camps, was tailored to the distribution of logging areas and the accessibility of production and forest management activities. The base camps constructed were either permanent or semi-permanent. For routine operational activities, such as RKT (Annual Work Plan), temporary camps were established according to the position of the RKT blocks.

- Main Camp: This was the primary or central camp, serving as the hub for forest management activities.
- Forest Management Camp: This camp focused on forest management activities, particularly related to seedling production.
- Community Development Camp: This camp was dedicated to community development activities around the forest.
- Log pond Camp: This camp was the administrative center for TUK (Log Collection Centers), primarily handling logs being prepared for industry.

Wood collection areas included TPn (temporary wood collection points) and TPK (wood storage areas). The construction of these wood collection sites was intended to serve the entire production area planned for each year, with locations determined based on the logging blocks. A TPn with an area of approximately 0.5 ha and an average distance of 250 meters was estimated to serve a logging area of about 100 ha. Therefore, to serve a single logging block of 1,868 ha, 19 TPn, covering a total area of 9.5 ha, were required.

Step 5: Timber Harvest Plan

Table 3-11 Annual area planned for timber harvest

Project Year	RKT Year	Planned Harvest Area (ha)			Planned volume harvested annually (m^3 ha^{-1} yr^{-1})			Annual Allowable Cut (m^3 yr^{-1})		
		VF	LOA	Total	VF	LOA	Total	VF	LOA	Total
1	2022	0	977	977	0	176.76	176.76	0.00	172,692.34	172,692.34
2	2023	0	600	600	0	176.76	176.76	0.00	106,054.66	106,054.66
3	2024	0	631	631	0	176.76	176.76	0.00	111,534.15	111,534.15
4	2025	0	1,115	1,115	0	176.76	176.76	0.00	197,084.91	197,084.91
5	2026	124	2,195	2,319	176.76	176.76	176.76	21,917.96	387,983.30	409,901.27
6	2027	200	2,258	2,458	176.76	176.76	176.76	35,351.55	399,119.04	434,470.60
7	2028	0	2,295	2,295	0	176.76	176.76	0.00	405,659.08	405,659.08
8	2029	0	2,295	2,295	0	176.76	176.76	0.00	405,659.08	405,659.08
9	2030	0	2,295	2,295	0	176.76	176.76	0.00	405,659.08	405,659.08
10	2031	0	2,295	2,295	0	176.76	176.76	0.00	405,659.08	405,659.08
11	2032	0	2,295	2,295	0	176.76	176.76	0.00	405,659.08	405,659.08
12	2033	0	2,295	2,295	0	176.76	176.76	0.00	405,659.08	405,659.08
13	2034	0	2,295	2,295	0	176.76	176.76	0.00	405,659.08	405,659.08
14	2035	0	2,295	2,295	0	176.76	176.76	0.00	405,659.08	405,659.08
15	2036	0	2,295	2,295	0	176.76	176.76	0.00	405,659.08	405,659.08
16	2037	0	2,295	2,295	0	176.76	176.76	0.00	405,659.08	405,659.08
17	2038	0	2,295	2,295	0	176.76	176.76	0.00	405,659.08	405,659.08
18	2039	0	2,295	2,295	0	176.76	176.76	0.00	405,659.08	405,659.08
19	2040	0	2,295	2,295	0	176.76	176.76	0.00	405,659.08	405,659.08
20	2041	0	2,295	2,295	0	176.76	176.76	0.00	405,659.08	405,659.08
21	2042	0	2,295	2,295	0	176.76	176.76	0.00	405,659.08	405,659.08

22	2043	0	2,295	2,295	0	176.76	176.76	0.00	405,659.08	405,659.08
23	2044	0	2,295	2,295	0	176.76	176.76	0.00	405,659.08	405,659.08
24	2045	0	2,295	2,295	0	176.76	176.76	0.00	405,659.08	405,659.08
25	2046	0	2,295	2,295	0	176.76	176.76	0.00	405,659.08	405,659.08
26	2047	0	1,148	1,148	0	176.76	176.76	0.00	202,917.92	202,917.92
Total		**324**	**52,529**	**52,853**				**57,270**	**9,284,909**	**9,342,178**

3.2.1.3 VM0010 6.3 Stratification

The project stratification can be seen in Figure3-3 where the stratification is based on the 5 Logging Potential classes within the CSIR Project Area.

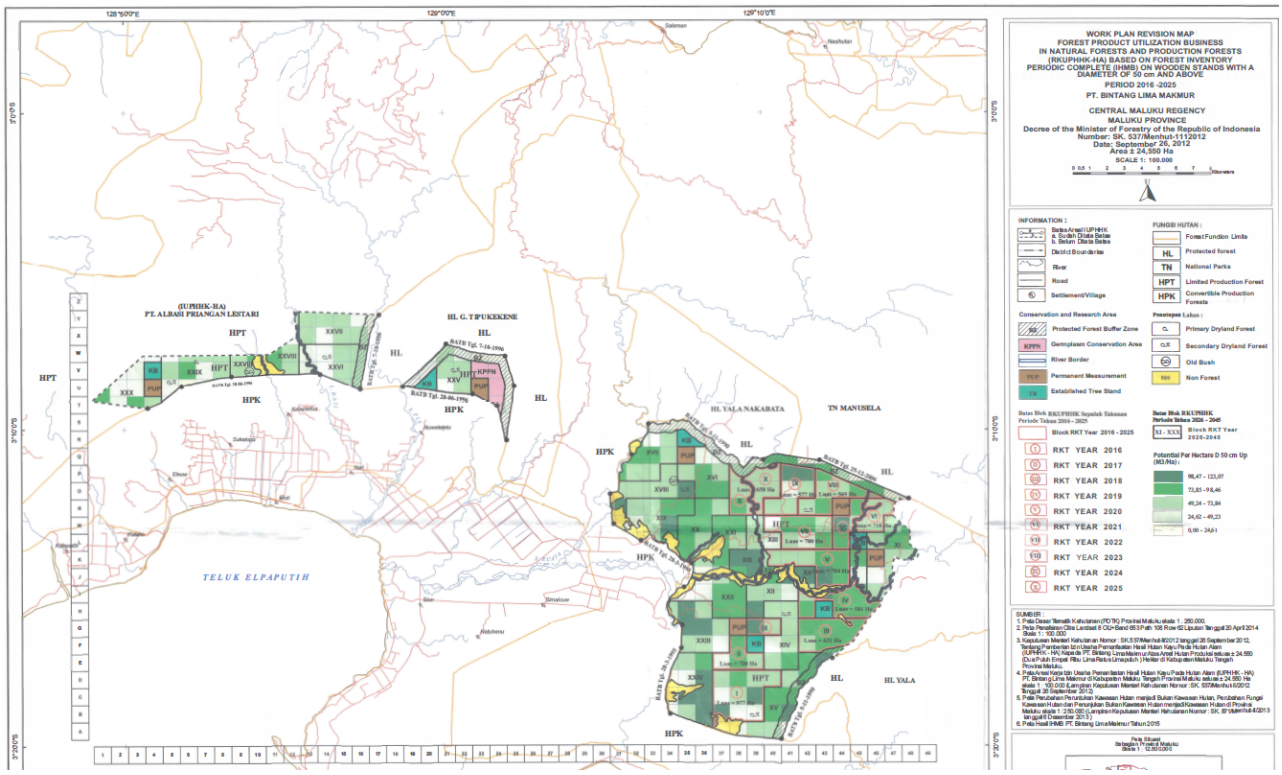


Figure 3-3. The project stratification based on the approved RKU 2016 – 2025

3.2.1.4 VM0010 Section 7.1 Additionality

Please refer to Section 3.1.5

3.2.1.5 VM0010 Section 8.1.1 Calculation of Carbon Stocks in Commercial Timber Volumes

The estimated of merchantable volume for all species J included in Project Sample Plots were summed for all trees with a minimum DBH of 50 cm using equation 1 of the VM0010.

$$V_{j,i,sp} = \sum_{l=1}^{L} V_{l,j,i,sp}$$

Equation (1)

Where:

$V_{j,i,sp}$ merchantable volume for species j in stratum i in sample plot sp, m3;

$V_{l,j,i,sp}$ merchantable volume for tree l of species j in stratum i in sample plot sp, m3;

l 1, 2, 3 ...L sequence of individual trees in sample plot;

i 1, 2, 3 ...*M* strata;

sp 1, 2, 3 ...*SP* sample plots; and

j 1, 2, 3 ...*J* tree species.

Table 3-12 Merchantable timber volume for trees with species and/or genus included in Sample Plots.

Plot ID	Non-Merchantable Volume (DBH < 50 cm) (m^3 $plot^{-1}$)	Merchantable Volume (DBH ≥ 50 cm) (m^3 $plot^{-1}$)
1031026	6.05	48.07
1031027	6.64	26.04
1031028	4.59	60.59
1031029	13.65	18.07
1032030	5.12	58.76
1033026	6.40	40.43
1033028	11.63	35.52
1033029	5.67	41.79
1033030	6.92	65.92
1034003	6.09	35.68
1034028	24.41	38.81
1034030	25.64	49.04
1033023	18.57	33.31
1035029	30.03	30.67
1035030	13.65	34.29
1035031	32.39	28.56
1036004	2.66	63.61
1036008	2.64	68.71
1037004	27.46	26.77
1037005	20.04	36.00
1038001	18.74	44.06
1038004	5.82	38.25
1038007	5.83	48.36
1039001	35.04	81.01
1039001	35.04	81.01
1039002	12.42	39.31
1039003	12.70	29.40
1039004	17.22	83.47

1039005	14.24	71.76
1039006	6.40	47.16
Average	14.46	46.81

The mean merchantable volume per unit area for all species *J* in two operational strata (VF and LOA) are calculated using equation 2 of VM0010.

$$V_{j,i|BSL} = \frac{1}{SP} \times \sum_{sp=1}^{SP} \frac{V_{j,i,sp}}{A_{sp}}$$

Equation (2)

Where:

$V_{j,i\|BSL}$	Mean merchantable volume per unit area of species *j* in stratum *i* in the baseline scenario, m3·ha-1;
$V_{j,i,sp}$	Merchantable volume for species *j* in stratum *i* in sample plot *sp*; m3;
A_{sp}	Area of sample plot sp, ha;
i	1, 2, 3 …*M* strata;
sp	1, 2, 3 …*SP* sample plots; and
j	1, 2, 3 …*J* tree species.

Table 3-13 Mean merchantable timber volume per hectare in the baseline scenario ($V_{j,i|BSL}$) with species and/or genus included in Strata.

Species	Species harvested (%)	Mean merchantable volume per hectare per species in strata (m3 ha-1)	merchantable timber harvested (%)
A. Meranti Species Group			
Shorea spp.	0.45	85.79	0.49
Pometia pinnata	0.05	9.99	0.06
Dacryodes costata	0.03	4.49	0.03
Alstonia scholaris	0.03	5.38	0.03
Palaquium javense Burck.	0.07	12.98	0.07
B. Mixed Forest Group			
Duabanga moluccana	0.04	7.06	0.04
Cinnamomum porrectum	0.03	5.57	0.03
Terminalia catappa	0.05	7.84	0.04
Adansonia spp.	0.00	0.59	0.00
Psidium guajava	0.01	1.82	0.01
Syzygium malaccense	0.01	1.32	0.01
Eugenia sp.	0.02	2.87	0.02
Corypha utan	0.01	1.67	0.01
Engelhardtia spicata	0.01	2.02	0.01
Syzygium ampliflorum	0.01	1.59	0.01

Callophyllum inophyllum	0.03	4.65	0.03
Myristica fragrans	0.04	6.83	0.04
Anthocephalus macrophyllus Roxb.	0.02	3.39	0.02
Kom. Lain	0.05	7.21	0.04
Syzygium polyanthum	0.03	2.29	0.01
Pterocarpus indicus Willd	0.01	1.42	0.01
Total		**176.76**	

$V_{j,i|BSL}$ For use in developing timber harvest plans (VM0010 Box 1). The timber harvest plan sets the allowable average extraction volume ($V_{EX,j,i|BSL}$) and average extracted stocks harvested to build forestry infrastructure ($V_{EX,INF,j,i|BSL}$), As shown in Table 3-14 and Table 3-15 below.

Table 3-14 Annual volume planned for harvested biomass per hectare ($V_{HB,j,i|BSL}$) and extracted per hectare ($V_{EX,j,i|BSL}$) according to species and/or genus included in Sample Plots.

	Mean C stock of harvested biomass per hectare per species (tC ha-1)		Wood Density	Mean C stock of extracted biomass per hectare per species (tC ha-1)	
Species	VF	LOA		VF	LOA
A. Meranti Species Group					
Shorea spp.	81.13	81.13	*0.64*	27.47	27.47
Pometia pinnata	9.44	9.44	*0.70*	3.50	3.50
Dacryodes costata	4.24	4.24	*0.50*	1.12	1.12
Alstonia scholaris	5.09	5.09	*0.40*	1.08	1.08
Palaquium javense Burck.	12.27	12.27	*0.65*	4.22	4.22
B. Mixed Forest Group					
Duabanga moluccana	6.68	6.68	*0.50*	1.77	1.77
Cinnamomum porrectum	5.27	5.27	*0.60*	1.67	1.67
Terminalia catappa	7.41	7.41	*0.59*	2.31	2.31
Adansonia spp.	0.56	0.56	*0.27*	0.08	0.08
Psidium guajava	1.72	1.72	*0.67*	0.61	0.61
Syzygium malaccense	1.25	1.25	*0.56*	0.37	0.37
Eugenia sp.	2.71	2.71	*0.75*	1.08	1.08
Corypha utan	1.58	1.58	*0.57*	0.48	0.48
Engelhardtia spicata	1.91	1.91	*0.56*	0.57	0.57
Syzygium ampliflorum	1.51	1.51	*0.72*	0.57	0.57
Callophyllum inophyllum	4.39	4.39	*0.64*	1.49	1.49

Myristica fragrans	6.46	6.46	*0.57*	1.95	1.95
Anthocephalus macrophyllus Roxb.	3.20	3.20	*0.45*	0.76	0.76
Kom. Lain	6.82	6.82	*0.57*	2.06	2.06
Syzygium polyanthum	2.17	2.17	*0.65*	0.75	0.75
Pterocarpus indicus Willd	1.34	1.34	*0.66*	0.47	0.47
Total	167.16	**167.16**		54.37	**54.37**

The merchantable volume per hectare per species, or the mean volume of timber extracted for wood processing during the establishment of forestry infrastructure, differs between species. The total values are 54.37 m^3 ha^{-1} for stratum VF and stratum LOA.

Not all harvested biomass leaves the forest area, as timber harvested consists of two components: wood removed to market (extracted timber) and wood remaining in the forest post-harvest. The fraction of merchantable timber volume from clearing of forest roads, skid trails and log landings that is to be processed into wood products ($F_{V,INF,HWP}$) is calculated from the forest management records by dividing the sum of volume of trees per hectare with DBH ≥ 50 cm with the sum of all volume of trees per hectare. The calculated value of $F_{V,INF,HWP}$ is 71.6%. Hence, the total merchantable volume per hectare for all species J of timber extracted for wood processing during the establishment of forestry infrastructure ($V_{EX,INF,j,i|BSL}$) values are 11.42 m^3 ha^{-1} for stratum VF and LOA as shown in Table 3-15 below.Table 3-16 Annual volume of timber that is not extracted for wood processing during the establishment of forestry infrastructure ($V_{notEX,INF,j,i|BSL}$) per hectare values are 7.14 m^3 ha^{-1} for all species J in stratum VF and LOA.

Table 3-15 Annual volume planned for harvest during the establishment of forestry infrastructure per hectare ($V_{EX,INF,j,i|BSL}$) according to species and/or genus included in Sample Plots.

Species	Mean volume of extracted timber for forestry infrastructure per unit area for species *j* in stratum (m^3 ha^{-1})
A. Meranti Species Group	
Shorea spp.	5.54
Pometia pinnata	0.65
Dacryodes costata	0.29
Alstonia scholaris	0.35
Palaquium javense Burck.	0.84
B. Mixed Forest Group	
Duabanga moluccana	0.46
Cinnamomum porrectum	0.36
Terminalia catappa	0.51

Adansonia spp.	0.04
Psidium guajava	0.12
Syzygium malaccense	0.09
Eugenia sp.	0.19
Corypha utan	0.11
Engelhardtia spicata	0.13
Syzygium ampliflorum	0.10
Callophyllum inophyllum	0.30
Myristica fragrans	0.44
Anthocephalus macrophyllus Roxb.	0.22
Kom. Lain	0.47
Syzygium polyanthum	0.15
Pterocarpus indicus Willd	0.09
Total	**11.42**

Table 3-16 Annual volume of timber that is not extracted for wood processing during the establishment of forestry infrastructure per hectare for all species J in stratum VF and LOA ($V_{notEX,INF,j,i|BSL}$).

Species	Mean volume of timber that is not extracted for forestry infrastructure per unit area for species *j* in stratum (m^3 ha^{-1})
A. Meranti Species Group	
Shorea spp.	3.47
Pometia pinnata	0.40
Dacryodes costata	0.18
Alstonia scholaris	0.22
Palaquium javense Burck.	0.52
B. Mixed Forest Group	
Duabanga moluccana	0.29
Cinnamomum porrectum	0.23
Terminalia catappa	0.32
Adansonia spp.	0.02
Psidium guajava	0.07
Syzygium malaccense	0.05
Eugenia sp.	0.12
Corypha utan	0.07
Engelhardtia spicata	0.08
Syzygium ampliflorum	0.06
Callophyllum inophyllum	0.19

Myristica fragrans	0.28
Anthocephalus macrophyllus Roxb.	0.14
Kom. Lain	0.29
Syzygium polyanthum	0.09
Pterocarpus indicus Willd	0.06
Total	**7.14**

The mean of harvested biomass for all species that are legally to be timber product is calculated, as follows:

$$C_{HB,j,i|BSL} = (V_{EX,j,i|BSL} + V_{EX,INF,j,i|BSL}) \times BCEF_R \times CF_j \quad \text{Equation (3)}$$

Where:

$C_{HB,j,i\|BSL}$	:	Mean carbon stock of harvested biomass per unit area for species *j* in stratum *i* ($tC \cdot ha^{-1}$)
$V_{EX,j,i\|BSL}$	:	Mean volume of extracted timber per unit area for species *j* in stratum *I* ($m^3 \cdot ha^{-1}$)
$V_{EX,INF,j,i\|BSL}$	:	Mean volume of extracted timber for forestry infrastructure per unit area for species *j* in stratum *i* ($m^3 \cdot ha^{-1}$)
$BCEF_R$	:	Biomass conversion and expansion factor applicable to wood removals in the project area (t.d.m m^{-3})
CF_j	:	Carbon fraction of biomass for species *j* ($tCt\ d.m.^{-1}$)
I	:	1,2,3 ...M strata; and
J	:	1,2,3 ...J tree species.

Table 3-17. Mean carbon stock of harvested biomass per hectare based on the species harvested within the project area

Species	Mean C stock of harvested biomass per hectare per species ($tC\ ha^{-1}$)
A. Meranti Species Group	
Shorea spp.	81.13
Pometia pinnata	9.44
Dacryodes costata	4.24
Alstonia scholaris	5.09
Palaquium javense Burck.	12.27
B. Mixed Forest Group	
Duabanga moluccana	6.68
Cinnamomum porrectum	5.27
Terminalia catappa	7.41
Adansonia spp.	0.56
Psidium guajava	1.72
Syzygium malaccense	1.25
Eugenia sp.	2.71
Corypha utan	1.58
Engelhardtia spicata	1.91
Syzygium ampliflorum	1.51

Callophyllum inophyllum	4.39
Myristica fragrans	6.46
Anthocephalus macrophyllus Roxb.	3.20
Kom. Lain	6.82
Syzygium polyanthum	2.17
Pterocarpus indicus Willd	1.34
Total	**167.16**

The total mean carbon stock of harvested biomass per hectare for all species is 167.16 tC ha^{-1} for stratum LOA. Following the VM0010 methodology, it is assumed that not all the harvested biomass leaves the forest, as it consists of two components: 1) wood removed as a timber product (market) and 2) wood remaining in the forest as the result of harvest. The mean carbon stock of the wood removed to markets (extracted timber), is calculated as:

$$C_{EX,j,i|BSL} = (V_{EX,j,i|BSL} + V_{EX,INF,j,i|BSL}) \times D_j \times CF_j$$ Equation (4)

Where:

$C_{EX,j,i|BSL}$: Mean carbon stock of extracted timber per unit areafor species *j* in stratum *i* ($tC \cdot ha^{-1}$)

$V_{EX,j,i|BSL}$: Mean volume of extracted timber per unit area for species *j* in stratum *I* ($m^3 \cdot ha^{-1}$)

$V_{EX,INF,j,i|BSL}$: Mean volume of extracted timber for forestry infrastructure per unit area for species *j* in stratum *i* ($m^3 \cdot ha^{-1}$)

D_j : Basic wood density of species (t.d.m m^{-3})

CF_j : Carbon fraction of biomass for species *j* (tCt d.m.$^{-1}$)

i : 1,2,3 ...M strata; and

j : 1,2,3 ...J tree species.

Table 3-18. Mean carbon stock of harvested biomass per hectare per species within project area

Species	Wood Density (t d.m. m^{-3})	Mean C stock of extracted biomass per hectare per species (tC ha^{-1})
A. Meranti Species Group		
Shorea spp.	*0.64*	27.47
Pometia pinnata	*0.70*	3.50

Dacryodes costata	*0.50*	1.12
Alstonia scholaris	*0.40*	1.08
Palaquium javense Burck.	*0.65*	4.22
B. Mixed Forest Group		
Duabanga moluccana	*0.50*	1.77
Cinnamomum porrectum	*0.60*	1.67
Terminalia catappa	*0.59*	2.31
Adansonia spp.	*0.27*	0.08
Psidium guajava	*0.67*	0.61
Syzygium malaccense	*0.56*	0.37
Eugenia sp.	*0.75*	1.08
Corypha utan	*0.57*	0.48
Engelhardtia spicata	*0.56*	0.57
Syzygium ampliflorum	*0.72*	0.57
Callophyllum inophyllum	*0.64*	1.49
Myristica fragrans	*0.57*	1.95
Anthocephalus macrophyllus Roxb.	*0.45*	0.76
Kom. Lain	*0.57*	2.06
Syzygium polyanthum	*0.65*	0.75
Pterocarpus indicus Willd	*0.66*	0.47
Total		**54.37**

3.2.1.6 VM0010 Section 8.1.2 Calculation of dead wood (logging slash) generated in the process of timber harvest

As permitted by the VCS AFOLU Requirements, the deadwood is assumed to be left on the forest floor following timber harvest (10-year decay function). Thus, the change in carbon stock in dead wood is estimated as the difference between the total carbon stock of the harvested biomass (CHB,j,i|BSL) and the carbon stock of the extracted timber (CEX,j,i|BSL), including the residual stand damage (CRSD,j,i|BSL) and biomass of trees left to decay as a result forestry infrastructure establishment (CnotHB,inf,j,i|BSL), as follows (VM0010 Equation 5):

$$\Delta C_{DWSLASH,i,p|BSL} = \sum_{j=1}^{J}[C_{HB,j,i|BSL} - C_{EX,j,i|BSL} + C_{RSD,j,i|BSL} + C_{notHB,inf,j,i|BSL}] \quad \text{Equation (5)}$$

The $C_{RSD,j,i|BSL}$ and $C_{notHB,inf,j,i|BSL}$ are calculated as follows

$$C_{RSD,j,i|BSL} = C_{EX,j,i|BSL} \times F_{RSD|BSL} \quad \text{Equation (6)}$$

$$C_{notHB,inf,j,i|BSL} = V_{notEX,inf,j,i|BSL} \times BCEF_R \times CF_j \quad \text{Equation (7)}$$

Where:

$\Delta C_{DWSLASH,i,p\|BSL}$	:	Change in carbon stock of dead wood as logging slash resulting from timber harvest per unit area in stratum *i* in land parcel *p* ($tC \cdot ha^{-1}$)
$C_{HB,j,i\|BSL}$	:	Mean carbon stock of harvested biomass per unit area for species j in stratum *i* ($tC \cdot ha^{-1}$)
$C_{EX,j,i\|BSL}$	:	Mean carbon stock of extracted timber per unit area for species *j* in stratum *i* ($tC \cdot ha^{-1}$)
$C_{RSD,j,i\|BSL}$	:	Mean carbon stock in timber from residual stand damage per unit area for species *j* in stratum *i* ($tC \cdot ha^{-1}$)
$C_{notHB,inf,j,i\|BSL}$	:	Mean carbon stock of biomass that is not harvested duri ng the establishment of forestry infrastructure per unit area for species *j* in stratum *i* ($tC \cdot ha^{-1}$)
$F_{RSD\|BSL}$	:	Factor for residual stand damage (dimensionless)
$V_{notEX,inf,j,i\|BSL}$	:	Mean volume of timber that is not extracted for wood processing during the establishment of forestry infrastructure per unit area for species *j* in stratum *i* ($m^3 \cdot h^{-1}$)
$BCEF_R$	:	Biomass conversion and expansion factor applicable to wood removals in the project area ($t.d.m\ m^{-3}$)
CF_j	:	Carbon fraction of biomass for species *j* ($tC\ t.d.m.^{-1}$)
I	:	1, 2, 3 …M strata; and
J	:	1, 2, 3 …J tree species
P		1, 2, 3 …P land parcels.

Table 3-19. Change in carbon stock of dead wood as logging slash resulting from timber harvest per unit area in each stratum

	Mean C stock in timber from residual stand damage (tC ha-1)		Mean C stock of biomass that is not harvested during the establishment of forestry infrastructure (tC ha-1)		C stock of dead wood (tC ha-1)	
Species	VF	LOA	VF	LOA	VF	LOA
A. Meranti Species Group						
Shorea spp.		6.87		3.08		63.60
Pometia pinnata		0.87		0.36		7.18
Dacryodes costata		0.28		0.16		3.56
Alstonia scholaris		0.27		0.19		4.47
Palaquium javense Burck.		1.06		0.47		9.57
B. Mixed Forest Group						

Duabanga moluccana		0.44		0.25		5.61
Cinnamomum porrectum		0.42		0.20		4.21
Terminalia catappa		0.58		0.28		5.96
Adansonia spp.		0.02		0.02		0.52
Psidium guajava		0.15		0.07		1.33
Syzygium malaccense		0.09		0.05		1.02
Eugenia sp.		0.27		0.10		2.01
Corypha utan		0.12		0.06		1.28
Engelhardtia spicata		0.14		0.07		1.56
Syzygium ampliflorum		0.14		0.06		1.13
Callophyllum inophyllum		0.37		0.17		3.44
Myristica fragrans		0.49		0.24		5.24
Anthocephalus macrophyllus Roxb.		0.19		0.12		2.75
Kom. Lain		0.51		0.26		5.53
Syzygium polyanthum		0.19		0.08		1.69
Pterocarpus indicus Willd		0.12		0.05		1.04
Total		**13.59**		**6.34**		**132.73**

3.2.1.7 VM0010 Section 8.1.3 Calculation of baseline carbon sequestered in wood products

In every instance where wood is collected to be turned into wood products, the carbon stock within those wood products must be accounted for in the baseline scenario , thus the carbon stock in the wood products pool included. The carbon stock of extracted timber across species (CEX,j,i|BSL) is calculated as refers to the Table 3-18.

The methodology differentiates between 1) wood products that will decompose within 3 years after harvest (i.e., Wood Waste (WW) and Short-Lived Fraction (SLF)), 2) wood products that are discarded between 3 and 100 years after harvest, and 3) other wood products that are deemed to store carbon permanently. The carbon stock of extracted timber that is immediately emitted to the atmosphere at the time of harvest is calculated as follows:

$$\Delta C_{WP0,i|BSL} = \sum_k C_{EX,i,k|BSL} \times (WW_k + SLF_k)$$

Equation (9)

Where:

$C_{WP0,i|BSL}$: Mean carbon stock of harvested biomass per unit area for species j in stratum *i* ($tC \cdot ha^{-1}$)

$C_{EX,i,k|BSL}$: Mean carbon stock of extracted timber per unit area for species *j* in stratum *i* ($tC \cdot ha^{-1}$)

WW_k		Fraction of biomass carbon from wood waste that is assumed to be emitted to the atmosphere immediately at the time of harvest for wood product *k* (dimensionless)
SLF_k		Fraction of biomass carbon from the shortlived wood product pool that is assumed to be emitted to the atmosphere immediately at the time of harvest for wood product *k* (dimensionless)
I	:	1, 2, 3 ...M strata; and
K	:	Wood products (sawnwood, wood base products, etc).

For WW and SLF, the VM0010 methodology employed default values sourced from Winjum et al. (1998). 38Specifically, a 24% value (appropriate for developing countries) was applied to all types of wood products for WW. For SLF, the methodology set a 0.18 for other industrial roundwood as the PT PS only produced roundwood of timber product.

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

$$C_{WPi|BSL} = \sum_k C_{EX,i,k|BSL} - C_{WP0,i|BSL}$$

Equation (10)

Where:

$C_{WP,i\|BSL}$	:	Carbon stock of extracted timber from stratum *i* that is assumed to enter the wood products pool that is not immediately emitted at the time of harvest ($tC \cdot ha^{-1}$)
$C_{WP0,i\|BSL}$	:	Mean carbon stock of harvested biomass per unit area for species *j* in stratum *i* ($tC \cdot ha^{-1}$)
$C_{EX,i,k\|BSL}$	:	Mean carbon stock of extracted timber per unit area for species *j* in stratum *i* ($tC \cdot ha^{-1}$)
I	:	1, 2, 3 ...M strata; and
K	:	Wood products (sawnwood, wood base products, etc).

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

$$\Delta C_{WP100,i,p|BSL} = \sum_k (C_{WP,i|BSL} \times OF_k)$$

Equation (11)

Where:

$C_{WP100,i\|BSL}$		Carbon stored in wood products that are assumed to be retired between 3 - 100 years after harvest from stratum *i* in land parcel *p* ($tC \cdot ha^{-1}$)
$C_{WP,i\|BSL}$	:	Carbon stock of extracted timber from stratum *i* that is assumed to enter the wood products pool that is not immediately emitted at the time of harvest ($tC \cdot ha^{-1}$)

OF_k	:	Fraction of biomass carbon for wood product type k that is assumed to be emitted to the atmosphere between 3 and 100 years of timber harvest (dimensionless)
I	:	1, 2, 3 ...M strata
P	:	1, 2, 3 ...P land parcels, and
K	:	Wood products (sawnwood, wood base products, etc).

For the fraction of biomass carbon for wood product that is assumed to be emitted to the atmosphere between 3 and 100 years of timber harvest, the default values for OF provided in the methodology were used, with the default values for the tropical forest region. The value of the Other industrial roundwood for OF is 0.99 in the methodology referred from Winjum et al 1998[39].

Table 3-20. The value of other industrial roundwood.

Product class	Carbon stock of extracted wood products	C stock of extracted timber immediately emitted	C stock of extracted timber entering the wood products pool at the time of deforestation	C stock emitted in the 100 years after harves
	(t C ha-1)	(t C ha-1)	(t C ha-1)	(t C ha-1)
Log export	54.37	22.83	31.53	31.22
Total	**54.37**	**22.83**	**31.53**	**31.22**

3.2.1.8 Section 8.1.4 Calculation of Change in carbon stocks due to forest regrowth after harvest

Following the VM0010 methodology, the carbon sequestration in the baseline scenar io resulting from forest regrowth after timber harvest up to year t is equal to the forest regrowth rate of each stratum, and it is calculated as follows:

$$C_{RG,i,p|BSL} = RGR_i \times t^* \qquad \text{Equation (22)}$$

Where

$C_{RG,i,p|BSL}$	:	Carbon sequestration resulting from forest regrowth after timber harvest and establishment of forestry infrastructure in stratum *i* in land parcel *p* (tC ha^{-1} yr^{-1})
RGR_i	:	Regrowth rate of forest post timber harvest post forestry infrastructure establishment for stratum *i* (tC ha^{-1} yr^{-1})
I	:	1,2,3 ...M strata; and
T	:	1, 2, ...,t* years elapsed since the start of the project (years)

The regrowth rate was calculated from the IPCC default values for aboveground net biomass growth in natural forests[40] , with a specific criterion of domain (Tropical), Ecological Zone (Tropical Rainforest) and Continent (Asia) as well as Status Condition where the secondary >20 years is for the stratum VF and ≤20 years for stratum LOA. Thus, the values are 0.7 t.d.m ha-1 yr^{-1} (stratum VF) and 2.7.d.m ha^{-1} yr^{-1} (Stratum LOA), multiplied by the carbon fraction (CF) where the 0.47 is applied as refers to IPCC default for aboveground tree biomass (table 4.3 in volume 4 of the 2006 IPCC guidelines).

3.2.1.9 VM0010 Section 8.1.5 Calculation of baseline emissions from the combustion of fossil fuels in forestry and wood processing machinery

Carrying out the baseline activity (e.g. selective logging or clearcutting) involves using forestry and wood processing machinery, which generates greenhouse gas (GHG) emissions due to fossil fuel combustion. The combustion from wood processing machinery was not calculated as there were no such an activity by PT BLM AND PT GES2 (e.g. only roundwood product). However, the combustion from fossil fuel from harvesting operation, log hauling and log transport were calculated to identify whether significance or insignificance. The significance test result from the combustion of fossil fuels in forestry was 3.3%. According to the VM0010 methodology section 5.4, the sum of decreases in carbon pools and increases in emissions that may be neglected must be less than

5% of the total project GHG benefits, thus this excluded. To align with the methodology, any GHG emissions from these sources are not accounted for, as this approach is deemed conservative. Consequently, these emissions are excluded from the calculations, and C_{Fuel} is set to zero in the baseline.

3.2.1.10 VM0010 Section 8.1.6 Calculation of baseline scenario greenhouse gas emissions from change in carbon stocks

In accordance with the VM0010 methodology, the net carbon stock change to be converted to emissions is equal to the carbon stock change as a result of timber harvest plus the carbon stock change resulting from conversion and retirement of wood products minus carbon sequestration from forest regrowth after harvest.

The annual calculations are differentiated based on the periods of years 1, 2 -10, 11-20, and all years since the start of the project activity were calculated, using the following equations:

$$\Delta C_{NET|BSL(1)} = \sum_{i,p} A_{1,i,p} \times \left(\Delta C_{DWSLASH,i,p\backslash BSL}/10 + \Delta C_{WP0,i,p\backslash BSL} + \Delta C_{WP100,i,p\backslash BSL}/20\right)$$

Equation (23)

$$\Delta C_{NET|BSL(2-10)} = \sum_{i,p} A_{2-10,i,p} * \sum_{i=1}^{M} \left((\Delta C_{DWSLASH,i,p\backslash BSL}/10) + (\Delta C_{WP100,i,p\backslash BSL}/20)\right)$$

Equation (24)

$$\Delta C_{NET|BSL(11-20)} = \sum_{i,p} A_{11-20,i,p} * \sum_{i=1}^{M} (\Delta C_{WP100,i,p\backslash BSL}/20)$$

Equation (25)

The net change (sequestration) in carbon stock due to forest regrowth across all parcels in all years since harvest in the baseline scenario were calculated, as follows:

$$\Delta C_{NET|BSL(1+)} = \sum_{i} A_{t*,i,p} * \sum_{i=1}^{M} (\Delta C_{RG,i\backslash BSL})$$

Equation (26)

Therefore, the net change in carbon stock for all parcels harvested during each year of the project crediting period in the baseline scenario, starting from the beginning of the project activity, is calculated as follows:

$$\Delta C_{NET|BSL,t*} = \sum_{p=1}^{P} [-\Delta C_{NET,p|BSL(1)} - \Delta C_{NET,p|BSL(2-10)} - \Delta C_{NET,p|BSL(11-20)} + \Delta C_{NET,p|BSL(+1)}]$$

Equation (27)

$$GHG_{NET|BSL,t*} = \Delta C_{NET|BSL,t*} \times * \frac{44}{12}$$

Equation (28)

Where:

$\Delta C_{NET\|BSL,t}$	:	Net change in carbon stock across all parcels in the baseline scenario in the year t* since the start of the project activity (tC)
$\Delta C_{NET,p\|BSL(1)}$	:	Net change in carbon stock in the baseline scenario for all parcels *p* that are within 1 year of harvest in the baseline scenario (tC)
$\Delta C_{NET,p\|BSL(2\text{-}10)}$	:	Net change in carbon stock in the baseline scenario for all parcels *p*, that were harvested between 2 – 10 years ago in the baseline scenario (tC)
$\Delta C_{NET,p\|BSL(11\text{-}20)}$	:	Net change in carbon stock in the baseline scenario in parcel *p*, that were harvested between 11 – 20 years ago in the baseline scenario (tC)
$\Delta C_{NET,p\|BSL(+1)}$	:	Net change in carbon stock due to forest growth in the baseline scenario for all parcels *p* that have been harvested in the baseline scenario (tC)
C_{FUEL}	:	Total carbon emissions associated with the combustion of fossil fuel in forestry and wood processing machinery (tC)
$\Delta C_{DWSLASH,i,p\|BSL,t}$	:	Change in carbon stock of dead wood as logging slash resulting from timber harvest per unit area in stratum *i* in land parcel *p* (tC ha^{-1})

$\Delta C_{WP0,i,p\|BSL,t}$	:	Change in carbon stock resulting from wood product conversion and retirement from stratum *i* in land parcel *p,* that is assumed to be emitted in the first year of harvest in the baseline (tC ha $^{-1}$)
$\Delta C_{WP100,i,p\|BSL,t}$	:	Carbon stored in wood products that is assumed to be retired between 3 - 100 years after harvest from stratum *i* in land parcel *p* (tC ha^{-1})
$C_{RG,i,p\|BSL}$		Carbon sequestration resulting from forest regrowth after timber harvest in stratum *i* in land parcel *p* at time t*(tC ha^{-1})
$A_{1,i,p}$	:	Area of stratum i in land parcel p that was harvested 1 year ago (ha ^{3})
$A_{2\text{-}10,i,p}$	:	Area of stratum i in land parcel p that was harvested between 2 and 10 years ago (ha)
$A_{11\text{-}20,i,p}$	:	Area of stratum i in land parcel p that was harvested between 11 and 20 years ago (ha)
$A_{t^*,i,p}$	:	Cumulative area of parcel p harvested in stratum i at time t* (ha)
t*	:	1, 2,....10, time elapsed since the start of the project (years)
I	:	1, 2, 3 ...M strata; and
P	:	1, 2, 3 ...P land parcels harvested within the project crediting period

The net carbon stock change in the baseline scenario has been converted to net greenhouse gas emissions, as shown in table below.

Table 3-21. The net carbon stock change in the baseline scenario.

Project Year	Net change in C stocks across all parcels in the baseline scenario (tC)	Net GHG emissions in the baseline scenario (tCO2e)
2022	(39,076.22)	(143,279.48)
2023	(63,629.80)	(233,309.26)
2024	(73,452.53)	(269,325.94)
2025	(82,306.35)	(301,789.94)
2026	(86,846.13)	(318,435.82)
2027	(94,665.66)	(347,107.43)
2028	(105,224.11)	(385,821.73)
2029	(115,159.39)	(422,251.08)
2030	(125,472.53)	(460,065.95)
2031	(130,257.83)	(477,612.05)
2032	(103,666.89)	(380,111.93)
2033	(99,567.37)	(365,080.35)
2034	(98,100.31)	(359,701.15)

2035	(99,814.51)	(365,986.53)
2036	(98,309.49)	(360,468.12)
2037	(102,689.77)	(376,529.16)
2038	(99,693.72)	(365,543.64)
2039	(96,726.30)	(354,663.11)
2040	(96,820.32)	(355,007.84)
2041	(103,796.04)	(380,585.48)
2042	(101,575.06)	(372,441.88)
2043	(87,555.90)	(321,038.31)
2044	(95,498.26)	(350,160.29)
2045	(93,388.55)	(342,424.69)
2046	(86,262.40)	(316,295.47)
2047	(63,719.70)	(233,638.90)
Total	(2,443,275.15)	(8,958,675.54)

3.2.2 Project Emissions (VCS, 3.15)

In accordance with the applicability conditions of VM0010 (referring to the minor revision on 10 June 2024), The increase in carbon stocks due to ongoing forest growth can only be attributed to a project in cases where trees would have been harvested under the baseline scenario. Growth in areas and trees not subject to harvest in the baseline scenario would have oc curred regardless of project implementation and cannot be credited to the project. As a result, carbon stock changes due to vegetation management and fuel removal will be negligible. Thus, net greenhouse gas emissions in the project scenario will be equal to carbon sequestration through ongoing forest growth minus any emissions resulting from forest disturbance (both illegal logging and natural disturbances)

3.2.2.1 VM0010 Section 8.2.1 Calculation of Ongoing Forest growth in the project scenario

The annual change in carbon stock in the aboveground biomass of trees in the project scenario (ΔCAB,t|PRJ) will be estimated using a method similar to that used for the baseline. This involves measuring field plots alongside remote sensing techniques, supplemented by optical and RADAR remote sensing data. By integrating field data with remote sensing information, thus the estimation of carbon stock for each stratum can be assessed the changes in stock between sampling periods. For the values applied referring to Section 3.2.1.8

Allometry

The allometry is based on the R2 value from Manuri 2017 (Referring to Table 3.1), as this has been used to calculate all forest type (excluding mangrove forest) for Java and Bali as well as Nusa Tenggara, Sulawesi and Maluku in the Indonesia 2 nd Forest Reference Level submission to UNFCCC (Republic of Indonesia, 2022). This allometry was applied from the

baseline data using the same approach as employed earlier in estimating the merchantable volume.

Measurements and Determining Sample Plot Carbon Stocks

Referring to the Figure 3-1 for the methodology apply in the field measurement, the same SOP's will be used as the field plots is a Permanence Sampling Plots, consisting of tree tagging and geocoordinate location. Thus, any minimum values employed in inventories are held constant for the duration of the project. The carbon stock in the aboveground biomass of each tree species within the sample plot in stratum (VF and LOA) will be estimated using the chosen allometric equation based on the tree's dimensions.

$$C_{AB,j,i,t,sp|PRJ} = \sum_{l=1}^{L_{j,i,sp,t}} f_j(X, Y \ldots) \times CFj$$

Equation (29)

Where:

$C_{AB,j,i,t,sp|PRJ}$	:	Carbon stock in aboveground biomass of trees of species *j* in plot *sp* in stratum *i* at time *t* in the project scenario, (tC)
CFj	:	Carbon fraction of biomass for tree group *j*, (tC t d.m.$^{-1}$)
fj(X,Y...)	:	Aboveground biomass of trees based on allometric equation for species group *j* based on measured tree variable(s), (t. d.m. tree-1)
i		1, 2, 3, ...M strata
j		1, 2, 3 ... J tree species
l		1, 2, 3, ... Lj,i,t,sp sequence number of individual trees of species group j in stratum i at time t in sample plot sp;

Determining Stratum Carbon Stocks and Determining Mean Carbon Stocks

As the calculation of the baseline carbon stocks, the same approach will be applied in the project emissions to determine the stratum and mean carbon stocks. Combining the field measurement with the satellite data (i.e. remote sensing), the stratum and mean carbon stock can be produced to assess the ongoing forest growth.

$$C_{AB,i,t|PRJ} = \frac{1}{SP} \times \sum_{sp=1}^{SP} \left(\frac{C_{AB,i,t,sp|PRJ}}{A_{sp}} \right)$$

Equation (31)

Where:

$C_{AB,i,t|PRJ}$	:	Mean aboveground biomass carbon stock of trees in stratum *i* at time *t*, (tC ha^{-1})
$C_{AB,j,i,t,sp|PRJ}$	:	Carbon stock in aboveground biomass of trees of species *j* in plot *sp* in stratum *i* at time *t* in the project scenario, (tC)
Asp	:	Area of sample plot sp, ha

sp	*1, 2, 3 … SP* sample plots
i	*1, 2, 3 … M strata*
t	*0, 1, 2, 3 … t** years elapsed since the start of the project activity.

Determining Carbon Stock Changes

Following those steps mentioned earlier, the annual carbon stock change in above ground biomass is calculated as follows:

$$\Delta C_{AB,t|PRJ} = \sum_{i,p}\left(A_{t*,i,p} \times \frac{C_{AB,i,t2|PRJ} - C_{AB,i,t1|PRJ}}{T}\right) \times \frac{44}{12}$$ Equation (32)

Where:

$\Delta C_{AB,t\|PRJ}$	:	Annual carbon stock change in aboveground biomass of trees in year *t* ($tCO_2e\ yr^{-1}$)
$\Delta C_{AB,i,t\|PRJ}$	:	Mean aboveground biomass carbon stock of trees in stratum *i* at time *t* (tC ha^{-1})
$A_{t*,i,p}$	:	Cumulative area harvested of parcel p in stratum *i* at time *t** (ha)
sp	:	1, 2, 3 … SP sample plots
T	:	Number of years between monitoring time t1 and t2 (T = t2 – t1) (years)
t1	:	Beginning of the monitoring period or time of harvest event, whichever is later
i	:	1, 2, 3 … M strata
t	:	1, 2, 3 … t* years elapsed since the start of the project activity
p	:	1, 2, 3, …, P land parcels harvested within the project crediting period; and
44/12	:	Ratio of molecular weights of carbon dioxide and carbon ($tCO_2e\ tC^{-1}$).

Table 3-22. The annual carbon stock changes

Year	Annual carbon stock change in aboveground biomass of trees (tCO2e yr-1)
2022	4,013.64
2023	8,290.96
2024	12,568.27
2025	16,845.58
2026	21,122.90
2027	25,400.21
2028	29,677.52

2029	33,954.84
2030	38,232.15
2031	42,509.46
2032	46,786.78
2033	51,064.09
2034	55,341.40
2035	59,618.72
2036	63,896.03
2037	68,173.34
2038	72,450.66
2039	76,727.97
2040	81,005.28
2041	85,282.60
2042	89,559.91
2043	93,837.22
2044	98,114.54
2045	102,391.85
2046	106,669.16
2047	78,587.09
Total	1,462,122.17

3.2.2.2 VM0010 Section 8.2.2 Calculation of Forest disturbance in the project scenario

Forest disturbance in the project scenario due to fire disturbance and carbon stock non-fire natural disturbance, plus any carbon stock changes that occur as a result of illegal logging .

Option A: Natural Disturbance – Fire

According to the VM0010 referring to the *IPCC 2006 Inventory Guidelines*, estimation of greenhouse gas emissions from biomass burning must be calculated as:

$$\Delta C_{DIST-FR,t|PRJ} = \sum_{i=1}^{M} A_{burn,i,t} \times B_{i,t|PRJ} \times COMF_i \times G_{g,i} \times 10^{-3} \times GWP_{CH4}$$

Equation (33)

Where:

$\Delta C_{DIST-FR,t|PRJ}$: Net greenhouse gas emissions resulting from fire disturbanc e in year *t* (tCO_2e)

$A_{Burn,i,t}$: Area burnt for stratum *i* at time *t* (ha)

$B_{i,t|PRJ}$: Average aboveground biomass stock present in the project scenario but absent in the baseline scenario before burning stratum *i*, time *t* (t d. m. ha^{-1})

COMFi	:	Combustion factor for stratum I (dimensionless)
Gg,i	:	Number of years between monitoring time t1 and t2 (T = t2 – t1) (years)
GWPCH4	:	Emission factor for stratum i for methane (g kg-1 dry matter burnt)
I	:	1, 2, 3 … M strata, and
T	:	1, 2, 3 … t* years elapsed since the start of the IFM project activity.

As mentioned in the VM0010 methodology, the fire disturbances occurred in the project scenario would also have burning in the baseline scenario. Project emissions are thus equivalent to the fire damage to biomass that would have been absent in the baseline scenario (where it has been harvested and removed) but is present in the project scenario.

Thus, the aboveground biomass stock that absent in the baseline scenario, but present in the project scenario for a particular stratum must be calculated as:

$$B_{i,t|PRJ} = \sum_j V_{EX,j,i|BSL} \times BCEF_R$$

Equation (34)

Where:

$B_{i,t\|PRJ}$	:	Average aboveground biomass stock present in the project scenario but absent in the baseline scenario before burning stratum *i*, time *t* (t d. m. ha^{-1})
$V_{EX,j,i\|BSL}$	:	Mean volume of extracted timber per unit area for species *j* in stratum *i* ($m^3 \cdot ha^{-1}$)
$BCEF_R$	:	Biomass conversion and expansion factor applicable to wood removals in the project area (t.d.m m^{-3})
I	:	1, 2, 3 … M strata
J	:	1, 2, 3 …J tree species; and
T	:	1, 2, 3 … t* years elapsed since the start of the IFM project activity.

For the ex-ante, the values applied was 182 ha for the total area burned in the year 2023 within the project area based on the data Figure 3-4, while other years were assumed with zero burned. The further fire disturbance will be monitored during the project implementation using the data NASA FIRMS alerts41. Such alerts will be applied to detect and assess any possible hotspot within

the project area as this provides a notification via email, consisting of the geocoordinate.

Option B: Natural Disturbance – Non-Fire

The net greenhouse gas emissions resulting from non-fire natural disturbance is calculated as follows:

$$\Delta C_{DIST,t|PRJ} = \sum_{i=1}^{M}\left(A_{dist,i,t} \times \sum_{j=1}^{J}\{C_{AB,i,j|BSL}\}\right) \times \frac{44}{12}$$

Equation (35)

Where:

$\Delta C_{DIST,t\|PRJ}$	:	Net greenhouse gas emissions resulting from non-fire natural disturbance in year *t* (tCO_2e)
$A_{dist,i,t}$	:	Area disturbed for stratum *i* at time *t* (ha)
$C_{AB,i\|BSL}$	:	Carbon stock in aboveground biomass per unit area in stratum ($tC\ ha^{-1}$)
44/12	:	Combustion factor for stratum *i* ($tCO_2e\ tC^{-1}$)
I	:	1, 2, 3 … M strata
J	:	1, 2, 3 …*J* tree species; and
T	:	1, 2, 3 … t* years elapsed since the start of the IFM project activity.

Same as the fire disturbance, it is assumed that such an event (non-fire disturbance) would have happened in both the project and baseline scenarios. Thus, project emissions are equal to the biomass damage from the non-fire natural disturbance that is not present in the baseline scenario (where it has been harvested and removed) but present in the project scenario. It is conservatively assumed that the natural disturbance is a stand -replacing event, and that the change in biomass due to the disturbance is released in the year when the disturbance occurs.

Furthermore, it is assumed that the area disturbed is only from the illegal logging for the ex-ante estimation with a total of 700 ha based on the SBIA/PRA occurring in the year 2025.

For the post-ante, the disturbances and illegal logging will be derived from the SBIA/PRA (every 2 years) and sampling as suggested by the VM0010 methodology. If the results of the SBIA/PRA suggest that there is a potential for illegal logging activities, then limited field sampling must be undertake n combining with the data from Global Forest Watch GLAD deforestation aler ts42. This secondary data will guide the team to where the potential illegal logging may occur during the monitoring period. This will be complemented with an analysis of optical data products (Landsat & Sentinal -2) as a remote sensing approach.

If the SBIA/PRA and the limited sampling indicate degradation is occurring, net carbon stock changes as a result of illegal logging must be calculated as:

$$\Delta C_{DIST-IL,t|PRJ} = \sum_{i=1}^{M}\left(A_{DIST-IL,i} \times \frac{C_{DIST-IL,i,t|PRJ}}{AP_i}\right) \times \left(1 + \frac{V_{EX,INF,j,i|BSL}}{V_{EX,j,i|BSL}}\right) + C_{FUEL} \times \frac{C_{DIST-IL,t|PRJ}}{\sum_{i=1}^{I} C_{EX,i|BSL} \times 44/12 \times A_i}$$

Equation (37)

Where:

$\Delta C_{DIST\_IL,t\|PRJ}$	:	Net carbon stock changes as a result of illegal logging at time *t* (tCO_2e)
$A_{DIST\_IL,i}$	:	Area potentially impacted by illegal logging in stratum *i* (ha)
$C_{DIST\_IL,I,t\|PRJ}$	:	Biomass carbon of trees cut and removed through illegal logging in stratum *i* at time *t* (tCO_2e)
$V_{EX,j,i\|BSL}$	:	Mean volume of extracted timber per unit area for species *j* in stratum *i* ($m^3 \cdot ha^{-1}$)
$V_{EX,INF,j,i\|BSL}$	:	Mean volume of extracted timber for forestry infrastructure per unit area for species *j* in stratum *i* ($m^3 \cdot ha^{-1}$)
C_{FUEL}	:	Total carbon emissions associated with the combustion of fossil fuel in forestry and wood processing machinery (tC)
$C_{EX,i\|BSL}$	:	Change in carbon stock of extracted wood products resulting from timber harvest per unit area in stratum *i* in land parcel *p* ($tC\ ha^{-1}$)
Ap_i	:	Total area of illegal logging sample plots in stratum *I* (ha)
I	:	1, 2, 3 …M strata in the in the project case; and
T	:	1, 2, 3, … t years elapsed since the projected start of the project activity.

The VM0010 Equation 37 not only accounts for the reduction in carbon stocks due to illegal logging but also includes emissions from the fuel used in these operations and potential emissions from any infrastructure development needed to support illegal logging. To estimate emissions from infrastructure development associated with illegal logging, an expansion factor is calculated based on typical baseline harvesting practices, which compares the volume extracted due to infrastructure to the merchantable volume extracted.

For the ex-ante estimation, the net carbon stock changes as a result of illegal logging are 37,037.64 tCO2e per annum, this approach is considered conservative. The proposed project activities are expected to completely prevent illegal logging within the project area throughout the project lifetime.

3.2.2.3 VM0010 Section 8.2.3 Calculation of Net greenhouse gas emissions in the project scenario

The net greenhouse gas emissions in the project scenario are calculated by adding the net emissions from fire and non-fire forest disturbances, plus any carbon stock changes caused by illegal logging, and then subtracting the annual carbon stock increase in the aboveground biomass of trees due to forest growth. Thus, net greenhouse gas emissions in the project scenario in year t is calculated as:

$$\Delta C_{NET,t|PRJ} = \Delta C_{AB,t|PRJ} - \left(\Delta C_{DIST-FR,t|PRJ} + \Delta C_{DIST,t,PRJ} + \Delta C_{DIST-IL,t|PRJ}\right)$$ Equation (38)

Where:

$GHG_{NET\|PRJ}$	:	Net greenhouse gas emissions in the project scenario since the start of the project activity (tCO_2e)
$\Delta C_{NET,t\|PRJ}$	:	Net greenhouse gas emissions in the project scenario in year *t* (tCO_2e)
$\Delta C_{DIST\_FR,i\|PRJ}$	:	Net greenhouse gas emissions resulting from fire disturbance in year *t* (tCO_2e)
$\Delta C_{DIST,i\|PRJ}$	:	Net greenhouse gas emissions resulting from non-fire natural disturbance in year *t* (tCO_2e)
$\Delta C_{DIST\_IL,i\|PRJ}$	:	Net carbon stock changes as a result of illegal logging at time *t* (tCO_2e)
$\Delta C_{AB,i\|PRJ}$	:	Annual carbon stock change in aboveground biomass of trees in year *t* (tCO_2e)
T	:	1, 2, 3, … t years elapsed since the projected start of the project activity.

$$GHG_{NET|PRJ} = \sum_{t=1}^{t^*} \Delta C_{NET,t|PRJ}$$ Equation (39)

$\Delta C_{NET\|PRJ}$	:	Net carbon stock change in the project scenario since the start of the project activity, tCO_2e;
$\Delta C_{NET,t\|PRJ}$	:	Net carbon stock change in the project scenario in year *t*, tCO_2e;
T	:	*1, 2, 3, … t** years elapsed since start of the project activity.

Table 3-23. Net GHG emissions in the project scenario

Project Year	Net greenhouse gas emissions in the project scenario (t CO2e)	Cumulative net greenhouse gas emissions in the project scenario in year (t CO2e)
2022	167,658.51	167,658.51
2023	8,290.96	175,949.47
2024	12,568.27	188,517.74
2025	16,845.58	205,363.32
2026	21,122.90	226,486.22
2027	25,400.21	251,886.43
2028	29,677.52	281,563.95
2029	33,954.84	315,518.79
2030	38,232.15	353,750.94
2031	42,509.46	396,260.40
2032	46,786.78	443,047.18

2033	51,064.09	494,111.27
2034	55,341.40	549,452.67
2035	59,618.72	609,071.39
2036	63,896.03	672,967.42
2037	68,173.34	741,140.76
2038	72,450.66	813,591.42
2039	76,727.97	890,319.39
2040	81,005.28	971,324.67
2041	85,282.60	1,056,607.27
2042	89,559.91	1,146,167.18
2043	93,837.22	1,240,004.40
2044	98,114.54	1,338,118.94
2045	102,391.85	1,440,510.79
2046	106,669.16	1,547,179.95
2047	78,587.09	1,625,767.04

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

The project does not consider emissions from the native grassland, therefore, the parameter is assumed as zero.

3.2.3.1 Activity shifting leakage

AAD only controls resource use within the CSIR project area and cannot access other forest resources, so activity transfer leakage does not apply to CSIR. AAD has no other forestry companies under its umbrella. Therefore, there is zero leakage due to the transfer of activities, and the only type of leakage emissions calculated are the greenhouse gas emissions resulting from market effects when implementing project activities, as described below.

3.2.3.2 Market Leakage

Leakage due to market effects is calculated by multiplying the net emissions from planned timber harvesting activities in the baseline scenario by an appropriate leakage factor as follows.

Referring to VM0010 Methodology Box 2, market leakage is determined taking into account that national logging will tend to result in reduced timber supply due to project implementation. The extent of leakage depends on the areas of the country's forest resources that may be displaced by logging. If logging is moved to forests where the biomass contains a smaller proportion of available materials compared to the project area, higher emissions are expected because more trees will need to be felled to achieve the same volume of stock. Conversely, if the forest being replaced contains a higher proportion of available biomass from commercial tree species than the project forest, a smaller area will need to be logged, resulting in lower emissions.

Table 3-24. The merchantable volume and biomass from commercial species.

≥ 50 cm merchantable biomass* (ton d.m./ha)	≥ 10 cm biomass** (ton d.m./ha)	PMPi
102.86	542.99	19%

Table 3-25. Significance analysis for determining leakage factor

Variation	±15% PML_{FT}	PMP_i
6.30%	48.3%	1.65%
	42.0%	

Based on the data total planning on national wood forest products from 2015 to 202443, the total planned logged volume was around 60 million m3 (only DBH>50 cm allowed), equivalent to 19,1 million tC. However, the actual volume of wood products had been harvested approximately at 43,4 million m3 or equivalent to 13.8 million tC. Assuming those areas harvested only in Production Forest (Hutan Produksi, HP), thus the mean merchantable biomass national as a proportion of total aboveground tree biomass for each forest type was around 42%. By multiplying 15% of the PMLFT as VM0010 methodology requirement, the variance was around 6.30% or in total 48.3%. Comparing the total actual wood forest products as a result of logging activities planned by PT BLM AND PT GES2 between 2016 and 2025 at 10.5 million m3 or equivalent to 3.3 million tC (1.65%) with those national wood products, it was significantly smaller.

Therefore, the ratio of merchantable biomass to total biomass (PMPi) is less than 15% of ratio of merchantable biomass to total biomass for each forest type (PMLFT) as the percentage of total plan of wood forest products in Indonesia or PMLFT is > 15% greater than PMPi. The analyses assumed that the PMPi within the project area will not affect significantly PMLFT national, thus the Leakage factor for market-effects calculations (LFme) is 0.2.

Table 3-26. Annual leakage due to activity shifting

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

Net GHG emission reductions are calculated as:

$$ER_t = (C_{FUEL} - MIN\left(0, C_{NET|BSL,t*}\right) + MIN\left(0, \Delta C_{NET|PRJ}\right) \times (1 - LF_{ME}) \times (1 - U_{total|LtPF}) \quad \text{Equation (40)}$$

ER_t	Net GHG emission reductions in year t* since the start of the project activity, in the project scenario (tCO2e)
C_{FUEL}	Total carbon emissions associated with the combustion of fossil fuel in forestry and wood processing machinery (tCO2e)
$C_{NET\|BS,t*}$	Net carbon stock change in the baseline scenario in the year t* since the start of the project activity (tCO2e)
$\Delta C_{NET\|PRJ}$	Net carbon stock change in the project scenario since the start of the project activity (tCO2e)
LF_{ME}	Leakage factor for market-effects calculations, dimentionless;
$U_{total\|LtPF}$	Total uncertainty for LtPF Project, dimensionless;
MIN	Function to find the lowest number in a range

Net carbon dioxide removals are calculated as:

$$CR_{t*} = (MAX(0, \Delta C_{NET|PRJ}) - MAX(0, C_{NET|BSL,t*})) \times (1 - U_{total|LtPF}) \quad \text{Equation (41)}$$

CR_{t*}	Net carbon dioxide removals in year t* since the start of the project activity, in the project scenario (tCO2e)
ΔCNET|PRJ	Net carbon stock change in the project scenario since the start of the project activity (tCO2e)
CNET|BS,t*	Net greenhouse gas emissions in the baseline scenario in the year t* since the start of the project activity (tCO2e)
LFME	Leakage factor for market-effects calculations, dimentionless;
Utotal|LtPF	Total uncertainty for LtPF Project, dimensionless;
MAX	Function to find the highest number in a range

Estimated Uncertainty

The total uncertainty for LtPF project is calculated as:

$$U_{TOTAL|LtPF} = \sqrt{U^2_{|PRJ} + U^2_{|BSL}}$$ Equation (42)

$U_{total|LtPF}$ Total uncertainty for LtPF Project, dimensionless;

$U_{|PRJ}$ Total uncertainty for the improved forest management activities in the project scenario, dimensionless; and

$U_{|BSL}$ Total uncertainty for the baseline scenario, dimensionless.

If $Utotal|LtPF$ ≤ 0.15 then no deduction will result for uncertainty. If $U_{total|LtPF}$ > 0.15 then the amount of greenhouse gas emission credits associated with IFM activities will be deducted from the net reductions and removals.

Calculation of Verified Carbon Units

The buffer credits are quantified separately for removals and reductions as:

$$Bu_{CR,t*} = (MAX(0, \Delta C_{NET|PRJ}) - MAX(0, C_{NET|BSL,t*})) \times NPR\%$$ Equation (43)

$$Bu_{ER,t*} = (MIN(0, \Delta C_{NET|PRJ}) - MIN(0, C_{NET|BSL,t*})) \times NPR\%$$ Equation (44)

$Bu_{CR,t*}$ Buffer credits to be deducted from removals in year t* (tCO2e)

$Bu_{ER,t*}$ Buffer credits to be deducted from reductions in year t* (tCO2e)

$\Delta C_{NET|PRJ}$ Net carbon stock change in the project scenario since the start of the project activity (tCO2e)

$C_{NET|BS,t*}$ Net greenhouse gas emissions in the baseline scenario in the yea r t* since the start of the project activity (tCO2e)

NPR % Overall project non-permanence risk rating converted to a percentage

The total VCUs that result from project activities leading to removals and reductions is calculated as:

$$VCU_{CR,t*} = CR_{t*} - Bu_{CR,t*}$$ Equation (45)

$$VCU_{ER,t*} = ER_{t*} - Bu_{ER,t*}$$ Equation (46)

$VCU_{CR,t*}$ Number of verified carbon units, in year t*, that result from project activities leading to removals

$VCU_{ER,t*}$ Number of verified carbon units, in year t*, that result from project activities leading to reductions

CR_{t*} Net carbon dioxide removals in year t* since the start of the project activity, in the project scenario (tCO2e)

ER_{t*} Net emission reductions in year t* since the start of the project activity, in the project scenario (tCO2e)

Project Year	Buffer credits to be deducted from removals (t CO2e)	Buffer credits to be deducted from reductions (t CO2e)	Number of VCUs that result from project activities leading to removals	Number of VCUs that result from project activities leading to reductions
2022	0	140,958.56	688,209.43	522,375.83
2023	0	117,077.23	571,612.36	433,874.44
2024	0	125,336.67	611,937.86	464,482.95
2025	0	133,719.30	652,864.82	495,547.99
2026	0	140,139.99	684,212.90	519,342.32
2027	0	149,332.20	729,092.51	553,407.57
2028	0	160,958.81	785,857.73	596,494.42
2029	0	172,924.12	844,276.60	640,836.46
2030	0	185,852.12	907,395.63	688,746.08
2031	0	196,061.56	957,241.74	726,581.08
2032	0	187,440.29	915,149.67	694,631.67
2033	0	193,565.82	945,056.65	717,332.16
2034	0	202,059.40	986,525.28	748,808.35
2035	0	213,263.09	1,041,225.68	790,327.93
2036	0	223,187.29	1,089,679.11	827,105.83
2037	0	237,507.13	1,159,593.64	880,173.49
2038	0	247,956.21	1,210,609.71	918,896.53
2039	0	259,150.27	1,265,263.08	960,380.41
2040	0	272,979.77	1,332,783.60	1,011,630.92
2041	0	291,826.01	1,424,797.59	1,081,472.87
2042	0	305,666.78	1,492,373.12	1,132,765.14
2043	0	312,880.51	1,527,593.06	1,159,498.35
2044	0	334,510.71	1,633,199.37	1,239,657.35
2045	0	350,602.28	1,711,764.06	1,299,290.79
2046	0	364,294.07	1,778,612.21	1,350,030.95
2047	0	385,458.07	1,881,942.36	1,428,462.27
Total	0	5,904,708.26	28,828,869.77	21,882,154.15
Average	0	236,188.33	1,153,154.79	875,286.17

Determining buffer account allocation

The allocation of GERs to the buffer account was determined following the AFOLU Non Permanence Risk Tool, version 4.2. As a result of the process, the percentage of GERs allocated in the buffer account is 17%.

State the non-permanence risk rating (%)	17%
Has the non-permanence risk report been attached as either an appendix or a separate document?	☒ Yes ☐ No
For ARR and IFM projects with harvesting, state, in tCO2e, the Long-term Average (LTA).	The ARR for PARA1 is SIGS, not for carbon credit.
Has the LTA been updated based on monitored data, if applicable?	☐ Yes ☒ No No ARR carbon credits application.
State, in tCO2e, the expected total GHG benefit to date.	
Is the number of GHG credits issued below the LTA?	☐ Yes ☒ No LTA applies specifically to projects involving afforestation, reforestation, revegetation, and improved forest management.

Vintage period	Estimated baseline emissions (tCO2e)	Estimated project emissions (tCO2e)	Estimated leakage emissions (tCO2e)	Estimated buffer pool allocation (tCO2e)	Estimated reduction VCUs (tCO2e)	Estimated removal VCUs (tCO2e)	Estimated total VCU issuance (tCO2e)
15-Aug-2022 to 31-Dec-2022	310,938	4,014	62,188	8,868	235,868	0	235,868
01-Jan-2023 to 31-Dec-2023	688,690	8,291	137,738	41,754	500,906	0	500,906
01-Jan-2024 to 31-Dec-2024	737,275	12,568	147,455	50,014	527,238	0	527,238
01-Jan-2025 to 31-Dec-2025	786,584	16,846	157,317	58,396	554,025	0	554,025

01-Jan-2026 to 31-Dec-2026	824,353	21,123	164,871	64,817	573,542	0	573,542
01-Jan-2027 to 31-Dec-2027	878,425	25,400	175,685	74,009	603,330	0	603,330
01-Jan-2028 to 31-Dec-2028	946,817	29,678	189,363	85,636	642,140	0	642,140
01-Jan-2029 to 31-Dec-2029	1,017,201	33,955	203,440	97,601	682,204	0	682,204
01-Jan-2030 to 31-Dec-2030	1,093,248	38,232	218,650	110,529	725,837	0	725,837
01-Jan-2031 to 31-Dec-2031	1,153,303	42,509	230,661	120,739	759,394	0	759,394
01-Jan-2032 to 31-Dec-2032	1,102,590	46,787	220,518	112,117	723,168	0	723,168
01-Jan-2033 to 31-Dec-2033	1,138,622	51,064	227,724	118,243	741,591	0	741,591
01-Jan-2034 to 31-Dec-2034	1,188,585	55,341	237,717	126,737	768,790	0	768,790
01-Jan-2035 to 31-Dec-2035	1,254,489	59,619	250,898	137,940	806,032	0	806,032
01-Jan-2036 to 31-Dec-2036	1,312,866	63,896	262,573	147,864	838,533	0	838,533
01-Jan-2037 to 31-Dec-2037	1,397,101	68,173	279,420	162,184	887,323	0	887,323
01-Jan-2038 to 31-Dec-2038	1,458,566	72,451	291,713	172,633	921,769	0	921,769
01-Jan-2039 to 31-Dec-2039	1,524,413	76,728	304,883	183,827	958,975	0	958,975
01-Jan-2040 to 31-Dec-2040	1,605,763	81,005	321,153	197,657	1,005,949	0	1,005,949
01-Jan-2041 to 31-Dec-2041	1,716,624	85,283	343,325	216,503	1,071,513	0	1,071,513

01-Jan-2042 to 31-Dec-2042	1,798,040	89,560	359,608	230,344	1,118,528	0	1,118,528
01-Jan-2043 to 31-Dec-2043	1,967,710	93,837	393,542	237,558	1,242,773	0	1,242,773
01-Jan-2044 to 31-Dec-2044	2,062,366	98,115	412,473	259,188	1,292,591	0	1,292,591
01-Jan-2045 to 31-Dec-2045	2,142,906	102,392	428,581	275,279	1,336,654	0	1,336,654
01-Jan-2046 to 31-Dec-2046	1,606,075	106,669	321,215	288,971	889,220	0	889,220
01-Jan-2047 to 14-Aug-2047	2,267,400	78,587	453,480	180,175	1,555,159	0	1,555,159
Total	33,980,950	1,462,122	6,796,190	3,759,586	21,963,052	0	21,963,052
Averege	1,359,238	58,485	271,848	150,383	878,522	0	878,522

3.3 Monitoring

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

Data / Parameter	*FV,INF,HWP*
Data unit	%
Description	The fraction of merchantable timber volume from clearing of forest roads, skidtrails and log landings that is to be processed into wood products. Based on this fraction as well as forest inventory or sample plot data and forestry infrastructure data, *VEX,INF,j,i|BSL* and *VnotEX,INF,j,i|BSL* will be calculated.
Equations	To be applied in the timber harvest plan
Source of data	A credible and conservative value for FV,INF,HWP must be set based on one of the following sources in order of their appearance: • Forest management records of the baseline agent or other similar forestry companies • Peer-reviewed literature • Government statistics from the region If the project proponent cannot provide such a credible estimate, then it is conservatively assumed that all timber cleared for the purpose of forestry infrastructure is processed into sawnwood and hence must be accounted for under the harvested wood products section.

Value applied	-
Justification of choice of data or description of measurement methods and procedures applied	n.a.
Purpose of Data	Determination of baseline scenario
Comments	Parameter needs to be re-assessed and updated (if appropriate) as part of the baseline re-evaluation.

Data / Parameter	*VEX,INF,j,i|BSL*
Data unit	m3 ha-1
Description	Mean volume of timber extracted for wood processing during the process of forestry infrastructure establishment per unit area for species *j* in stratum *i*
Equations	(3), (4), (37)
Source of data	VEX,INF,j,i|BSL is provided in the timber harvest plan. It is calculated by multiplying FV,INF,HWP with the merchantable volume (from sample plots or existing forest inventory data) to be harvested/cleared for the purpose of forestry infrastructure development.
Value applied	-
Justification of choice of data or description of measurement methods and procedures applied	n.a.
Purpose of Data	Determination of baseline scenario
Comments	n.a.

Data / Parameter	*VnotEX,INF,j,i|BSL*
Data unit	m3 ha-1
Description	Mean volume of timber that is not extracted for wood processing during the establishment of forestry infrastructure per unit area for species *j* in stratum *i*
Equations	(7)
Source of data	*VnotEX,INF,j,i|BSL* is provided in the timber harvest plan. It is calculated by multiplying 1-*FV,INF,HWP* with the merchantable volume (from sample plots or existing forest inventory data) to be harvested/cleared for the purpose of forestry infrastructure development.
Value applied	-
Justification of choice of data or description of measurement methods and procedures applied	n.a.
Purpose of Data	Determination of baseline scenario
Comments	n.a.

Data / Parameter	*FRSD|BSL*
Data unit	Dimensionless
Description	Residual Stand Damage Factor
Equations	(6)
Source of data	Choose data from peer reviewed literature (i.e., available from a recognized, credible source and must be reviewed for publication by an appropriately qualified, independent organization or an appropriate peer review group, or published by a government agency), e.g., Brown, S. Pearson T., Moore, N., Parveen A., Ambagis, S., Shoch, D. (2005). Impact of selective logging on the carbon stocks of tropical forests: Republic of Congo as a case study. Deliverable 6: Logging Impact on carbon stocks, Report submitted to United States Agency for International Development, Cooperative Agreement No. EEM -A-00-03- 00006-00.
Value applied	
Justification of choice of data or description of measurement methods and procedures applied	n.a.
Purpose of Data	Determination of baseline scenario
Comments	Parameter needs to be re-assessed and updated (if appropriate) as part of the baseline re-evaluation.

fRSD (tCdamaged tCextracted-1)	Commercial Log Length (m)	Country	Reference
1.74	22	Congo	Brown et al. (2005)
2.30	17	Malaysia	Pinard and Putz. (1996)
2.78	10.8	Belize	Brown et al. (2005)
3.10	9.8	Bolivia	Pearson et al. (2005)
2.40	20.2	Southern Amazonia, Brazil	Feldspauch et al. (2005)

Data / Parameter	*EFFUEL*
Data unit	tCO2e kL-1
Description	Fuel emission factor
Equations	(14)
Source of data	Data must be determined by following either the historic data pathway, (if the PP has a history of logging operations) or the common practice pathway as stipulated at the beginning of this section.
Value applied	Various

Justification of choice of data or description of measurement methods and procedures applied	N.A.
Purpose of Data	Determination of baseline scenario
Comments	Parameter needs to be re-assessed and updated (if appropriate) as part of the baseline re-evaluation.

Data / Parameter	*FCHARVEST*
Data unit	kL m-3
Description	Fuel consumption of equipment employed for felling, snigging/skidding, delimbing and bucking per m3 of merchantable log harvested;
Equations	(14)
Source of data	Data must be determined by following either the historic data pathway, (if the project proponent has a history of logging operations) or the common practice pathway as stipulated at the beginning of this section.
Value applied	Various
Justification of choice of data or description of measurement methods and procedures applied	N.A.
Purpose of Data	Determination of baseline scenario
Comments	Parameter needs to be re-assessed and updated (if appropriate) as part of the baseline re-evaluation.

Data / Parameter	*FCHAULING*
Data unit	kL m-3
Description	Fuel consumption of equipment for hauling one m3 of merchantable log.
Equations	(15)
Source of data	Data must be determined by following either the historic data pathway, (if the project proponent has a history of logging operations) or the common practice pathway as stipulated at the beginning of this section.
Value applied	Various
Justification of choice of data or description of measurement methods and procedures applied	N.A.
Purpose of Data	Determination of baseline scenario
Comments	Parameter needs to be re-assessed and updated (if appropriate) as part of the baseline re-evaluation.

Data / Parameter	*KMTRANSPORT*
Data unit	km truck-1

Description	Log transport distance from the collection depot to processing plant;
Equations	(17)
Source of data	Digital maps specifying harvesting areas and logging and transporting roads to processing facility
Value applied	Various
Justification of choice of data or description of measurement methods and procedures applied	N.A.
Purpose of Data	Determination of baseline activity emissions
Comments	N.A.

Data / Parameter	*CAPTRUCK*
Data unit	m3 truck-1
Description	Truck load capacity
Equations	(16)
Source of data	Data must be determined by following either the historic data pathway, (if the project proponent has a history of logging operations) or the common practice pathway as stipulated at the beginning of this section.
Value applied	Various
Justification of choice of data or description of measurement methods and procedures applied	N.A.
Purpose of Data	Determination of baseline scenario
Comments	Parameter needs to be re-assessed and updated (if appropriate) as part of the baseline re-evaluation.

Data / Parameter	*EFFVEHICLE*
Data unit	km kL-1
Description	Fuel efficiency for vehicle type
Equations	(18)
Source of data	Data must be determined by following either the historic data pathway, (if the project proponent has a history of logging operations) or the common practice pathway as stipulated at the beginning of this section.
Value applied	Various
Justification of choice of data or description of measurement methods and procedures applied	N.A.
Purpose of Data	Determination of baseline scenario
Comments	Parameter needs to be re-assessed and updated (if appropriate) as part of the baseline re-evaluation.

Data / Parameter	*EDEMAND*
Data unit	kWh m-3
Description	Electricity demand for processing per volume processed
Equations	(19)
Source of data	Data must be determined by following either the historic data pathway, (if the project proponent has a history of logging operations) or the common practice pathway as stipulated at the beginning of this section.
Value applied	Various
Justification of choice of data or description of measurement methods and procedures applied	N.A.
Purpose of Data	Determination of baseline scenario
Comments	Parameter needs to be re-assessed and updated (if appropriate) as part of the baseline re-evaluation.

Data / Parameter	*EFELECTRICITY*
Data unit	tCO2e kWh-1
Description	Emission factor for electricity in the host country
Equations	(20)
Source of data	Country-specific data from International Energy Agency
Value applied	Various
Justification of choice of data or description of measurement methods and procedures applied	N.A.
Purpose of Data	Determination of baseline scenario
Comments	Parameter needs to be re-assessed and updated (if appropriate) as part of the baseline re-evaluation.

Data / Parameter	*TGENERATOR*
Data unit	h
Description	Total operating time of generator
Equations	(21)
Source of data	Data must be determined by following either the historic data pathway, (if the project proponent has a history of logging operations) or the common practice pathway as stipulated at the beginning of this section.
Value applied	Various
Justification of choice of data or description of measurement methods and procedures applied	N.A.
Purpose of Data	Determination of baseline scenario
Comments	Parameter needs to be re-assessed and updated (if appropriate) as part of the baseline re-evaluation.

Data / Parameter	*FCGENERATOR*
Data unit	kL h-1
Description	Fuel consumption per hour of operation of generator
Equations	(22)
Source of data	Data must be determined by following either the historic data pathway, (if the project proponent has a history of logging operations) or the common practice pathway as stipulated at the beginning of this section.
Value applied	Various
Justification of choice of data or description of measurement methods and procedures applied	N.A.
Purpose of Data	Determination of baseline scenario
Comments	Parameter needs to be re-assessed and updated (if appropriate) as part of the baseline re-evaluation.

Data / Parameter	*PRGENERATOR*
Data unit	kW
Description	Power rating of generator or generator size;
Equations	(21)
Source of data	Data must be determined by following either the historic data pathway, (if the project proponent has a history of logging operations) or the common practice pathway as stipulated at the beginning of this section.
Value applied	Various
Justification of choice of data or description of measurement methods and procedures applied	N.A.
Purpose of Data	Determination of baseline scenario
Comments	Parameter needs to be re-assessed and updated (if appropriate) as part of the baseline re-evaluation.

Data / Parameter	*Vl,j,i,sp*
Data unit	m3
Description	Merchantable volume for tree *l* of species *j* in sample plots *p* in stratum *i*
Equations	(1)
Source of data	Calculated from volume tables or equations linking diameter at breast height (DBH, at typically 1.3 meters aboveground level), and/or merchantable height (MH), to commercial (merchantable) volume of trees in the sample plots above the minimum DBH set in the timber harvest plan. If locally derived equations or yield tables are not available , use relevant regional, national or default equations from IPCC literature, national inventory reports or published

	peer-reviewed studies– such as those provided in Tables 4.A.1 to 4.A.3 of the GPG-LULUCF (IPCC 2003).
Measurement procedures (if any)	Various.
Comments	It is necessary to verify the applicability of equations used. Allometric equations can be verified by both: 1. Verification of equation conditions Justification should be provided for the applicability of the equation to the project locations. Such justification should include identification of climatic, edaphic, geographical and taxonomic similarities between the project location and the location in which the equation was derived. Any equation used should have an r2 value of greater than 0.5 (50%) and a p value that is significant (<0.05 at the 95% confidence level). 2. Additional field verification The following limited measures method must be used for field verification: select at least 10 trees per species distributed across the age range (but excluding trees less than 15 years old for which there is rarely a great relative inaccuracy in equations); measure DBH, and height to a 10 cm diameter top or to the first branch; calculate stem volume from measurements; and plot the estimated volume of all the measured trees along with the curve of volume against diameter as predicted by the allometric equation. If the estimated volume of the measured trees is distributed both above and below the curve (as predicted by the allometric equation) the equation may be used. The equation may also be used if the measured individuals have a volume consistently higher than predicted by the equation. The equation may not be used if >75% of the measured trees have a volume lower than the predicted curve. In this instance another equation must be selected.

Data / Parameter	*CFj*
Data unit	tC·td.m.-1
Description	Carbon fraction of dry matter for species *j*
Equations	(3), (4), (7)
Source of data	Either the default value 0.5tC·td.m. -1 or species-specific values from the literature must be used. he same value, however, must be used in all instances where this parameter is used.
	0.47
Measurement procedures (if any)	N/A
Comments	IPCC default for aboveground tree biomass (table 4.3 in volume 4 of the 2006 IPCC guidelines). Parameter needs to be re-assessed and updated (if appropriate) as part of the baseline re-evaluation.

Data / Parameter	*Dj*
Data unit	t.d.m. m-3
Description	Basic wood density of species *j* in t d.m. m-3
Equations	(4)
Source of data	Must be chosen with priority from higher to lower preference as follows • National species-specific or group of species-specific values (e.g., from National GHG inventory); • Species-specific or group of species-specific values from neighboring countries with similar conditions. When species- specific data from neighboring countries is of higher quality, being more representative of the species in the project scenario, it may be preferable to use these values than lower quality national data; • Global species-specific or group of species-specific (e.g., IPCC 2006 AFOLU Chapter 4 Tables 4.13 and 4.14). Species-specific wood densities may not always be available and may be difficult to apply with certainty in the typically species-rich forests of the humid tropics, hence it is acceptable practice to use wood densities developed for forest types or plant families or species groups. For a detailed list of values for many species worldwide, the Global Wood Density Database can be used (Zanne et al. 2009)33. Global Wood Density Database (Chave, et al., 2009)
Measurement procedures (if any)	N/A
Comments	Default values must be updated whenever new guidelines are produced by the IPCC

Data / Parameter	*Fj(X,Y...)*
Data unit	t d.m. $tree^{-1}$
Description	Allometric equation(s) for species *j* linking measured tree variable(s) to aboveground biomass of living trees
Equations	(17)
Source of data	Equations must have been derived using a wide range of measured variables (e.g., DBH, Height, etc.) based on datasets that comprise at least 30 trees. Equations must be based on statistically significant regressions and must have an r^2 that is ≥ 0.8. The source of equation(s) must be chosen with priority from higher to lower preference, as available, as follows: • National species-, genus-, family-specific; • Species-, genus-, family-specific from neighboring countries with similar conditions (i.e., broad continental regions); • National forest-type specific; • Forest-type specific from neighboring countries with similar conditions (i.e., broad continental regions);

	• Forest type-specific such as those provided Tables 4.A.1 to 4.A.3 of the GPG-LULUCF (IPCC 2003); or in Pearson, T., Walker, S. and Brown, S. 2005. Sourcebook for Land Use, Land-Use Change and Forestry Projects. Winrock International and the World Bank Biocarbon Fund. 57pp.; or in Chave, J., C. Andalo, S. Brown, M. A. Cairns, J. Q. Chambers, D. Eamus, H. Folster, F. Fromard, N. Higuchi, T. Kira, J.-P. Lescure, B. W. Nelson, H. Ogawa, H. Puig, B. Riera, T. Yamakura. 2005 Tree allometry and improved estimation of carbon stocks and balance in tropical forests. Oecologia 145: 87-99, or Chave et al. 2014. Improved allometric models to estimate the aboveground biomass of tropical trees; Global Change Biology 20 (10): 3177-3190. Species-, genus- and family-specific allometric equations may not always be available and may be difficult to apply with certainty in the typically species-rich forests of the humid tropics34. Hence it is acceptable practice to use equations developed for regional forest types, provided that their accuracy has been validated with direct site - specific data following guidance given below. If a forest-type specific equation is used, it should not be used in combination with species- specific equation(s) (i.e., it must be used for all tree species35). For extratropical projects, the allodb R package includes a database from 701 woody species identified at 24 large Forest Global Earth Observatory (ForestGEO) forest dynamics plots representing a wide diversity of extratropical forests. See more in: Gonzalez-Akre et al. (2021)[36].
Measurement procedures (if any)	N/A
Comments	It is necessary to validate the applicability of equations used. Source data from which equation(s) was derived should be reviewed and confirmed to be representative of the forest type/species and conditions in the project and covering the range of potential independent variable values. Allometric equations can be validated either by: <u>1. Limited Measurements</u> • select at least 30 trees (if validating forest type-specific equation, selection should be representative of the species composition in the project area, i.e., species representation roughly in proportion to relative basal area). Minimum diameter of measured trees must be 20cm and maximum diameter must reflect the largest trees present or potentially present in the future in the project area (and/or leakage belt); • measure DBH, and height to a 10 cm diameter top or to the first branch;

	• calculate stem volume from measurements and multiply by species-specific density to gain biomass of bole; • apply a biomass expansion factor to estimate total aboveground biomass from stem biomass[37]; and • plot the estimated biomass of all the measured trees along with the curve of biomass against diameter as predicted by the allometric equation. If the estimated volume of the measured trees is distributed both above and below the curve (as predicted by the allometric equation) the equation may be used. The equation may also be used if the measured individuals have a biomass consistently higher than predicted by the equation. If >75% of the measured trees have a biomass lower than the predicted curve, destructive sampling must be undertaken, or another equation must be selected. 2. Destructive Sampling • select at least 5 trees (if validating forest type-specific equation, selection should be representative of the species composition in the project area, i.e., species representation in roughly in proportion to relative basal area) at the upper end of the range of independent variable values existing in the project area; • measure DBH and commercial height and calculate volume using the same procedures/equations used to generate commercial volumes to which BCEFs will be applied; • fell and weigh the aboveground biomass to determine the total (wet) mass of the stem, branch, twig, leaves, etc. Extract and immediately weigh subsamples from each of the wet stem and branch components, followed by oven drying at 70 degrees C to determine dry biomass; • determine the total dry weight of each tree from the wet weights and the averaged ratios of wet and dry weights of the stem and branch components; and • plot the estimated biomass of all the measured trees along with the curve of biomass against diameter as predicted by the allometric equation. If the estimated volume of the measured trees is distributed both above and below the curve (as predicted by the allometric equation) the equation may be used. The equation may also be used if the measured individuals have a biomass consistently higher than predicted by the equation. If >75% of the measured trees have a biomass lower than the predicted curve another equation must be selected. Details of destructive sampling measurements are given in several publications: Brown, S. 1997. Estimating biomass and biomass change of tropical forests: a primer. FAO Forestry Paper 134, Rome,

	Italy. Available at http://www.fao.org/docrep/W4095E/W4095E00.htm Picard N., Saint-André L., Henry M. 2012. Manual for building tree volume and biomass allometric equations: from field measurement to prediction. Food and Agricultural Organization of the United Nations, Rome, and Centre de Coopération Internationale en Recherche Agronomique pour le Développement, Montpellier, 215 pp. https://www.fao.org/4/i3058e/i3058e.pdf If using species-specific equations, and new species are encountered while monitoring, new allometric equations must be sourced from the literature and validated, if necessary, as per requirements and procedures above. Default values must be updated whenever new guidelines are produced by the IPCC

Data / Parameter	*BCEFR*
Data unit	t.d.mm-3
Description	Biomass conversion and expansion factor applicable to wood removals in the project area
Equations	(3), (34)
Source of data	The source of data must be chosen with priority from higher to lower preference as follows: • Existing local forest type-specific; • National forest type-specific or eco-region-specific (e.g., from national GHG inventory); • Forest type-specific or eco-region-specific from neighboring countries with similar conditions. Sometimes (c) might be preferable to (b); • Global forest type or eco-region-specific (e.g., IPCC 2006 INV GLs AFOLU Chapter 4 Table 4.5). Alternatively: BCEFR = BEFR * D Where BCEF values are not directly available, they can be calculated as Biomass Expansion Factor (BEF)* basic wood density (D). Application of this equation requires caution because basic wood density and biomass expansion factors tend to be correlated. If the same sample of trees was used to determine D, BEF or BCEF, conversion will not introduce error, therefore, it is acceptable to use this equation. If, however, basic wood density is not known with certainty, transforming one into the other might introduce error, as BCEF implies a specific but unknown basic wood density, therefore, all conversion and expansion factors must be derived or their applicability checked locally.
Value applied	1.89
Measurement procedures (if any)	N/A
Comments	The combustion factor is a measure of the proportion of the fuel that is actually combusted, which varies as a function of

	the size and architecture of the fuel load (i.e., a smaller proportion of large, coarse fuel such as tree stems will be burnt compared to fine fuels, such as grass leaves), the moisture content of the fuel and the type of fire (i.e., intensity and rate of spread). Default values must be updated whenever new guidelines are produced by the IPCC.

Data / Parameter	*Ggi*
Data unit	g kg-1 dry matter burnt
Description	Emission factor for stratum *i* for gas *g*
Equations	(20)
Source of data	Defaults can be found in Volume 4, Chapter 2, of the IPCC 2006 Inventory Guidelines in table 2.5
Measurement procedures (if any)	N/A
Comments	Default values must be updated whenever new guidelines are produced by the IPCC

Data / Parameter	*OF, SLF, WW*
Data unit	Kg kg-1
Description	*OF* = Fraction of wood products that will be emitted to the atmosphere between 3- and 100-years after production; *SLF* = Fraction of wood products that will be emitted to the atmosphere within 3 years of production; and *WW* = Fraction of extracted biomass effectively emitted to the atmosphere during production Wood waste fraction (*WW*): Winjum et al. 1998 indicates that the proportion of extracted biomass that is oxidized (burning or decaying) from the production of commodities to be equal to 19% for developed countries, 24% for developing countries. Short-lived fraction (*SLF*) Winjumetal (1998) give decay rates for proportions of wood products, which were converted to short-term (<3yr) uses (applicable internationally) as below: Sawnwood 0.12 Woodbase panels 0.06 Other industrial roundwood 0.18 Paper and Paperboard 0.24 Additional oxidized fraction (*OF*) Winjum et al 1998 gives annual oxidation fractions for each class of wood products split by forest region (boreal, temperate and tropical). This methodology projects these fractions over 95 years to give the additional proportion that is oxidized between the 3rd and the 100th year after initial harvest:

Wood Product Class	*OF*		
	Boreal	Temperate	Tropical
Sawnwood	0.39	0.62	0.86
Woodbase panels	0.62	0.86	0.98

	Other industrial roundwood	0.86	0.98	0.99
	Paper and paperboard	0.39	0.62	0.99
Equations	(9), (11)			
Source of data	The source of data is the published paper of Winjum et al.1998 38			
Measurement procedures (if any)	N/A			
Comments	Parameter needs to be reviewed as part of the baseline re - evaluation.			

Data / Parameter	*PMLFT*
Data unit	%
Description	Mean merchantable biomass as a proportion of total aboveground tree biomass for each forest type.
Equations	Section 8.3.2, Box 2.
Source of data	The source of data must be chosen with priority from higher to lower preference as follows: Parameter needs to be re-assessed and updated (if appropriate) as part of the baseline re-evaluation. • peer-reviewed published sources (including carbon/biomass maps or growing stock volume39 maps with a scale of at least 1 km); • official Government data and statistics; or • original field measurements. The forest types considered must be only those relevant for the specific market effects leakage, that is, only forest types with active timber production. An appropriate source of data will be Government records on annual allowable cuts for the areas of commercial forests. Where volumes are used the source of data wood density is required to convert to merchantable biomass. The source of data on wood densities must be chosen as per the species-specific density parameter, *Dj*.
Measurement procedures (if any)	N/A
Comments	Parameter needs to be re-assessed and updated (if appropriate) as part of the baseline re-evaluation.

Data / Parameter	*RGRi*
Data unit	tC.ha-1.yr-1
Description	Forest regrowth rate post timber harvest for stratum *i*
Equations	(22)
Source of data	Regrowth rate must be calculated from either • data generated in a reference area using measurements of timber volume in a chronosequence of replicated sample plots; or

	• published data on forest growth after timber harvest of the same forest type within the same region as the project; or • IPCC default values for aboveground net biomass growth in natural forests40.
Measurement procedures (if any)	
Comments	Default values must be updated whenever new guidelines are produced by the IPCC

Data / Parameter	*VEX,j,i|BSL*
Data unit	m3 ha-1
Description	Mean volume of extracted timber per unit area for species *j* in stratum *i*
Equations	(3), (4), (34), (37)
Source of data	The timber harvest plan sets the allowable mean extracted volume from the merchantable volume of timber in the forest inventory (*Vj,i|BSL*),based on legal limits. Forest Inventory (Inventarisasi Hutan Menyeluruh Berkala, IHMB) was carried out by inventory team of PT BLM AND PT GES2.
Value applied	Various
Measurement procedures (if any)	Data were obtained from the net production capacity and the production area referred to the project area (divided by stratum).
Comments	Determination of baseline scenario

Data / Parameter	*THi,p*
Data unit	Years
Description	Number of years since timber harvest in stratum *i* in land parcel *p*
Equations	n.a
Source of data	The timber harvest schedule specifies the year (1,2,3...) timber harvest in each land parcel is scheduled to occur and the number of years each land parcel is in a post-harvest state during the project crediting period.
Measurement procedures (if any)	
Comments	

Data / Parameter	*Ai,p*
Data unit	ha
Description	Area covered by stratum *i* over land parcel *p*
Equations	(23), (24), (25)
Source of data	Geodetic coordinates and/or Remote Sensing data and/or legal parcel records
Measurement procedures (if any)	It must be assumed ex-ante that land parcel boundaries and strata areas must not change through time
Comments	

Data / Parameter	*At*,i,p*

Data unit	ha
Description	Cumulative area harvested in stratum *i* in parcel *p* at time *t**
Equations	(26), (31)
Source of data	Timber harvesting plan. Geodesic coordinates, remote sensing data and/or legal parcel records.
Measurement procedures (if any)	
Comments	Land parcel boundaries and strata areas must be set at project validation and must not change through time

Data / Parameter	*A1,i,p*
Data unit	ha
Description	The area of stratum i in land parcel p that was harvested 1 year ago
Equations	(23)
Source of data	Geodesic coordinates, GIS Files or legal parcel records
Measurement procedures (if any)	
Comments	

Data / Parameter	*A2-10,i,p*
Data unit	ha
Description	The area of stratum *i* in land parcel *p* that was harvested between 2 and 10 years ago
Equations	(24)
Source of data	Geodesic coordinates, GIS Files or legal parcel records
Measurement procedures (if any)	
Comments	

Data / Parameter	*A11-20,i,p*
Data unit	ha
Description	The area of stratum *i* in land parcel *p* that was harvested between 11 and 20 years ago
Equations	(25)
Source of data	Geodesic coordinates, GIS Files or legal parcel records
Measurement procedures (if any)	
Comments	

Data / Parameter	*Asp*
Data unit	ha
Description	Area of sample plots p
Equations	(2), (30)
Source of data	Recording and archiving of size of sample plots
Measurement procedures (if any)	Standard procedures for plot delineation in forest timber inventory surveys must be used (see references in Box 3 for example procedures)
Comments	Ex-ante the size of the plots must be defined and recorded in the monitoring plan.

3.3.2 Data and Parameters Monitored (VCS, 3.16)

Data / Parameter:	Illegal Logging PRA Results
Data unit:	Dimensionless
Description:	Used in Section 8.2.2.20 Option A
Equations	
Source of data:	PRA
Description of measurement methods and procedures to be applied:	The PRA must evaluate whether timber harvest may be occurring in the project area and must consist of semi-structured interviews / questionnaires. If ≥10% of those interviewed / surveyed believe that illegal logging may be occurring within the project boundary then the limited on-the-ground illegal logging survey must be triggered. An additional output of the PRA must be a depth of penetration of illegal logging pressure. A maximum distance must be recorded for penetration into the forest from access points (such as roads, rivers, already cleared areas) for the purpose of harvesting timber.
Frequency of monitoring/recording:	Every two years
QA/QC procedures to be applied:	
Purpose of data:	
Calculation method:	
Comments:	Ex ante estimation must be made of illegal logging in the with -project case. If the belief is that zero illegal logging will occur within the project boundaries then this parameter may be set to zero if clear infrastructure, hiring and policies are in place to prevent illegal logging.

Data / Parameter:	Result of Limited Illegal Logging Survey
Data unit:	Dimensionless
Description:	Section 8.2.2.2 option B
Equations	
Source of data:	Limited on-the-ground illegal logging survey
Description of measurement methods and procedures to be applied:	Sampled by surveying multiple transects of known length and width across the access-buffer area to check whether new tree stumps are evident or not. The access-buffer area must be equal in area to at least 1% of *ADIST_IL,i*
Frequency of monitoring/recording:	Must be repeated each time the PRA indicates a potential for illegal logging.
QA/QC procedures to be applied:	
Purpose of data:	

Calculation method:	
Comments:	An *ex ante* estimation must be made of illegal logging in the with- project case. If the belief is that zero illegal logging will occur within the project boundaries then this parameter may be set to zero if clear infrastructure, hiring and policies are in place to prevent illegal logging.

Data / Parameter:	*Aburn,i,t*
Data unit:	ha
Description:	Area burnt in stratum *i* at time *t*
Equations	(33)
Source of data:	Geodesic coordinates and / or Remote Sensing data LiDAR, Landsat, Sentinal-2 and remote sensing data in combination with ground truthing
Description of measurement methods and procedures to be applied:	Information about the burned areas will be gathered from field plots and remote sensing analysis, which are part of the ongoing monitoring of forest growth in the project scenario. To achieve comprehensive coverage, this data will be supplemented with an analysis of optical data products from Landsat and Sentinel -2 satellites, known for their effectiveness in detecting deforestation and some degree of degradation.
Frequency of monitoring/recording:	Areas burnt must be monitored at least every five years
Value applied	0
QA/QC procedures to be applied:	Standard quality control / quality assurance (QA/QC) procedures for forest inventory including field data collection and data management must be applied. Use or adaptation of QA/QCs already applied in national forest monitoring, or available from published handbooks, or form the IPCC GPG LULUCF 2003, is recommended.
Purpose of data:	Estimation of forest disturbance in the project scenario
Calculation method:	
Comments:	Ex ante estimations of areas burned must be based on historic incidence of fire in the Project region.

Data / Parameter:	*Adist,i,t*
Data unit:	ha
Description:	Area disturbed in stratum *i* at time *t*
Equations	(35)
Source of data:	LiDAR, Landsat, MODIS Terra and Sentinal-2 remote sensing data in combination Geodesic coordinates and / or Remote Sensing data
Description of measurement methods and procedures to be applied:	The data of such natural disturbances will be gathered from field truthing and remote sensing analysis, which are part of the ongoing monitoring of forest growth in the project scenario. To achieve comprehensive coverage, this data will be supplemented with an analysis of optical data products (i.e. MODIS Terra and Sentinel-2 satellites), detecting deforestation and some degree of degradation for the effectiveness.

Frequency of monitoring/recording:	Areas disturbed must be monitored at least every five years
Value applied	0
QA/QC procedures to be applied:	Standard quality control / quality assurance (QA/QC) procedures for forest inventory including field data collection and data management must be applied. Use or adaptation of QA/QCs already applied in national forest monitoring, or available from published handbooks, or form the IPCC GPG LULUCF 2003, is recommended.
Purpose of data:	
Calculation method:	
Comments:	*Ex ante* estimations of areas disturbed must be based on historic incidence of natural disturbance in the Project region

Data / Parameter:	*ADIST_IL,i*
Data unit:	ha
Description:	Area potentially impacted by illegal logging in stratum *i*
Equations	(37)
Source of data:	LiDAR, Landsat, Sentinal-2 and remote sensing data in combination with GIS delineation and ground-truthing
Description of measurement methods and procedures to be applied:	*ADIST_IL,i* must be composed of a buffer from all access points (access buffer), such as roads and rivers or previously cleared areas. The width of the buffer must be determined by the depth of degradation penetration as defined as a PRA output.
Frequency of monitoring/recording:	Repeated each time the PRA indicates a potential for degradation
Value applied	0
QA/QC procedures to be applied:	Standard quality control / quality assurance (QA/QC) procedures for forest inventory including field data collection and data management follows the IPCC GPG LULUCF 2003
Purpose of data:	Estimation of forest disturbance in the project scenario
Calculation method:	Ex-ante a limited survey can be used to determine a likely depth of degradation penetration
Comments:	*Ex ante* limited survey can be used to determine a likely depth of degradation penetration

Data / Parameter:	*CDIST_IL,i,t|PRJ*
Data unit:	tCO2e
Description:	Biomass carbon of trees cut and removed through illegal logging in stratum *i* at time *t*
Equations	(37)
Source of data:	Field measurements in sample plots
Description of measurement methods and procedures to be applied:	The sampling plan must be designed using plots systematically placed over the buffer zone so that they sample at least 3% of the area of the buffer zone (*ADIST_IL,i*). The diameter of all tree stumps will be measured and conservatively assumed to be the same as

	the DBH. Where the stump is a large buttress, several individuals of the same species nearby must be located and a ratio of the diameter at DBH to the diameter of buttress at the same height above ground as the measured stumps must be determined. This ratio will be applied to the measured stumps to estimate the likely DBH of the cut tree. The aboveground carbon stock of each harvested tree will be estimated using the allometric regression equations chosen for forest growth in the project scenario. The mean aboveground carbon stock of the harvested trees is conservatively estimated to be the total emissions and to all enter the atmosphere
Frequency of monitoring/recording:	Repeated each time limited sampling of ADIST_IL, indicates illegal logging
QA/QC procedures to be applied:	Standard quality control / quality assurance (QA/QC) procedures for forest inventory including field data collection and data management must be applied. Use or adaptation of QA/QCs already applied in national forest monitoring, or available from published handbooks, or form the IPCC GPG LULUCF 2003, is recommended.
Purpose of data:	
Calculation method:	
Comments:	If species-specific equations are used and species cannot be identified from stumps then it must be assumed that the harvested species is the species most commonly harvested. A PRA must be used to determine the most commonly harvested species.

Data / Parameter:	*APi*
Data unit:	ha
Description:	Total area of illegal logging sample plots in stratum *i*
Equations	(37)
Source of data:	Ground measurement
Description of measurement methods and procedures to be applied:	A sampling plan must be designed using multiple sample plots systematically placed across the buffer zone so that they sample at least 3% of the area of the buffer zone.
Frequency of monitoring/recording:	Not more than five years
Value applied	0
QA/QC procedures to be applied:	Standard quality control / quality assurance (QA/QC) procedures for forest inventory including field data collection and data management must be applied. Use or adaptation of QA/QCs already applied in national forest monitoring, or available from published handbooks, or form the IPCC GPG LULUCF 2003, is recommended.
Purpose of data:	
Calculation method:	
Comments:	*Ex ante* estimation should be made of area of plots. This should be set to exactly 3% of the buffer zone *ADIST_IL,i*

Data / Parameter:	*PMPi*
Data unit:	%
Description:	Merchantable biomass as a proportion of total aboveground tree biomass for stratum *i* within the project boundaries
Equations	Section 8.3.2, Box 2: Leakage Factor Calculation
Source of data:	Within each stratum divide the summed merchantable biomass (defined as total gross biomass of a tree with 15cm DBH or larger) by the summed total of aboveground tree biomass.
Description of measurement methods and procedures to be applied:	
Frequency of monitoring/recording:	Not more than five years
Value applied	0, since the leakage factor of this project is zero
QA/QC procedures to be applied:	Standard quality control /quality assurance (QA/QC) procedures for forest inventory including field data collection and data management must be applied. Use or adaptation of QA/QCs already applied in national forest monitoring, or available from published handbooks, or form the *IPCC GPGLULUCF 2003*, is recommended.
Purpose of data:	*Calculation of project emissions*
Calculation method:	N/A
Comments:	Ex-ante a time zero measurement must be made of this factor. The timber harvest plan sets the allowable mean extracted volume from the merchantable volume of timber in the forest inventory (*Vj,i|BSL*), based on legal limits.

Data / Parameter:	*Ai,*
Data unit:	ha
Description:	Area covered by stratum *i*
Equations	(13), (14), (18)
Source of data:	LiDAR, Landsat, Sentinal-2 and remote sensing data in combination with ground truthing (i.e. Permanence Sampling Plots) and/or legal parcel records
Description of measurement methods and procedures to be applied:	N/A
Frequency of monitoring/recording	
QA/QC procedures to be applied:	N/A
Purpose of data:	Calculation of baseline and project emissions
Calculation method	Remote sensing analysis

Comments:	In the baseline scenario strata areas must not change through time. In the project scenario it must be assumed ex-ante that stand boundaries and strata areas must not change through time. Ex post adjustments of the project scenario strata may be needed if unexpected disturbances occur during the project crediting period, severely affecting different parts of an originally homogenous stratum. This disturbance will be delineated as a separate stratum for the purpose of monitoring the carbon stock changes.

3.3.3 Monitoring Plan (VCS, 3.16, 3.20)

3.3.3.1 Monitoring Methods

The objective of the monitoring plan as set out in this climate part of Project Description is to quantify the emissions reductions achieved by the project during each monitoring period, and consists of three main components: forest patrols and observations, plot measurements, and identification of disturbances.

These core monitoring components will be able to help the project technical team to accurately assess the project's effectiveness and VCU generation during each monitoring period. The details of the monitoring plan are laid out in the sections below. As for the community monitoring part please see section 4.4. The biodiversity monitoring part please see section 5.4,

As new project activities are carried out within the project area, their specific monitoring methods will be added to the CSIR monitoring plan. If any project activities or monitoring activities are to be phased out or incorporated at a later date due to adaptive management, the monitoring and implementation plans for the CSIR IFM project will be updated accordingly. These activities, and their frequency are shown in Table 16.

Table 16: The three primary monitoring activities, the frequency that they will be performed and the method to be used.

Activity	Frequency	Method
Forest Patrols and Perimeter Observation	Monthly	Patrol team inspects perimeter of Project Accounting Area on the ground and via helicopter
Plot Measurements	Bi-annually	Sampling teams visit a portion of plots in project and proxy areas
Identification of significant disturbance	At least annually	Periodic inspection of aerial imagery or videography, with ground inspection when necessary

Descriptions of these monitoring activities are described in Annex 3 – 'Forest Land Carbon Stock Measurement and Sample Plot Monitoring Manual v1.3 '. In addition to these three primary project monitoring activities several additional monitoring activities will happen at informal frequencies during the Project Partners' general operations. This includes regular forest ranger patrols through the Project Accounting Area, and outreaches to the communities. These additional monitoring activities will serve to identify many instances of encroachment or tree harvesting that may occur in the Project Accounting Area. The monitoring plan is meant as a guide to maintain consistency during monitoring, and also includes training and internal audit procedures for quality control. It is meant as a working document to be revised as needed during the course of the project. When revisions are necessary they should be noted as monitoring deviations in the subsequent monitoring report prepared for a VCS and CCB verification event.

3.3.3.2 Monitoring Team Organizational Structure

The teams responsible for carrying out monitoring activities and the roles within each team are as follows:

Field Patrol Team

- Forestry Department Ranger Lead – responsible for carrying out patrol, noting all relevant patrol data and observations in field patrol forms, and conducting ground-truthing of any identified areas with disturbances
- Watch Post Supports – community support personnel that can contribute to patrol logs or can act as in-field support for lead

Carbon Inventory Field Team

- Forestry Department Sample Plot Manager – responsible for training team members, conducting quality control checks, data recording and transcription, and conducting ground-truthing of any identified areas with disturbances
- Forestry Department Sample Plot Technicians – responsible for taking measurements in the field based on training and inventory protocol, support manager in data collection and transcription

Technical Team

- AAD Technical Manager – responsible for overseeing technical work to methodological and standard requirements, conducting quality control checks
- AAD Technical Analyst – responsible for conducting technical analyses related to remote sensing and carbon stock quantification, quality control checks.

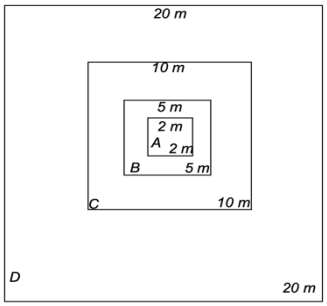
3.3.3.3 Measurement of carbon stocks changes by Sample Plots

VM0010 PDR.122 Summary of sampling procedures for the project accounting areas, with a copy of a sampling protocol used to carry out measurements.

To accurately estimate the biomass in the Project Accounting Area, a *stratification analysis* is done based on the different land cover types present. Random sample plots are generated for and placed within each of the strata to account for variance within each stratum. The number of sample plots needed to meet the uncertainty and error requirements of the VM0010 are determined using equation [B.2]. The UTM coordinates associated with the plots are generated using a geo-referenced map and then distributed to the field crews. Extra plots are often generated for each stratum in the event that some of the original plots are not accessible due to slope, terrain, rivers, landslides, ravines and other such environmental issues.

Sampling procedures are described in detail in the document 'Forest Land Carbon Stock Measurement and Sample Plot Monitoring Manual v1.3.pdf', provided as Annex 3 with this document. While this document has been provided to the auditor for review, it is not publicly available due to the proprietary knowledge within. A summary of the procedures is provided as follows:

Plot size



Plot sizes for each stage of vegetation growth are as follows:

a. Seedling with a minimum area of 4 m^2. Height <1M

b. Sapling with a minimum area of 25 m^2. 5M>Height>=1M

c. Pole with a minimum area of 100 m^2. DBH< 10cm, Height >=5M

d. Trees with a minimum area of 400 m^2. DBH >=10cm.

Figure 16. Indonesia MoEF standard Forest Field Plot dimension protocol

A nested square sample plot design was used for the CSIR . The larger square has a length and width of 20 M x 20M to measure the Tree DBH >= 10cm. A 10M x 10M square counts the Pole number with DBH < 10 cm but the height >= 5M. A 5M x 5M counts the Sapling number with 5M> Height >=1M. The center square of 2Mx2M counts the Seedling number with height<1M. are measured in the larger plot and shrubs in the smaller. The minimum diameter for considering an individual plant as a tree for the CSIR is 10 cm diameter measured at 1.3 m above the ground (DBH). All smaller woody plants are considered shrubs.

The SOP provides a checklist for plot sample teams to ensure full preparedness before initiating any work. Sample teams then navigate to the coordinates of the plot center using a

GPS device. When establishing a new sample plot, a hidden mark should be set up. It can be an un-noticeable landmark/monument or other un-noticeable mark to the out sider. So it will be un-noticeable to the trespasser. Sample plot teams must navigate to the original plot center coordinates as provided by project management, there are only a few instances for team safety or other reasons in which a team may move a plot center or abandon a plot location,

Due to environmental constraints on tree morphology, the DBH location may be moved up or down on the tree bole. Standing dead trees are included in the measurement, but lying dead trees are not. All trees' measurements are recorded on site on the data collection sheet. The team leader is responsible for quality assurance of trees' measurements and data recording and must monitor and check the work of the team as needed.

100% of the Biomass plots must be re-measured every five years. Biomass plot locations are depicted below in Figure 16. The procedures used for locating and sampling biomass sample plots can be found in Annex 3– 'Forest Land Carbon Stock Measurement and Sample Plot Monitoring Manual v1.3'. Changes in project carbon stocks are calculated as the difference in project stocks in each stratum between the current and prior monitoring periods, as determined from in-situ measurement of biomass plots:

Carbon stocks that are lost to burning, wood products, and leakage are accounted for using the procedures and equations in section 3.2.2 Project Emissions.

To reduce the standard deviation of the measure. There are two approaches.

1. To use the stratified sampling with equal interval as illustrated in the above Figure 16. The additional 2 stratified sampling plots with equal 20M apart can be implemented with the same protocol which will reduce the traveling cost of sample plot. But the measurement efforts will be triple.
2. Using Terrestrial LiDAR to implementing the stratified sampling with equal interval. It will capture the point cloud of the tree, pole, sapling and seedling measurement, recording and calculation. Please see Annex 3. 'Forest Land Carbon Stock Measurement and Sample Plot Monitoring Manual v1.3.pdf'

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

The Project Proponent will have the climate monitoring plan available for public review at the Project Office. The full results of the initial climate monitoring are included in this project document, which is being made publicly available in the Project Accounting Area. Additionally, a project document summary has been written and provided to communities throughout the Project Accounting Area in English and Indonesian. This project document and the project document summary have additionally been posted to AAD's webpage and on the CCB website (http://www.vcsprojectdatabase.org) for public review and comment.

3.4 Optional Criterion: Climate Change Adaptation Benefits

N/A

4 COMMUNITY

5 BIODIVERSITY

5.1 Without-Project Biodiversity Scenario

5.1.1 Existing Conditions (VCS, 3.19; CCB, B1.1)

Seram is considered a global biodiversity hotspot (33. Myers et al., 2000), located within the distinct biogeographical region of Wallacea (eastern side), named after Alfred Russel Wallace (31. Michaux, 2010). The island has a geologically complex, mountainous center – 11% of which is designated as Manusela National Park (38. Pownall et al., 2017). Manusela National Park contains one of the bigger intact areas of high biodiversity rainforest in Indonesia and is a refuge for numerous endemic species. The Critical Ecosystem Partnership Fund (CEPF) found that more than half of the mammals, 40% of the birds, and 65% of the amphibians found in Wallacea do not occur outside the Seram hotspot, and 560 species are listed as globally threatened (6. Critical Ecosystem Partnership Fund, 2014).

Global interest in the conserving the biodiversity of Seram does not necessarily conflict with local livelihoods (Sasaoka, 2018). Mixed tree cropping is still a vital livelihood component in Seram and many of the locally endemic bird species thrive in these agroforest habitats. Many endemic and near-endemic species are also found at higher altitude forest and in the coastal areas of southern Seram (40. Reeve et al., 2014). Yet in the most remote montane forests, local communities have made livelihoods out of selling exotic bird species, at least since the 120 0s (60. Valeri, 2000). To strengthen local stewardship of natural resources, CEPF granted funding to 80 projects that target Key Biodiversity Areas (KBAs) within the Wallacea hotspot in 2018. Seram includes 18 KBAs, of which 13 are terrestrial, 5 are marine. The KBAs cover 25% of Seram's land mass, including the 6 nearby islands (Ambon, Haruku, Saparua, Boano, Kelang, and Manipa) which only Ambon is outside of the CSIR project zone, the other 5 islands are all inside the CSIR Project Accounting Area. This paves the way for the CSIR biodiversity backbone building.

Critically Endangered *Aquilaria malaccensis*, Vulnerable *Aquilaria hirta, Aquilaria cumingiana, Aquilaria filaria, Gyrinops versteegii* and Endangered *Gyrinops decipiens, Gyrinops salicifolia, Gyrinops moluccana*	The CSIR 's core of IFM will protect the forest in Central Seram and ARR by setting up of 1,008 Ha (PARA1) of Agarwood Plantation Restoration on bare land to increase forestation and Prevent deforestation and forest degradation by SIGS. Not only will this not adversely impact the habitats of these species and original other non-endangered species, it will also improve the appreciation and nature of these species by reducing encroachment and for future eco-tourism.

Across the Maluku Province	The Objectives and Benefits of CSIR is not only protect the forest but also to establish the world class Agarwood Sanctuary. In PAA1 (19,20 7 Ha), PAA2 (34,811 Ha), (34,806 Ha) area, Agarwood encroachment is monitored through the FMU6 patrol team and community watch-post. The nature Agarwood habitats will also be tagged with GPS and put into the protection location list.
***Shorea selanica* (Critically Endangered)** ***Shorea montigena* (Critically Endangered)** **At Central Seram**	The CSIR 's core of IFM will protect the forest in Central Seram and ARR by setting up 1,008 Ha of Agarwood Plantation Restoration on bare land to increase forestation and Prevent deforestation and forest degradation by SIGS. The Shorea species currently been identified in Central Seram will be marked and protected. Its seeds will be also planted inside the Agarwood Plantation Restoration. Not only will this not adversely impact the habitats of these species and original other non-endangered species, it will also improve the appreciation and nature of these species by reducing encroachment and for future eco-tourism. In PAA1, PAA2 and area, Shorea selanica and Shorea montigena are monitored through the FMU6 patrol team and community watch-post. Their nature habitats will also been tagged with GPS and put into the protection location list.
***Monarcha boanensis* (Critically Endangered)** **At Buano Island**	The CSIR will improve the forest in Buano island (and PARA1) by setting up Agarwood Plantation on bare land to increase forestation and Prevent deforestation and forest degradation by SIGS. Not only will this not have an adverse impact the habitats of the Monarcha boanensis, it will also improve the appreciation and nature of Monarcha boanensis for future eco-tourism.
Cacatua moluccensis (VU) ***Lorius domicella (EN)*** ***Lorius domicella (EN)*** ***Pteropus chrysoproctus (VU)*** ***Across the Central Seram area***	The CSIR 's core of IFM will protect the forest in Central Seram and ARR by setting up Agarwood Plantation on bare land (PARA1) to increase forestation and PAA1, PAA2, to Prevent deforestation and forest degradation by SIGS. Not only will this not have an adverse impact the habitats of these specie, it will also improve the appreciation and nature of these species by reducing encroachment and for future eco-tourism.

5.1.2 High Conservation Values (CCB, B1.2)

High conservation value	HCV 1.2 Critically Endangered Species

	HCV 1.3 Areas that Contain Habitat for Viable Populations of Endangered, Restricted Range or Protected Species
Qualifying attribute	Seram Island is the natural habitat for Agarwood Aquilaria malaccensis(CR), Aquilaria hirta (VU), Aquilaria cumingiana(VU), Aquilaria filaria (VU), and Gyrinops decipiens (EN), Gyrinops salicifolia (EN), Gyrinops moluccana (EN) and Gyrinops versteegii (VU).
Focal area	Restoration of 1,008 Ha of Agarwood spp. in 20 plantations in the Manipa Island, Kelang Island, Buano Island, Huamual peninsula east side of Seram Barat District and Taniwel District (see Figure 19) with ForestWise technology by 50:50 ratio intercropping with Legumes tree Sesbania sesban/grandiflora to eliminate nitrogen fertilizer completely. These 20 plantation will also restore *Shorea selanica* and *Shorea montigena.* The natural focal area of Agarwood and Shorea spp. also include PAA1, PAA2, which cover Manipa Island, Kelang Island, Buano Island, Huamual peninsula east side of Seram Barat District and Taniwel District by community and biodiversity monitoring activities (table 18 and 21). .

Table 19. IUCN Endangered status of species in the CSIR Project zone

Birds		
Cacatua moluccensis	VU	Global
Lorius domicella	EN	Global
Lorius domicella	EN	Global
Pteropus chrysoproctus	VU	Regional
Monarcha boanensis	CR	Global
Plants		
Shorea selanica	CR	Global
Shorea montigena	CR	Global
Aquilaria malaccensis,	CR	Global
Aquilaria hirta	VU	Global
Aquilaria cumingiana	VU	Global
Aquilaria filaria	VU	Global
Gyrinops decipiens	EN	Global
Gyrinops salicifolia	EN	Global

Gyrinops moluccana	EN	Global
Gyrinops versteegii	VU	Global

The HCV Agarwood and Shorea restotation Plantation has been designed across the project zone in 20 locations as in Figure 20.

Figure 20. High Conservation Area location map

5.1.3 Without-project Scenario: Biodiversity (CCB, B1.3)

Focal issues without project

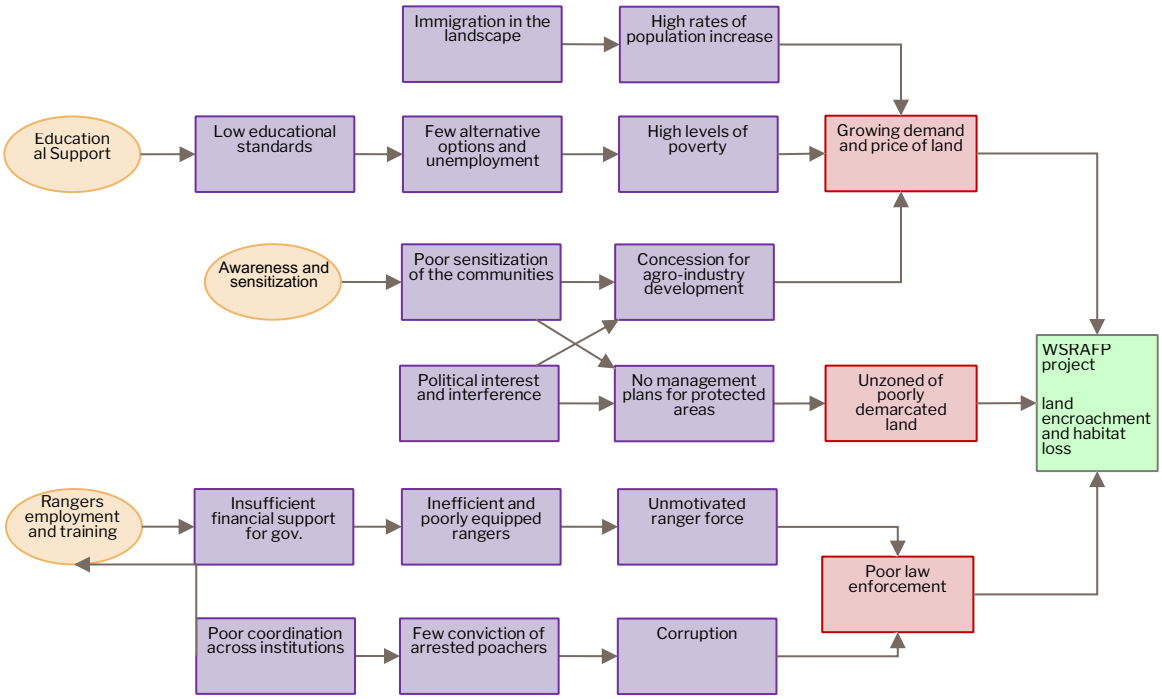
The SBIA/PRA workshops identify the most important biodiversity and key threats as **Focal Issues**. as followings:

1. *Land encroachment and habitat loss*: Protected area and forested land is illegally converted to other land uses due to land-grabbing by outside migrant, often through persuading poor local people through payment to clear forest for them.
2. *Wildlife poaching and trade*: Low rates of detection, capture, and prosecution of poachers, and high price of wildlife meat due to high demand from consumers, combined with low awareness and lack of alternative livelihoods for local people, leads to high reward with minimal risk for poaching
3. *Illegal logging*: Population growth and poverty with limited alternative livelihoods mean people are motivated to obtain income from illegal logging and timber trade, abetted by poor law enforcement and high timber value due to high demand.

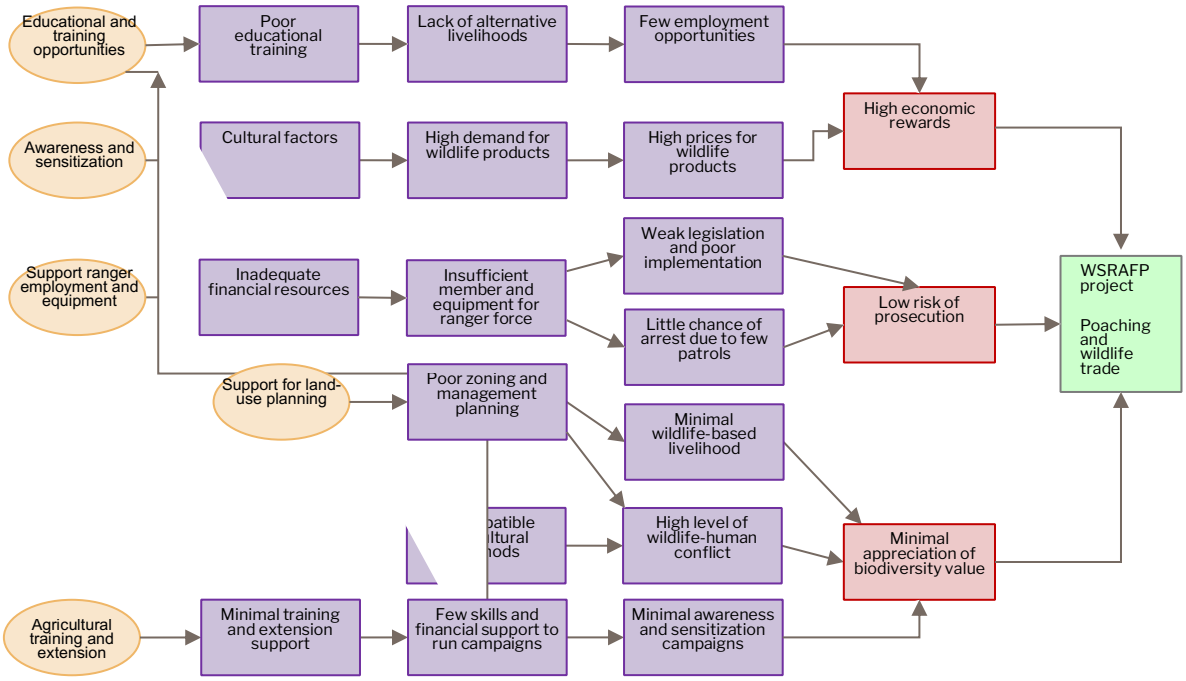
Problem Flow Diagrams

After establishing the fundamental issues that the project should focus on to achieve the overarching IFM goals, the SBIA/PRA workshop then delved deeper into these Focal Issues to establish the causal logic leading to the problems, and produced a Problem Flow Diagram (also termed Conceptual Model) for each of the Focal Issues (Figure 21). A Problem Flow Diagram (PFD) is a situation analysis of the issue that represents stakeholders' understanding of what drives the existence of the focal issue; it identifies economic, political, institutional, social and/or cultural factors that contribute to existence of the issue.

a) Land encroachment



b) Wildlife poaching and trade



c) Illegal logging

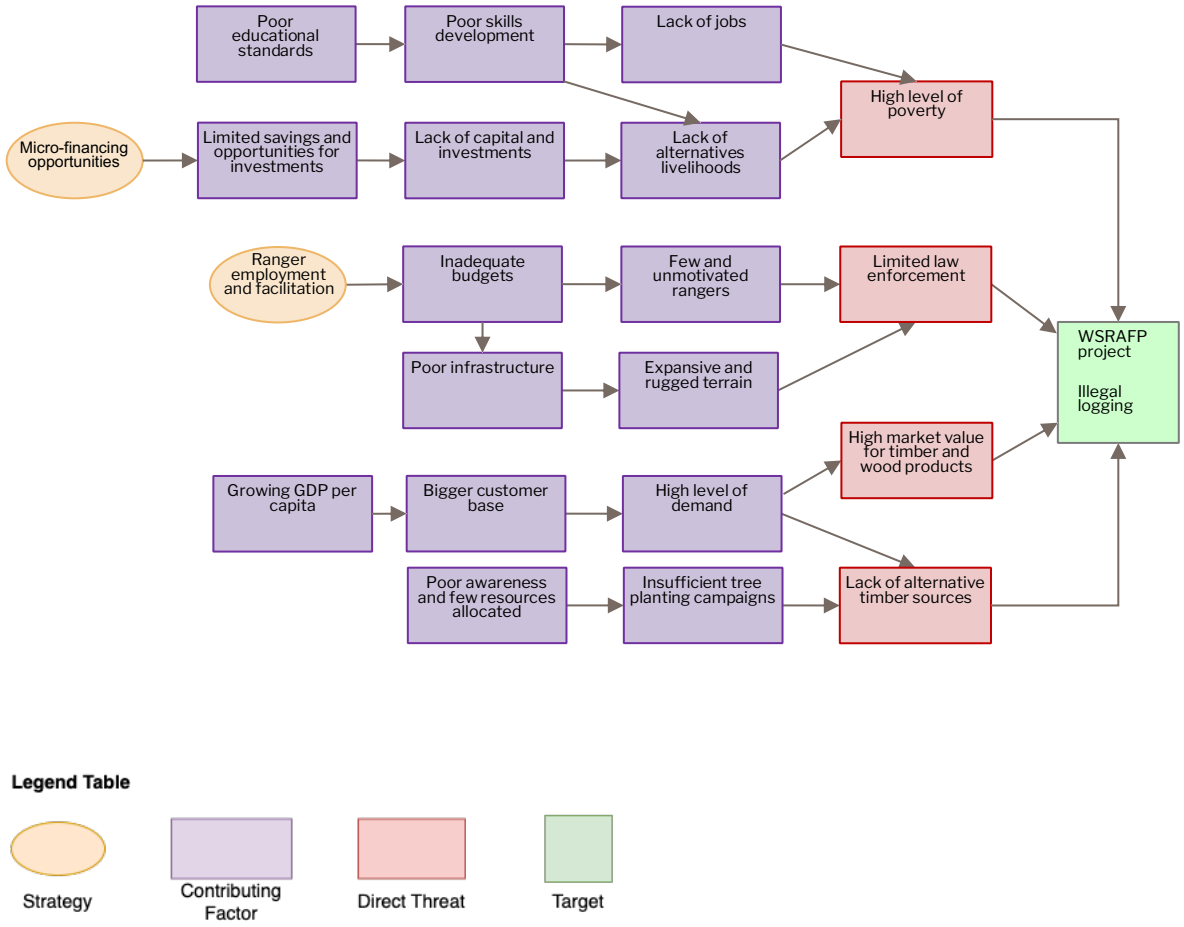


Figure 21: Problem Flow diagrams produced for the Focal Issues during the SBIA/PRA workshop for the CSIR

Without-project projections

The major direct threats identified for each Focal Issue in the short-to-medium term (5-10 yrs.) in the absence of the IFM project (Table 20).

Table 20: Future without-project projections of the key contributing factors to the Focal Issues identified during the CSIR SBIA/PRA workshop

a. Land encroachment and habitat loss

Direct Factor	In 5-10 years, will condition improve, worsen, or remain unchanged?	What will drive the change?

Poor law enforcement	Worsen	• Fewer rangers on patrol – fewer patrols conducted • Less budget for law enforcement implementation • Lack of capacity for implementing effective law enforcement • Less trust from international communities • Increased gray area of Government
No Zoning or Protected Area Demarcation	Worsen	Increase pressures due to population growth and other drivers of deforestation and limited government budget support.
Demand for land and increasing land price	Worsen	• Population growth • Need for land for Industrial agriculture product • Economic Development

b. Wildlife poaching and trade

Direct Factor	In 5-10 years, will condition improve, worsen, or remain unchanged?	What will drive the change?
High economic rewards for poaching	Worsen	• Increasing demand from increasing number of consumers • Lack of alternative livelihoods
Low risk of being prosecuted	Worsen	• Fewer poachers are detected and arrested due to poor law enforcement • Increased gray area of Government
Lack of awareness of biodiversity value	Worsen	• Lack of consistent and informative awareness and sensitization campaigns delivered by Government or NGOs

c. Illegal logging

Direct Factor	In 5-10 years, will condition improve, worsen, or remain unchanged?	What will drive the change?

Poor law enforcement	Worsen	• Fewer rangers on patrol – fewer patrols conducted • Less budget for law enforcement implementation • Lack of capacity for implementing effective law enforcement • Less trust from international communities Increased corruption
Poverty	Worsen	• Population increase • Poor agriculture techniques • Unemployment and lack of alternative livelihoods
High demand for timber and Agarwood (both local and international)	Worsen	• Population growth leading increase in demand • Income of people increase lead to demand timber • High price of timber • High price of Agarwood

5.2 Net Positive Biodiversity Impacts

5.2.1 Expected Biodiversity Changes (VCS, 3.19; CCB, B2.1)

According to the TMF satellite database from 1990 to 2022. The Project zone has lost 14,449 Ha (10.39%) of its natural forest. The forest loss in isolated island is more severe. In Buano Island, 2,119 Ha (49.4%) of forest was lost. In Kelang Island, 2,906 Ha (47%) forest was lost. In Manipa Island, 895 Ha (27.6%) forest was lost. In the Huamual peninsula district, 3,718 Ha (42.4%) forest was lost. It is caused by the local community for subsistence agriculture and encroachment. The habitats of fauna and flora in these area have been significant affected. Forest in the inland areas of the Project zone is less degraded. Without the project, there would be a loss of 19,20 7 Ha from Forest to Food Commodity on PAA1, 34,811 Ha of Selective Timber Logging on PAA2, and substantial amount of the 34,806 Ha of Unplanned Deforestation on PAA3. This will further substantiate the biodiversity change of the fauna and flora in the project zone. Agarwood is being traded in significant quantity from maluku (37. CITES PC14 Doc. 9.2.2 Annex 2) and Seram Island has Agarwood poaching of 1921Kg in 2021 (*48.* TECHNICAL REPORT 3: PERMANENCE AND LEAKAGE IDENTIFICATION FROM NATURAL AND HUMAN ACTIVITY, FORDIA 2021)

Biodiversity element	Avoid Deforestation and Forest Degradation to save the habitat of biodiversity of endangered flora and fauna.

Estimated change	Avoid Planned Deforestation of 19,20 7 Ha of farmland conversion (PAA1). Avoid Planned Deforestation and Unplanned Degradation of 34,811 Ha (PAA2) of commercial logging. Avoid Unplanned Deforestation of 34,806 Ha (PAA3) to preserve the natural habitat of Agarwood Aquilaria malaccensis(CR), Aquilaria hirta (VU), Aquilaria cumingiana(VU), Aquilaria filaria (VU), and Gyrinops decipiens (EN), Gyrinops salicifolia (EN), Gyrinops moluccana (EN) and Gyrinops versteegii (VU) Shorea selanica (CR) and Shorea montigena (CR) by CSIR Forest protection Patrol and implementing community SIGS. Restoration Forestation of 1,008 Ha of Agarwood species, Sesbania sesban, Samanea saman, Shorea selanica, Shorea montigena. (PARA1) in Manipa, Kelang, Buano,Islands, Seram Barat, Taniwel Districts. The Objectives and Benefits of CSIR are not only protect the forest but also to establish the world class Agarwood Sanctuary. In PAA1 (19,20 7 Ha), PAA2 (34,811 Ha), (34,806 Ha) area, Agarwood encroachment is monitored through the FMU6 patrol team and community watch-post. The nature Agarwood habitats will also be tagged with GPS and put into the protection location list.
Justification of change	The CSIR built a SIGS platform as described in section 2.1.18.

5.2.2 Mitigation Measures (VCS, 3.19; CCB, B2.3)

None of the project activities is expected to have any negative impacts on biodiversity, including any of the area's HCVs. On the contrary, they are specifically designed to improve the status of the forest and habitat, as well as reduce any direct threats on wildlife from poaching. The level of uncertainty and risk associated with these activities is very low based on the project proponent's decade-long experience with conservation in this landscape, thus we the precautionary principle was not explicitly applied here.

5.2.3 Net Positive Biodiversity Impacts (CCB, B2.2, GL1.4)

Comparison of without-project and with-project scenarios

Based on the situation and without-project analyses (Section 5.1.3), most of the Direct Factors across the three Focal Issues were projected as being likely to worsen in the absence of the CSIR , including:

1. Limited law enforcement
2. Demand for land and increasing land conflicts.
3. High economic reward for poaching wildlife
4. Minimal risk of being prosecuted for poaching wildlife and Agarwood.

5. Lack of understanding or capacity to show appreciation for biodiversity value
6. High demand for timber and Agarwood (both local and international).

With-project the scenarios will substantially improve including:

7. More law enforcement.
8. Land conflicts reduced.
9. Poaching wildlife reduced and convert into HCV restoration.
10. Low prosecution for poaching wildlife and Agarwood.
11. Better understanding or capacity to show appreciation for biodiversity value
12. Convert the demand of timber and Agarwood to restoration and NTFP.

Thus, the project activities planned under Section 5.2.2 will result in clear biodiversity benefits compared to a without-project scenario where all these key factors get worse.

Gold Level for climate change adaptation benefits

The global warming has significant change the sea temperature. At this stage the rains fall pattern in Central Seram has not greatly been affected. The evenly distributed rains fall has eased the possibility of forest fire by drought and pave the foundation for the HCV CSIR and livelihood of the communities. While modelling climate impacts is complex and difficult to do with any precision, it is clear is that the climate in Indonesia will be increasingly variable and that the impacts of climate change will be evident primarily through extremes in the water resource sector. According to the 59, Asian Development Bank and Indonesian Ministry of the Environment and Forestry, the direct impacts of climate change will be reflected in changes to the natural rainfall pattern, higher temperatures and the rising sea level, which may result in flooding or drought which rarely happed at current state. The direct impacts of climate change – rising temperatures, changing rainfall patterns and sea level rise – generate secondary effects on ecosystems and natural resources. (59. The Climate Country Profile: Indonesia, World Bank Group 2021)

Indonesia's forests will also be affected by climate change impacts. The likely increase in temperature has the potential to change the extent and composition of forests, such as a decrease in wet forests and an increase in moist forests. Changes to forest composition may lead to changing availability of forest resources for rural livelihoods. Shifting seasons and rainfall patterns may lead to reduced forest productivity and increased risk of forest fires, while mangrove forests in coastal zones may be submerged by rising sea levels. Collectively, these effects could lead to the degradation and/or loss of forests, leading to decreased income security for forest-dependent communities.

Additionally, the creation of CSIR plantation system spread around the FMU6 20 villages not only provide the HCV Agarwood Forest (in addition to the IFM forest protection) but also the wildlife dependent on these forests which potentially would be adversely affected by these

climate changes. Thus, the project directly helps the biodiversity by mitigating for these effects by reducing emissions through IFM , increased carbon capture/sequestration by Agarwood/Sesbania Plantation, at the same time adapt to these anticipated changes by maintaining the 101 plantations and all Project Accounting Area in good condition for these species, including bio diversified corridors that make it possible for the wide-ranging species to move in case of drastic changes.

5.2.4 High Conservation Values Protected (CCB, B2.4)

By protecting the Central Seram Forest Landscape, the CSIR will be directly protecting vital wildlife habitats, safeguarding critical water resources and maintaining landscape connectivity by keeping the corridor intact and unfragmented. As such, all the high conservation values (at the species, ecosystem or functional levels) will be much better in the 'With Project' versus 'Without Project' scenario for the reasons noted above. There is no negative effect on Seram biodiversity.

5.2.5 Species Used (VCS, 3.19; CCB, B2.5, B2.6)

Species introduced	Classification	Justification for use	Adverse effects and mitigation
Aquilaria malaccensis	native	Restoration	None
Aquilaria hirta	native	Restoration	None
Aquilaria cumingiana	native	Restoration	None
Aquilaria filaria	native	Restoration	None
Gyrinops decipiens	native	Restoration	None
Gyrinops salicifolia	native	Restoration	None
Gyrinops moluccana	native	Restoration	None
Gyrinops versteegii	native	Restoration	None
Sesbania sesban	native	Companion Planting to eliminate chemical fertilizer	None
Samanea saman	native	Companion Planting to eliminate chemical fertilizer	None
Shorea selanica	native	Restoration	None
Shorea montigena	native	Restoration	None

5.2.6 Invasive Species (VCS, 3.19; CCB, B2.5)

Existing invasive species	Mitigation measures to prevent spread or continued existence of invasive species
No Invasive Species	None

All Project Activities that include any planting or reforestation within the Project zone shall utilize native or naturalized tree/plant species that will be nurtured in nurseries on-site. No non-native species will be used in the Project Accounting Area. All agricultural areas in the landscape have been excised from the Project Accounting Area a priority.

5.2.7 GMO Exclusion (CCB, B2.7)

No GMOs will be used both within the Project Accounting Area and Project zone.

5.2.8 Inputs Justification (VCS, 3.19; CCB, B2.8)

Name	No chemical fertilizers used
Justification of use	N/A
Potential adverse effect	None

5.2.9 Waste Products (VCS, 3.19; CCB, B2.9)

The main wastes anticipated from implementation of this project are from construction activities e.g., water reservoirs, pipelines, classrooms, health facilities and any other infrastructure. For any such activity, we will adhere to the national regulations and guidelines, as stipulated under the established Environmental and Social Impact Assessment process.

5.3 Offsite Biodiversity Impacts

5.3.1 Negative Offsite Biodiversity Impacts (CCB, B3.1) and Mitigation Measures (CCB, B3.2)

There is little chance of having significant negative biodiversity impacts outside the Project zone for two reasons. Firstly, the sources of threat to biodiversity are mainly local and they are unlikely to be transferred outside the Project zone (e.g. fuel wood collection and subsistence poaching) since neighbouring forests are either protected or under the jurisdiction of other communities. Secondly, commercial poaching threats related to wildlife trade or concessionary logging, which could be transferred further, are guided by existing Indonesian legislation and hence unlikely to be simply moved elsewhere solely because of implementation the CSIR . Thirdly, the complementary governmental patrol and community watch-post provide a positive safeguard to the forest and the biodiversity preservation.

Negative offsite impact	Mitigation measure(s)

None	

5.3.2 Net Offsite Biodiversity Benefits (VCS, 3.19; CCB, B3.3)

As there are no anticipated negative offsite impacts to biodiversity. The positive offsite net biodiversity benefits include expanding conservation of Agarwood species restoration outside of the Project Accounting Area by local community, reducing general poaching of wildlife.

5.4 Biodiversity Impact Monitoring

5.4.1 Biodiversity Monitoring Plan (CCB, B4.1, B4.2, GL1.4, GL3.4)

Indicators are important in impact assessment because they respond to the basic question "what should be measured to show that the claimed net social benefits are real and additional?" (Richards & Panfil 2011). Same question applied to the Biodiversity Benefits. An ideal indicator from the perspective of showing attribution is one that measures an 'intermediate state' or assumption between an output and outcome or an outcome and an impact, clearly showing progress along a causal chain (Richards & Panfil, 2011). Thus, we used our theory of change logic in the Result Chain diagrams (section 5.2.1) as the basis for selecting indicators that factor in attribution. We then decided on the best sampling methods to use to collect these data to acceptable levels accuracy, precision and cost effectiveness whilst retaining transparency and simplicity. From this, a Monitoring Plan was developed to guide data collection. The executor to generate these indicators is listed in the Table 26 below.

Further, the indicators will be analyzed based on the Pressure-State-Response framework, which also relies on a causal-chain logic, where threats negatively impact the status/condition of biodiversity, while responses or project interventions reduce pressure. Most Response indicators can be grouped under: Habitat improvement; Security enhancement; and Improvement of community livelihoods efforts. Pressure indicators fall under: Human population size and dynamics; Human-wildlife conflict (HWC); and Incidences including poaching, grazing, encroachment, charcoal and firewood collection amongst others. Finally, State indicators are grouped into three categories: wildlife (including species presence, diversity, distribution and movement); vegetation and land-use (including changes in various vegetation/habitat types, encroachment and fire). Most of the response and pressure indicators correspond to the social indicators developed in the community monitoring plan (See section 4.4.1), and so data collection follows the protocols outlined therein. On top, we determined 9 indicators not part of the social indicator set, also classified into three categories: Output 1; Outcome 5; and Impact 3 (Table 21). For these new indicators, two main strategies will be used to obtain the data: Internal reporting and FMU6 records. We envision three main aspects of state indicators to measure, each with a distinct set of monitoring protocols:

Wildlife: wildlife surveys and monitoring for all species – with a focus on HCVs – will be done using several methods: FMU6 ranger and community watch-post patrols, school teacher and student watch-post daily observation and camera record, and information from any independent research projects in the area.

Vegetation and land-use: carbon plot monitoring plots and remote sensing (based on Tropical Moist Forest Database) and GIS techniques (see section 3.3.3).

Biodiversity Impact Assessment: Monitoring Plan

Table 21: Project biodiversity impact assessment for monitoring plan.

Focal Issue	Key results	SMART Objective	Indicator Code	Indicator	Indicator type	Data collection method	Who?	When?	Where?
Forest destruction and land encroachment	*Decrease in illegal logging*	*By 2027, reduce the number of illegal logging incidents by half in the CSIR*	**BIA001**	*Same as SIA001 to SIA010*	*Same as SIA*	*Same as SIA*	*Same as SIA*	*Same as SIA*	*Same as SIA*
	Decrease in encroachment and land-grabbing	*By 2027, reduce the number of encroachment and land- grabbing by half in the CSIR*	**BIA002**	*Same as SIA011*	*Same as SIA*	*Same as SIA*	*Same as SIA s*	*Same as SIA*	*Same as SIA*
Wildlife and HCV Fauna/Flora poaching and conservation	*Decrease Wild Agarwood and other HCV fauna/Flora Poaching and trade*	*By 2027, reduce the number of wildlife poaching incidents by half in the CSIR*	**BIA003**	*Same as SIA012 to SIA014*	*Same as SIA*	*Same as SIA*	*Same as SIA*	*Same as SIA*	*Same as SIA*
	other Fauna/Flora		**BIA004**	*# of Agarwood confiscated from outside poachers by FMU6 Patrol Team rangers*	Outcome	FMU6 report	FMU IV	Annually	Project Accounting Area
			BIA005	*# and species of wildlife HCV fauna/Flora confiscated from outside poachers by FMU6 Patrol Team rangers*	Impact	FMU6 report	FMU IV	Annually	Project Accounting Area
	Greater appreciation and awareness of wildlife benefits	*By 2027, 25% more community members demonstrate greater appreciation for wildlife and conservation*	**BIA006**	*Same as SIA025 to SIA028*	*Same as SIA*	*Same as SIA*	*Same as SIA*	*Same as SIA*	*Same as SIA*

			BIA007	*# of awareness, sensitization training with special focus on HCV Fauna and Flora into school systems.*	Output	Internal report	AAD/Cooperative/ FMU6	Quarterly	School
	Greater Conservation/ Restoration of Agarwood and other HCV Fauna/Flora	*By 2026, setup native agarwood species conservation program*	**BIA008**	*Same as SIA015-SI023*	*Same as*	*Same as*	*Same as*	*Same as*	*Same as*
			BIA009	*# and species of wild agarwood and other HCV identified and protected in the PAAs*	Impact	Internal report	FMU IV, School	Quarterly	Project Accounting Area
			BIA010	*# of SIGS Agarwood HCV Flora restoration plantation established*	Impact	Internal report	AAD/Cooperative/ FMU6	Annually	Project Accounting Area
			BIA011	*# and species and Agarwood and Shorea trees planted*	Outcome	Internal report	AAD/Cooperative/ FMU6	Annually	Project Accounting Area
			BIA012	*# of Fauna species rescued and released*	Outcome	FMU6 report	FMU IV	Annually	Project Accounting Area
		By 2028, Agarwood and other NTFP Community Biodiversity Ecotourism Sites established and promoted	**BIA013**	*Same as SIA020-SIA022*	*Same as SIA*	*Same as SIA*	*Same as SIA*	*Same as SIA*	*Same as SIA*
Improve community livelihoods	*Reduced cost of living*	*By 2027, 10% of community members with direct livelihood benefits from the CSIR*	**BIA014**	*Same as SIA029-SIA032*	*Same as SIA*	*Same as SIA*	*Same as SIA*	*Same as SIA*	*Same as SIA*
	Higher income levels	*By 2027, 10% of community members earning income directly from the CSIR and associated activities*	**BIA015**	*# of Chicken/Goat Agarwood SIGGs formed*	Outcome	Internal report	AAD/Cooperative	Annually	Project Accounting Area

			BIA016	*# of Shorea dammar resin SIGGs formed*	Outcome t	Internal report	AAD/Cooperative	Annually	Project Accounting Area

SMART objective: Specific, Measurable, Achievable, Relevant and Time-bound.

5.4.2 Biodiversity Monitoring Plan Dissemination (CCB, B4.3)

The CSIR will disseminate the monitoring plan and the results of the monitoring within 12 months of validation. These documents will be made publicly available on the internet on CCB and VCS websites and linked to AAD website too. They will also be communicated to the communities and other stakeholders (including the Government and Local Authorities) using diverse media including presentations, reports, brochures and orally during community awareness and sensitization meetings, and continuous SBIA/PRA workshops.

5.5 Optional Criterion: Exceptional Biodiversity Benefits

This project is seeking Exceptional Biodiversity Benefits based on the presence of IUCN Red Listed species and critical ecological functions.

5.5.1 High Biodiversity Conservation Priority Status (CCB, GL3.1)

THE CSIR meets the criteria for high conservation priority status. Please refer to Table 19 below for HCV fauna and flora species listing and their associated IUCN statuses.

5.5.2 Trigger Species Population Trends (CCB, GL3.2, GL3.3)

Trigger species	Monarcha boanensis IUCN 2008: T22707294A127184528 https://www.iucnredlist.org/species/22707294/127184528
Population trend at start of project	A native species of the Maluku Islands in Indonesia. Specifically, it is found on Buano Island, which is part of the Maluku archipelago. This bird species is considered critically endangered due to habitat loss and other environmental pressures. The Buano Monarch is notable for its unique ecological role and is one of the endemic species that contribute to the biodiversity of the region. Conservation efforts are essential to protect its habitat and ensure its survival. The species number of mature individuals according to the IUCN is 70-130 .
Without-project scenario	Buano island has 37.56% of undisturbed tropical moist forest (TMF data 2022) which has much less forest than other Project Accounting Area. In 1990, Buano island had 51.5% of undisturbed tropical moist forest (TMF data 1990). Without the CSIR project, the Monarcha boanensis population will continue to be threatened. Survey work has judged this species to have an extremely small population which, given the reported continuation of habitat loss on the one island where it occurs, results in its classification as Critically Endangered (Quoted from IUCN assessment).

With-project scenario	With CSIR project, Monarcha boanensis will be put on watch list for reporting its population occurrence. and the nature habitat be protected.

Trigger species	Shorea selanica IUCN 2023: T33146A125627493 and Shorea montigena IUCN 2023: T33146A125627493 https://www.iucnredlist.org/species/33146/125627493 https://www.iucnredlist.org/species/33426/125628716
Population trend at start of project	The Indonesian name of Shorea selanica is "Meranti Selan". This species is a tree endemic to the Maluku Islands and is classified as critically endangered due to habitat loss. It belongs to the family Dipterocarpaceae and plays a significant role in the local ecosystem, particularly in semi-evergreen lowland forests. Dammar resin can also be extracted from the Shorea tree. Not data on the species number, however, one sample plot has identified its existence.
Without-project scenario	Out of 90 sample plots, only one plot has identified its presence. Without the CSIR project, the Shorea population will continue to be threatened.
With-project scenario	With CSIR project, the current Shorea species will be marked and the nature habitat be protected. The seeds will be collected and will be planted together with Agarwood Plantation. Shorea species will be put on watch list for encroachment.

Trigger species	Critically Endangered Aquilaria malaccensis T32056A2810130, Vulnerable Aquilaria hirta T32056A2810130, Aquilaria cumingiana T38068A88301841, Aquilaria filaria T88305747A88305753, Gyrinops versteegii (Submitted to IUCN by CITES) and Endangered Gyrinops decipiens (Submitted to IUCN by CITES), Gyrinops salicifolia T88307237A88307241, Gyrinops moluccana (Submitted to IUCN by CITES). https://www.iucnredlist.org/species/32056/2810130 https://www.iucnredlist.org/species/34561/2853368 https://www.iucnredlist.org/species/38068/88301841 https://www.iucnredlist.org/species/88305747/88305753 https://www.iucnredlist.org/species/88307237/88307241

Population trend at start of project	These species have been found scattered in Maluku islands. Agarwood Encroachment has been reported but no specific species have been identified.
Without-project scenario	Out of 90 sample plots, only one plot has identified its presence. Without the CSIR project, the Agarwood population will continue to be threatened.
With-project scenario	With CSIR project, the current Agarwood species identified will be marked and the nature habitat be protected. The seeds will be collected and will be planted within the 1,008 Ha Agarwood Plantation. The Agarwood species will be put on watch list for encroachment. All 8 Agarwood species, if the seeds can be found from other Indonesia province, will be re- introduced into the 1,008 Ha Agarwood plantation to create the world class Agarwood Sanctury. This is the cord of CSIR .

APPENDIX 1: STAKEHOLDER DESCRIPTION TABLE

Use the table below to describe the commercially sensitive information included in the project description to be excluded in the public version.

Stakeholder	Rights, interest, and overall relevance to the project
Identify communities and any community groups within them, any cross-cutting community groups, and list other stakeholders.	Please refer to table a-c in section 2.3.2 for each stakeholder's rights, interest, and overall relevance to the project.
Huamual Belakang County	Communities included or adjacent to the Project Accounting Area for the CSIR
Pulau Manipa County	Communities included or adjacent to the Project Accounting Area for the CSIR
Seram Barat County	Communities included or adjacent to the Project Accounting Area for the CSIR
Huamual County	Communities included or adjacent to the Project Accounting Area for the CSIR
Taniwel County	Communities included or adjacent to the Project Accounting Area for the CSIR
Community in general including both present and future generations	Stakeholders adverse affected by status quo
Government and Local authorities	Stakeholders adverse affected by status quo
Youth & Women	Stakeholders adverse affected by status quo

Borrowers/debtors	Stakeholders adverse affected by status quo
Poachers	Stakeholders benefiting from status quo
Immigrants	Stakeholders benefiting from status quo
Land speculators	Stakeholders benefiting from status quo
Loggers	Stakeholders benefiting from status quo
Timber traders	Stakeholders benefiting from status quo
Agarwood and other Non-timber forest product collectors	Stakeholders benefiting from status quo
Workers/job-seekers	Stakeholders benefiting from status quo
Wildlife traders and Middlemen	Stakeholders benefiting from status quo
Restaurant owners	Stakeholders benefiting from status quo
Wildlife consumers	Stakeholders benefiting from status quo
Microfinances and money lenders/creditors	Stakeholders benefiting from status quo
Employers	Stakeholders benefiting from status quo

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APPENDIX 3: ACRONYMS

AAC	Annual Allowable Cut
AAD	Asia Assets Developments Co., Ltd.
AFOLU	Agriculture, Forestry and Other Land Use
AGB	Above Ground Biomass
AGMT	Above-Ground Merchantable Trees
AGOT	Above-Ground Non-Merchantable Trees
APAPI	Wae Kawa Central Seram Agarwood Ecosystem
APD	Avoided Planned Deforestation and Degradation
AUDD	Avoided Unplanned Deforestation and Degradation
BGB	Below-Ground Biomass
BGMT	Below-Ground Merchantable Trees
BGOT	Below-Ground Non-Merchantable Trees
BPS	Central Statistics Agency
CCB	Climate, Community, and Biodiversity
CCBA	Climate, Community, and Biodiversity Alliance
CLD	local development committee (comité local de développement)
COMIFAC	Comission des Forêts d'Afrique Centrale
COP	Conference of Party
CPA	Community Protected Area
CRA	Carbon Rights Agreement
DBH	Diameter at Breast Height
dbh	Diameter at Breast Height
FMU	Forest Management Unit
FOB	Freight On Board/Free On Board
FOERDIA	Forest and Environment Research, Development, and Innovation Agency
FORDA	Forest Research and Development Agency
FPIC	Free, Prior, and Informed Consent
FREL	National Forest Reference Emission Level

FRL	Forest Reference Level
CSIR	RestorationWise Silviculture
GER	Gross Emissions Reduction
GHG	Greenhouse Gas
GIS	Geographic Information Systems
GL	Guidelines
GPG	Good Practice Guidance
HCV	High Conservation Value
HD	Hutan Desa; Village Forest
HH	Hutan Hak; Private Forest
HK	Hutan Kemasyarakatan; Community Forest
HL	Hutan Lindung; Protected forest
HP	Hutan Produksi Tetap; Permanent Production Forest
HPK	Hutan Produksi Konversi; Conversion Production Forest
HPT	Hutan Produksi Terbatas; Limited production forest
HR	Hutan Rakyat; People's Forest
HTR	Hutan Tanaman Rakyat; Community Forest Plantation
ICCN	Institut Congolais pour la Conservation de la Nature
ID	Republic of Indonesia
IFCA	Indonesian Forest and Climate Alliance
IFM	Improved Forest Management
ILG	Incorporated Landowner Group
IPCC	Intergovernmental Panel on Climate Change
IPLC	Indigenous peoples and local communities
IUCN	International Union for Conservation of Nature
JNR	Jurisdictional and Nested REDD+
KPH	Kesatuan Pengelolaan Hutan; Forest Management Unit
KPHL	Kesatuan Pengelolaan Hutan Lindung; Protected Forest Management Unit
KPHP	Kesatuan Pengelolaan Hutan Produksi; Production Forest Management Unit
LLG	Local Level Government
MECNT	Ministry of the Environment, Conservation of Nature, and Tourism

MoEFF	Minitry of Environment and Forestry
MoFor	Ministry of Forestry
MOU	Memorandum of Understanding
MRV	Monitoring, Reporting, and Verification
NER	Net Emissions Reduction
NER	Net GHG Emission Reductions and Removals
NPV	Net Present Value
NTFP	Non-Timber Forest Products
PAA	Project Accounting Area
PAI	Project Activity Instance
PARA	Project Agarwood Restoration Area
PDD	Project Design Document
PDR	Project Description Requirement
PIR	Project Implementation Report
PRA	Participatory Rural Appraisal
RA	REDD+ Agency
REDD	Reduced Emissions from Deforestation and Forest Degradation
SAI	Sinetics Accreditation International
SBB FMU	UPTD KPHP Central Seram Forest Management Unit
SBIA	Social and Biodiversity Impact Assessment
SIGS	Sustainable Income Generating Scheme
SIGGs	Sustainable Income Generating Groups
SOC	Soil Organic Carbon
UPTD	Unit Pelaksana Teknis Dinas Daerah; Regional Service Technical Implementation Unit
VCS	Verified Carbon Standard
VCU	Verified Carbon Unit
WP	Wood Products
CSIR	Central Seram IFM RestorationWise Project

APPENDIX 4: EQUIPMENT LIST FOR MONITORING

To assist in the preparation of survey equipment and materials, the list of survey tools and materials is grouped according to the type of work as follows: Determining the location and making sample plot boundaries for the work of determining the location and making sample plot boundaries in the field, equipment and materials are needed as following:

1) Work map

2) GPS

3) Compass

4) Clinometer

5) Altimeter

6) Tape measure

7) Calculator or table for converting flat distance to pitch/slant distance

8) Benchmarks for 4 sample plot corners (pipe diameter 2 inches long 30 cm)

9) Plastic rope for making boundaries for recording units.

10) Plot nameplates.

To measure woody plants and dead wood, the following equipment is needed:

1) Tape measure (measurement of the radius of the sub-plot, measurement of seedlings, poles and stakes and length of dead wood)

2) Phi band / tree diameter measuring tape (measurement of tree DBH and dead wood diameter

3) Telescope Spiegel Relaskop (if available)

4) Tree label (for poles and trees)

5) Hammer and nail (attach tree tag)

6) Permanent marker (note tree number on tree label) Measurement of understory and litter and soil organic layer.

7) Scale.

Measuring undergrowth and litter on the same sub-plot requires:

1) Quadrants made of aluminum, measuring 0.5 m x 0.5 m

2) Knife or grass shears/cuttings

3) Hanging scale with a capacity of 10 kg with an accuracy of 10 g (to weigh the wet weight of the sample)

4) Digital scale with a capacity of 1 kg with an accuracy of 0.1 g (for weighing sub-samples

5) Porous sieve 2 mm (separating litter and organic soil)

6) 5 kg plastic bag

7) Permanent marker.

Measurement and sampling of mineral soils. Measuring and taking samples of mineral soil requires equipment and materials in the form of:

1) Metal box measuring 20 cm x 20 cm x 10 cm and or earthen ring with a diameter of 5 cm

2) Wood measuring 25 cm x 10 cm x 10 cm

3) Rubber mallet, to hit the iron box so that it sinks into the ground

4) Hoe/ Straight shovel

5) Earth knife

6) Hand shovel

7) Rubber band

8) Paper cement bag

9) 30 kg plastic bag

10) 5 kg plastic bag

11) Permanent marker.

For measurement of the Leakage in addition to the above equipments the following equipments is needed:

1) Densiometer

2) LiDAR