

# WEST SERAM REDD+ and Agarwood ForestWise PROJECT

Document Prepared by



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<b>History of CCB status</b>	First application
<b>Gold Level criteria</b>	<p>The WEST SERAM REDD+ AND AGARWOOD FORESTWISE PROJECT (WSRAFP) will meet the Gold Level criteria for community and biodiversity as summarized below.</p> <p>GL1: Exceptional Climate Change Adaptability.</p> <p>The WSRAFP Project will result in an estimated net 30,171,291 tCO<sub>2</sub>e of emission removals in the 30-year crediting period. This will be</p>

	<p>achieved through consistent collaborations with local Social Forest (PS) organization and communities with advanced forest technology. The project’s activities will enhance the communities’ capability to build the forest resilience and adaptation to climate change impacts. The restoration of degraded land and forest cover will ensure West Seram Social Forest region’s long-term sustainability and ecosystem revival.</p> <p>GL2: Exceptional Community Benefits with Direct Benefits, Community Engagement and Sustainability.</p> <p>WSRAFP 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). WSRAFP 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.</p> <p>GL3: Exceptional Biodiversity Benefits with efforts to protect endangered species, restore habitats, and maintain ecosystem functions.</p>
<p><b>Expected verification schedule</b></p>	<p>TBD</p>
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# SUMMARY OF PROJECT BENEFITS

The West Seram Restoration Advanced ForestWise Project (WSRAFP) will bring the following benefits for climate, community and biodiversity as summarized below. 12 SDGs

## 1.1 Unique Project Benefits

Table 1. Unique Project Benefits

Outcome or impact estimated by the end of project lifetime	Section reference
<p>1) Building RestorationWise Silviculture (hereafter referred to as ‘WSRAFP’) System and a Sustainable Agri-Ecosystem Land Uses by WSRAFP to form the Sustainable Income Generating Scheme (hereafter referred to as ‘SIGS’):</p> <p>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.</p>	<p>4.1.2 4.1.3 4.2.1 4.2.4</p>
<p>2) Strengthening Community Organizations and Improve Health Facilities and Care:</p> <p>The WSRAFP 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. WSRAFP 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.</p>	<p>4.2.1 4.4.1 4.5</p>
<p>3) Micro-finance set up:</p> <p>The WSRAFP Project will revolve micro-finance fund, micro-loans, micro-insurance and family savings system to support WSRAFP/NTFP activities to</p>	<p>4.2.1 4.2.1</p>

<p>the local communities especially the chicken/goat raising and other NTFPs, thus 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.</p>	<p>4.2.3</p>
<p>4) Enhanced Forest Conservation and Law Enforcement combined with Sensitization and Awareness Raising:</p> <p>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.</p>	<p>4.2.1 5.1.1 5.2.1 5.4.1</p>

## 1.2 Standardized Benefit Metrics

Table 2. Standardized Benefit Metrics.

Category	Metric	Estimated by the end of project lifetime	Section reference
<b>GHG emission reductions or carbon dioxide removals</b>	Net estimated removals in the project zone, measured against the without-project scenario	30,171,291 tCO <sub>2</sub> e	3.2.4.2
	Net estimated reductions in the project zone, measured against the without-project scenario	Not Applicable	N/A
<b>Forest<sup>1</sup> cover</b>	For REDD <sup>2</sup> 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 <sup>3</sup> projects: Estimated number of hectares of forest cover increased in the project zone measured against the without-project scenario.	37,875 Hectares.	2.1.18 3.1.2
<b>Improved land management</b>	Number of hectares of existing production forest land in which IFM <sup>4</sup> practices are expected to occur as a result of project activities, measured against the without-project scenario	Not Applicable	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	Not Applicable	N/A

<sup>1</sup> 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)

<sup>2</sup> 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)

<sup>3</sup> 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)

<sup>4</sup> 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)

<b>Training</b>	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= 12,897 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 the above population= 6,449 person	2.1.15 4.2.1 4.4.1
<b>Employment</b>	Total number of people expected to be employed in project activities <sup>5</sup> , expressed as number of full-time employees <sup>6</sup>	1000	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	500	2.1.15 4.2.1 4.4.1
<b>Livelihoods</b>	Total number of people expected to have improved livelihoods <sup>7</sup> or income generated as a result of project activities	12,897 person	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	6,449 person based on local women/men distribution 50:50 estimation <sup>8</sup>	2.1.15 4.2.1 4.4.1
<b>Health</b>	Total number of people for whom health services are expected to improve as a result of project activities, measured against the without-project scenario	Dental service through school system. About 35,000 people	2.1.15 4.2.1 4.4.1
	Number of women for whom health services are expected to improve as a result of	About 50% of 35,000= 17,500 female	2.1.15 4.2.1

<sup>5</sup> 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.

<sup>6</sup> 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])

<sup>7</sup> 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.

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

	project activities, measured against the without-project scenario		4.4.1
<b>Education</b>	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 35,000 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, 17,500 female	2.1.15 4.2.1 4.4.1
<b>Water</b>	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	1/2 of Total_Population About 64,000 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 Above Population = 32,000 female	4.2.1 4.4.1
<b>Well-being</b>	Total number of community members whose well-being <sup>9</sup> is expected to improve as a result of project activities	1/2 of Total_Population About 64,000 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 Above Population = 32,000 female	4.2.1 4.4.1
<b>Biodiversity</b>	Expected change in the number of hectares managed significantly better by the project	37,875 ha	2.1.18 4.1.3

<sup>9</sup> 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.

<b>conservation</b>	for biodiversity conservation <sup>10</sup> , measured against the without-project scenario		
	Expected number of globally Critically Endangered or Endangered species <sup>11</sup> benefiting from reduced threats as a result of project activities <sup>12</sup> , 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 <sup>13</sup> ). Shorea selanica (CR), Shorea montigena (CR), Lorius domicella (VU), Monarcha boanensis (CR)	5.4.1 5.5.2 2.1.18

<sup>10</sup> 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

<sup>11</sup> Per IUCN's Red List of Threatened Species

<sup>12</sup> In the absence of direct population or occupancy measures, measurement of reduced threats may be used as evidence of benefit

<sup>13</sup> <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 West Seram Region, Maluku Province, Indonesia of total area of 37,875 ha, and geographical coordination is -2.8749 ~ -3.4324 S, 127.88214 ~128.7731 E. Project zone is a integration of 40 Community/Village/Social forest distributed across 10 sub-districts including Amalatu, Elpapatih, Huamual, Huamual Belakang, Inamosol, Kairatu, Kairatu Barat, Seram Barat, Taniwel and Taniwel Timur.

There are 3 Project Accounting Areas (PAAs):

PAA1: Afforestation of approximately 2,374 ha on the Community/Village/Social Forest of Savana, Shrub and Dryland Farming Land Use area through a list of adapted fire resistant and native species.

PAA2: Reforestation of approximately 4,962 ha on the Community/Village/Social Forest of degraded Secondary Dryland Forest and Secondary Dryland Farming Land Use area through a list of adapted fire resistant and native species.

PAA3: Reforestation and Enrichment of the Biodiversity within approximately 30,539 ha on the Community/Village/Social Forest of Primary and Secondary Dryland Forest Land Use area through a list of adapted fire resistant and native endangered species.

WSRAFP ARR project implements measures designed to protect the natural ecosystems in the above mentioned PAAs, with a focus on preventing the main drivers of Aforestation, Reforestation and Enrichment of Biodiversity 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<sub>2</sub> emissions resulting from the PAAs Afforestation, Reforestation and Revegetation to Protect Forest of 33,989,500 tCO<sub>2</sub>e in crediting period from 1 January 2025 to 31 December 2054.

### Community Objectives

- Improve *community welfare* by Sustainable *Income* Generation Groups (SIGG), Creating local Bee raising/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 *quality of education* 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)

Table 3. Audit History.

Audit type	Period	Program	Validation/verification body name	Number of years
Validation	Q2 2026 (expected)	VCS and CCB	Earthood Services Ltd.	N/A

## 2.1.3 Sectoral Scope and Project Type (VCS, 3.2)

Table 4. Sectoral Scope and Project Type.

<b>Sectoral scope</b>	14: Agriculture, forestry, and other land use
<b>AFOLU project category</b> <sup>14</sup>	Afforestation, Reforestation and Revegetation (ARR)
<b>Project activity type</b>	<ul style="list-style-type: none"> <li>•Increasing vegetation cover through direct planting: Afforestation (PAA1)</li> <li>•Increasing vegetation cover through direct planting: Reforestation (PAA2)</li> <li>•Increasing vegetation cover through direct planting: Reforestation and Enrichment of the Biodiversity (PAA3)</li> </ul>

## 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 has been discussed following:

<sup>14</sup> See Appendix 1 of the VCS Standard

1) The seven Kyoto Protocol greenhouse gases.

CO<sub>2</sub>, Included

CH<sub>4</sub>, Not Included

N<sub>2</sub>O, Not Included

HFC<sub>s</sub>, Not Included

PFC<sub>s</sub>, Not Included

SF<sub>6</sub>, Not Included

NF<sub>3</sub>, Not Included

2) Ozone-depleting substances (ODS).

CFCs, Not Included

HCFCs, Not Included

Halons, Not Included

Methyl Bromide, Not Included

CCI<sub>4</sub>, Not Included

1,1,1-trichloroethane, Not Included

HBFCs, Not Included

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

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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 has 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 VM0047 Version 1.1 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 VM0047 Version 1.1, May 14, 2025, 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 VM0047 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-Specific 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 an afforestation, reforestation and revegetation (ARR) project. It does not include **Reduced Emissions from Deforestation and Degradation (REDD)**, **Improved Forest Management (IFM)**, **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 has been implemented according to the project design and there are 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 ARR which the reassessment of the baseline is not stipulated in VCS 4.7 and the project will reassess the baseline every years according to the VCS methodology 0047.**

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 ARR (A1.1)**

VCS A1.1 Eligible ARR activities are those that increase carbon sequestration and/or reduce GHG emissions by establishing, increasing, or restoring vegetative cover (forest or non-forest) through the planting, sowing, or human-assisted natural regeneration of woody vegetation. Eligible ARR projects may include timber harvesting in their management plan.

Note – Tree planting activities on forest lands managed for wood products (i.e., with a forest management plan) are categorized as IFM project activities.

**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.**

**The WSRAFP Project is an afforestation, reforestation and revegetation (ARR) project and complied the VCS A1.1.**

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 and PAA3, all three are eligible under ARR.

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.

WSRAFP submitted: 2025 October 1

Public comment period: TBD

Public comment expiration date: TBD

The current applied methodology is VCS methodology VM0047

VVB on site validation: TBD.

The project was submitted on 2025 October 1, 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 \(VCS, 3.7; CCB, G1.1\)](#)

Table 5. Project Proponent

<b>Organization name</b>	Asia Assets Developments Co., Ltd.
<b>Contact person</b>	Alex Chi
<b>Title</b>	Managing Director

<b>Address</b>	7F-8, No. 738 Zhongzheng Rd., Zhonghe Dist., New Taipei City 23511, Taiwan (R.O.C.)
<b>Telephone</b>	+886-2-82269177
<b>Email</b>	<a href="mailto:chi@asiaassetsdev.com">chi@asiaassetsdev.com</a>

<b>Organization name</b>	Forward Intelligence Energy Co., Ltd.
<b>Contact person</b>	Chi-Chong Hong. MD.,MPH.,MHSc
<b>Title</b>	Chairman
<b>Address</b>	No. 393 Sec. 1, Zhongzheng Rd., Sanxia Dist., New Taipei City, Taiwan (R.O.C.)
<b>Telephone</b>	+886-2-33932662
<b>Email</b>	<a href="mailto:c.c.hong@fwd.com.tw">c.c.hong@fwd.com.tw</a>

<b>Organization name</b>	PT Asia Pasifik Asset Percayaan
<b>Contact person</b>	Riyan Kumiawan
<b>Title</b>	Director
<b>Address</b>	Gallery Niaga Mediterania II Blok N8 N-O-P Pantai Indah Kapuk, Jakarta Utara 14460 Indonesia 62-21-392-4568
<b>Telephone</b>	62-21-392-4568
<b>Email</b>	<a href="mailto:pati52030@gmail.com">pati52030@gmail.com</a>

## 2.1.8 Other Entities Involved in the Project

Table 6. Other Entity

<b>Organization name</b>	Sinetics Accreditation International Taiwan Ltd.
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<b>Role in the project</b>	Technical Advisor
<b>Contact person</b>	Kai-Hsien Chen. Ph. D.
<b>Title</b>	President
<b>Address</b>	4F.-6, No. 736, Zhongzheng Rd., Zhonghe Dist., New Taipei City 23511, Taiwan (R.O.C.)
<b>Telephone</b>	+886-2-82269498
<b>Email</b>	<a href="mailto:kaic@sinetics.com.tw">kaic@sinetics.com.tw</a>

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

#### Conditions Prior to Project Initiation:

The West Seram Rastoration and Advanced ForestWise Project (WSRAFP) officially commenced on **1 March, 2025**. The project area comprises 40 adjacent Community/Village/Social forestry permits located in West Maluku Regency, Maluku Province, Indonesia, totaling approximately **37,875 hectares**:

- 1 Mamuna 1,373 Ha permit number SK.10033/MENLHK-PSKL/PKPS/PSL.0/12/2019 tanggal 09 Desember 2019
- 2 Tawena Siwa 131 Ha permit number SK.10039/MENLHK-PSKL/PKPS/PSL.0/12/2019 tanggal 09 Desember 2019
- 3 Gunung Mai 2,545 Ha permit number SK.10043/MENLHK-PSKL/PKPS/PSL.0/12/2019 tanggal 09 Desember 2019
- 4 Seke 1,748 Ha permit number SK.10045/MENLHK-PSKL/PKPS/PSL.0/12/2019 tanggal 09 Desember 2019
- 5 Piaseleng 1,431 Ha permit number SK.10118/MENLHK-PSKL/PKPS/PSL.0/12/2019 tanggal 16 Desember 2019
- 6 Rumahkay 1010 Ha permit number SK.10491/MENLHK-PSKL/PKPS/PSL.0/12/2019 tanggal 27 Desember 2019

- 7 Wapulane 224 Ha permit number SK.10546/MENLHK-PSKL/PKPS/PSL.0/12/2019 tanggal 27 Desember 2019
- 8 Agatis 522 Ha permit number SK.10595/MENLHK-PSKL/PKPS/PSL.0/10/2018 tanggal 30 Desember 2019
- 9 Seriholo 1404 Ha permit number SK.110/MENLHK-PSKL/PKPS/PSL.0/1/2018 tanggal 18 Januari 2018
- 10 Lumahpelu 1622 Ha permit number SK.1284/MENLHK-PSKL/PKPS/PSL.0/3/2018 tanggal 27 Maret 2018
- 11 Sumeith Pasinaro 353 Ha permit number SK.2834/MENLHK-PSKL/PKPS/PSL.0/5/2018 tanggal 7 Mei 2018
- 12 Kamal 692 Ha permit number SK.4984/MENLHK-PSKL/PKPS/PSL.0/6/2022 tanggal 6 Juni 2022
- 13 Niwelehu 925 Ha permit number SK.5107/MENLHK-PSKL/PKPS/PSL.0/6/2022 tanggal 13 Juni 2022
- 14 Murnaten 922 Ha permit number SK.5108/MENLHK-PSKL/PKPS/PSL.0/6/2022 tanggal 13 Juni 2022
- 15 Makububui 908 Ha permit number SK.5155/MENLHK-PSKL/PKPS/PSL.0/6/2022 tanggal 13 Juni 2022
- 16 Negeri Waraloin 665 Ha permit number SK.5915/MENLHK-PSKL/PKPS/PSL.0/9/2018 tanggal 14 September 2018
- 17 Warawa 224 Ha permit number SK.5956/MENLHK-PSKL/PKPS/PSL.0/9/2018 tanggal 19 September 2018
- 18 Laharoi 325 Ha permit number SK.5962/MENLHK-PSKL/PKPS/PSL.0/9/2018 tanggal 19 September 2018
- 19 Nusa Kamu 2000 Ha permit number SK.6191/MENLHK-PSKL/PKPS/PSL.0/7/2019 tanggal 09 Juli 2019
- 20 Maju Bersama 1847 Ha permit number SK.6235/MENLHK-PSKL/PKPS/PSL.0/7/2019 tanggal 11 Juli 2019

- 21 Wasilaine 219 Ha permit number SK.6509/MENLHK-  
PSKL/PKPS/PSL.0/10/2018 tanggal 2 Oktober 2018
- 22 Matasual 172 Ha permit number SK.6651/MENLHK-  
PSKL/PKPS/PSL.0/10/2018 tanggal 5 Oktober 2018
- 23 Sohuwe 670 Ha permit number SK.6662/MENLHK-  
PSKL/PKPS/PSL.0/12/2017 tanggal 7 Desember 2017
- 24 Laturake 477 Ha permit number SK.6690/MENLHK-  
PSKL/PKPS/PSL.0/12/2017 tanggal 11 Desember 2017
- 25 Kasieh 2170 Ha permit number SK.6692/MENLHK-  
PSKL/PKPS/PSL.0/12/2017 tanggal 11 \Desember 2017
- 26 Lumahlatal 1068 Ha permit number SK.6727/MENLHK-  
PSKL/PKPS/PSL.0/12/2017 tanggal 13 Desember 2017
- 27 Ariate 1,060 Ha permit number SK.687/MENLHK-  
PSKL/PKPS/PSL.0/2/2018 tanggal 13 Februari 2018
- 28 Buria 1038 Ha permit number SK.6999/MENLHK-  
PSKL/PKPS/PSL.0/12/2017 tanggal 29 Desember 2017
- 29 Telepipi 1,963 Ha permit number SK.7829/MENLHK-  
PSKL/PKPS/PSL.0/10/2018 tanggal 29 Oktober 2018
- 30 Kawanenu 696 Ha permit number SK.7835/MENLHK-  
PSKL/PKPS/PSL.0/10/2018 tanggal 29 Oktober 2018
- 31 Rambatu 687 Ha permit number SK.7892/MENLHK-  
PSKL/PKPS/PSL.0/10/2018 tanggal 31 Oktober 2018
- 32 Soribang 646 Ha permit number SK.7894/MENLHK-  
PSKL/PKPS/PSL.0/10/2018 tanggal 31 Oktober 2018
- 33 Mosole 593 Ha permit number SK.7895/MENLHK-  
PSKL/PKPS/PSL.0/10/2018 tanggal 31 Oktober 2018
- 34 Liwa-liwa 141 Ha permit number SK.7944/MENLHK-  
PSKL/PKPS/PSL.0/11/2018 tanggal 5 November 2018

- 35 Tibua 1,588 Ha permit number SK.7991/MENLHK-PSKL/PKPS/PSL.0/11/2018 tanggal 7 November 2018
- 36 Latalelak 797 Ha permit number SK.8323/MENLHK-PSKL/PKPS/PSL.0/12/2018 tanggal 03 Desember 2018
- 37 Nunul 867 Ha permit number SK.9203/MENLHK-PSKL/PKPS/PSL.0/12/2018 tanggal 31 Desember 2018
- 38 Eti 483 Ha permit number SK.9355/MENLHK-PSKL/PKPS/PSL.0/11/2019 tanggal 25 November 2019
- 39 Solohua 978 Ha permit number SK.9590/MENLHK-PSKL/PKPS/PSL.0/11/2019 tanggal 14 November 2019
- 40 Potohitu 100 Ha permit number SK.9591/MENLHK-PSKL/PKPS/PSL.0/11/2019 tanggal 14 November 2019

**Combined Baseline Activity:** Prior to AAD securing rights and initiating the WSRAFP project, the combined project area (~37,875 ha) faced a credible, legally sanctioned baseline scenario involving silverculture with annual unplanned logging/deforestation activities across the project zone, 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)

Table 7. Project Start Date

<b>Project start date</b>	1-March-2025
<b>Justification</b>	<p>Project Accounting Area start at the date 1 day after as 28 February 2025 per AAD signed an agreement with 40 entity of Community//Social Forest permits.</p> <p>VCS Standard v4.7 (Section 3.8) and CCB Standards v3.1 (G1.9): The project start date of an AFOLU project is the date on which</p>

<b>Crediting period</b>	<p>activities that lead to the generation of reductions or removals are implemented (e.g., preparing land for seeding, planting, changing agricultural or forestry practices, rewetting, restoring hydrological functions, or implementing management or protection plans).</p> <p>VCS Standard v4.7 (Section 3.8.2): Pipeline listing process shall be initiated within three years of the project start date.</p> <p>VCS Standard v4.7 (Section 3.8.3): Validation will be completed within eight years of the project start date.</p> <p>VM0047 v1.1 (Section 4.1(4)): The project start date is documented as the earliest of the following: a) The date on which site preparation activities began; b) <b>The land use change date</b></p>
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### 2.1.11 Benefits Assessment and Project Crediting Period (VCS, 3.9; CCB, G1.9)

Table 8. Crediting Period

<b>Crediting period</b>	The project lifetime will be 30 years from the Project start date of 1-March-2025 and an end date of 28 Febuary, 2055 The GHG accounting period will be the same 30 years as the lifetime of the project
<b>Start date of first or fixed crediting period</b>	1-March-2025 to 28-February-2055 (30 Years)
<b>CCB benefits assessment period</b>	1-March-2025 to 28-February-2055 (30 Years)

### 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 WSRAFP. The project lifetime will be

30 years commencing from 1st March 2025 to 28 February 2055 The GHG accounting period will be the same 30 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<sub>2</sub>e/year (project)
- ≥ 300,000 tCO<sub>2</sub>e/year (large project)

Table 8. Project Scale

Calendar year of crediting period	Estimated reductions (tCO <sub>2</sub> e)	Estimated removals (tCO <sub>2</sub> e)
01-March-2025 to 31-December-2025	0	347
01-January-2026 to 31-December-2026	0	5,232
01-January-2027 to 31-December-2027	0	28,588
01-January-2028 to 31-December-2028	0	80,568
01-January-2029 to 31-December-2029	0	169,073
01-January-2030 to 31-December-2030	0	294,152
01-January-2031 to 31-December-2031	0	443,930
01-January-2032 to 31-December-2032	0	615,290
01-January-2033 to 31-December-2033	0	805,452
01-January-2034 to 31-December-2034	0	967,063
01-January-2035 to 31-December-2035	0	1,131,479
01-January-2036 to 31-December-2036	0	1,239,386
01-January-2038 to 31-December-2038	0	1,338,821
01-January-2039 to 31-December-2039	0	1,391,109
01-January-2040 to 31-December-2040	0	1,444,230

01-January-2041 to 31-December-2041	0	1,433,882
01-January-2042 to 31-December-2042	0	1,464,103
01-January-2043 to 31-December-2043	0	1,401,838
01-January-2044 to 31-December-2044	0	1,385,125
01-January-2045 to 31-December-2045	0	1,355,113
01-January-2046 to 31-December-2046	0	1,327,783
01-January-2047 to 31-December-2047	0	1,320,079
01-January-2048 to 31-December-2048	0	1,322,049
01-January-2049 to 31-December-2049	0	1,320,316
01-January-2050 to 31-December-2050	0	1,265,179
01-January-2051 to 31-December-2051	0	1,251,239
01-January-2052 to 31-December-2052	0	1,233,824
01-January-2053 to 31-December-2053	0	1,221,388
01-January-2054 to 31-December-2054	0	1,256,410
01-January-2055 to 28-February-2055	0	215,303
Total number of years	30	30,171,291
Average annual ERRs		1,005,710

#### 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 WSRAFP project zone is located in West 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 40 community/village/social forests on the main land of the West 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.

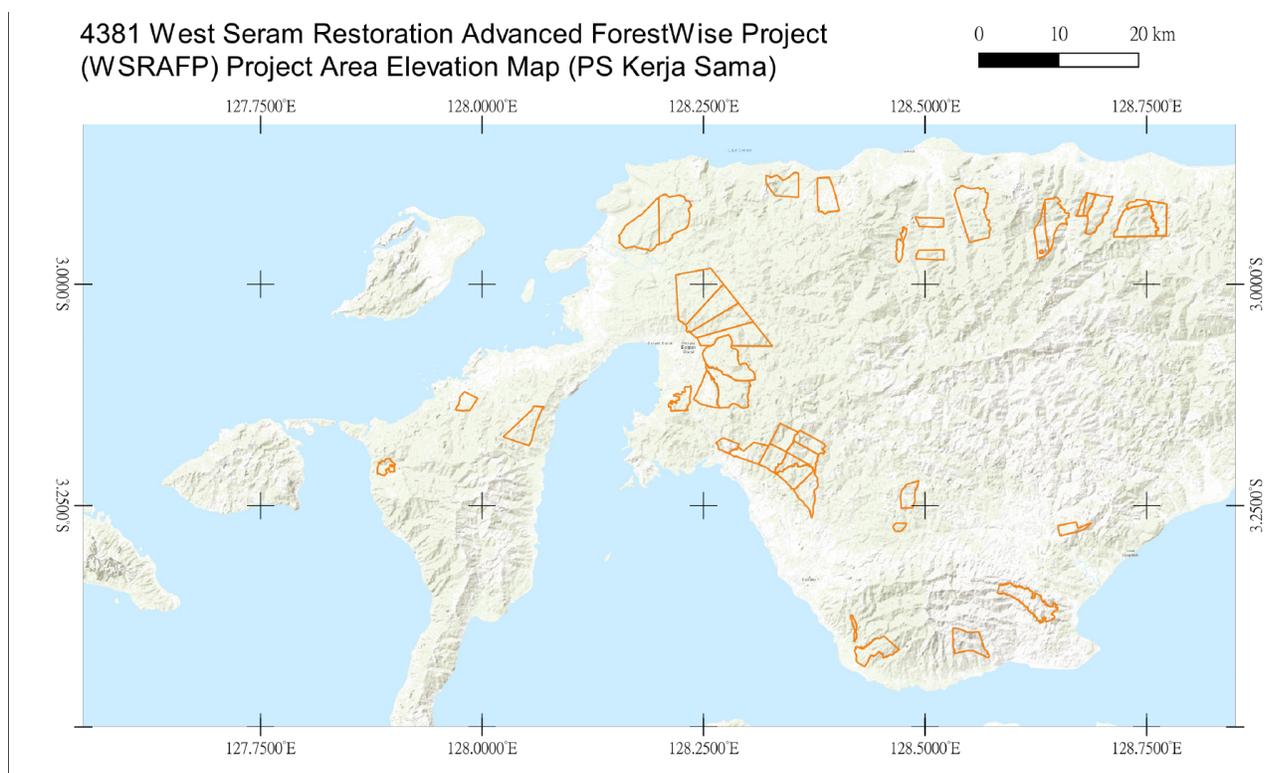


Figure 1. Map of the elevation within the project

**Slope**

Based on land slope class, the working area of WSRAFP have land with a slope level of mostly slow slopes (5-40%) covering an area of ± 37,875 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 West Seram.

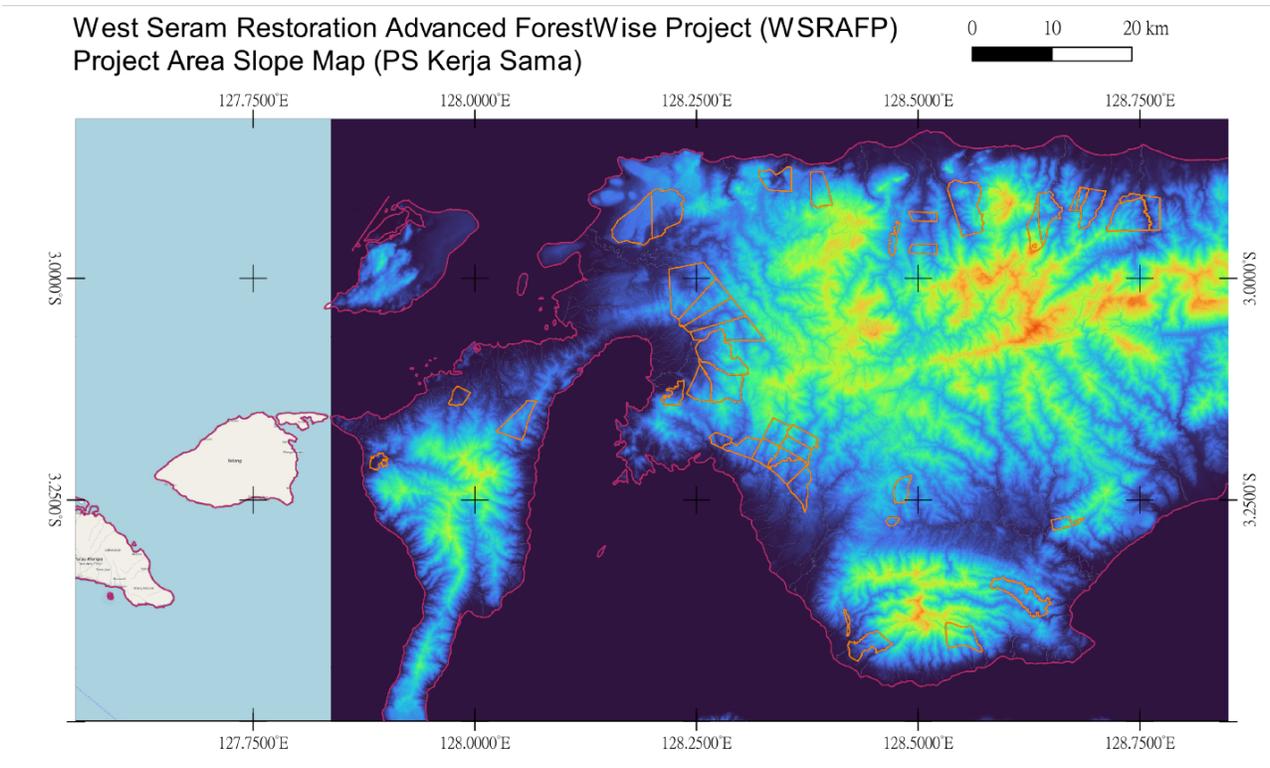


Figure 2. Map of the slope within the project

## Soils

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-Hapludalfs. 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 West Seram Regency consists of: on type organosol, alluvial, rendzina, grumusol, podzolic and soil complex. (Appendix A5. 2022 Soil Classification Map, West Seram, Indonesia)

Figure 3. Map of the Soil Type within the project

### Climate

West 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.).

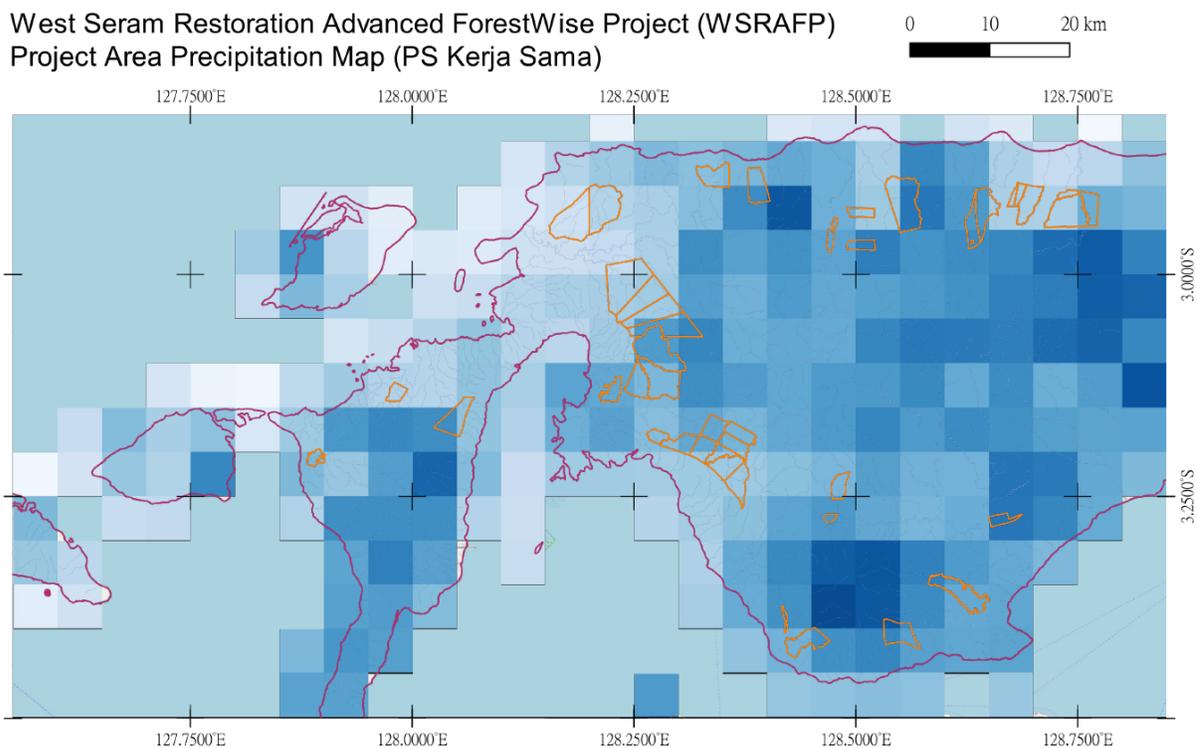


Figure 4. Climate Map within the project

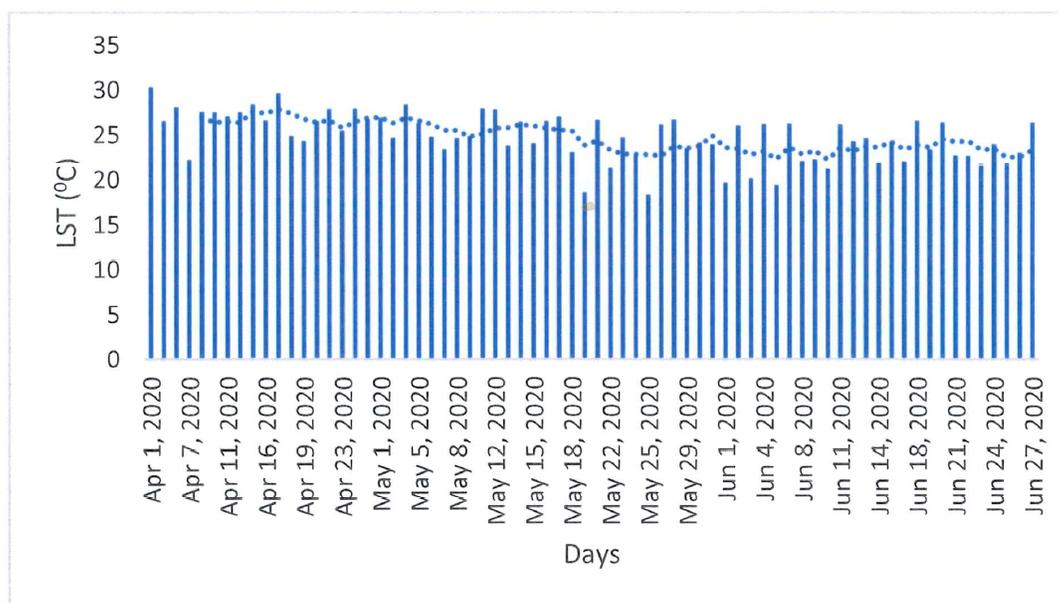


Figure 5: Temperature profile of West Seram from 1 April 2020 to 27 June 2020 (from Technical Report 1. Biophysical Report. (47.)

West Seram Restoration Advanced ForestWise Project (WSRAFP)  
Project Area Land Surface Temperature Map (PS Kerja Sama)

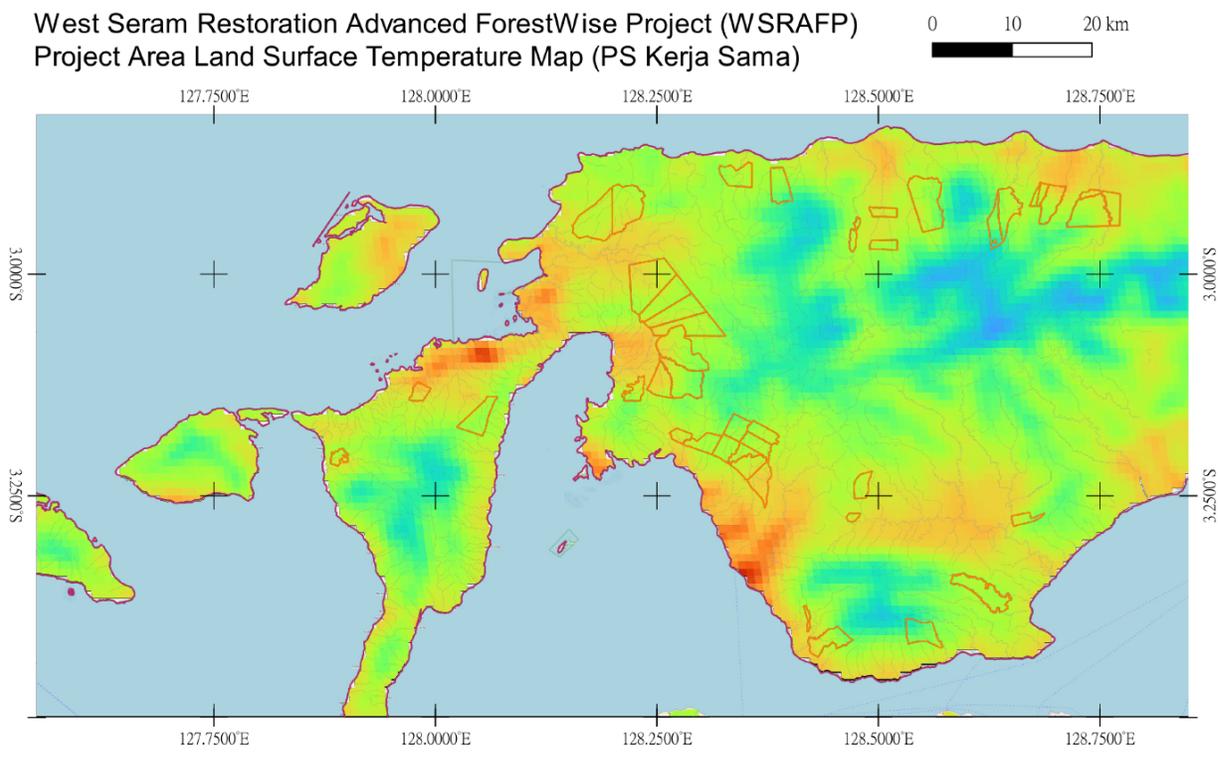


Figure 6. Map of the average Land Surface Temperature within Project Area.

Average Temperature: Approximately 26.8°C annually.

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

### Watershed

Based on the boundaries of the Watershed (DAS), the working area of West Seram main land Wae Kawa is included as one of the upstream buffers of the watershed with rivers found in the management area, especially Wae Rutung which flows throughout the year and as a separator / boundary marker (nature). between Negeri Waai and Tulehu, then Wae Yare, Wae/Aer Sikula, Wae Sikabiri also flow throughout the year. In the upstream part, the water discharge is abundant and decreasing towards the downstream/estuary of the river because the topography is getting sloping and the density of forest stands is decreasing. This includes the Wae One, Wae Lapia, Wae Marake Wae Oma watersheds in P. Haruku.

Cartographically, the West Seram main land area is located in the upper and middle parts of the Watershed (DAS). The characteristics/profile of the river are: steps, steep slope with rock main material, there are rapids/waterfalls, frequent erosion of rivers and V-shaped valleys and heavy water flows with deep surfaces. By looking at the steep to very steep topography, the river and its river branches resemble the structure of trees, the river flow pattern in the KPHL area is categorized as a dendritic flow pattern. (Appendix A4. 2022 Watershed Map, KPHP Unit IV, Seram, Indonesia)

In terms of water source, the river in the West Seram main land area is a spring, that is, a river that draws water from a spring. From the pattern point of view, the river flow pattern in the West Seram main land area generally has a dendritic river flow pattern, that is, branch-like, irregular branches, and river flow patterns in different directions and angles.

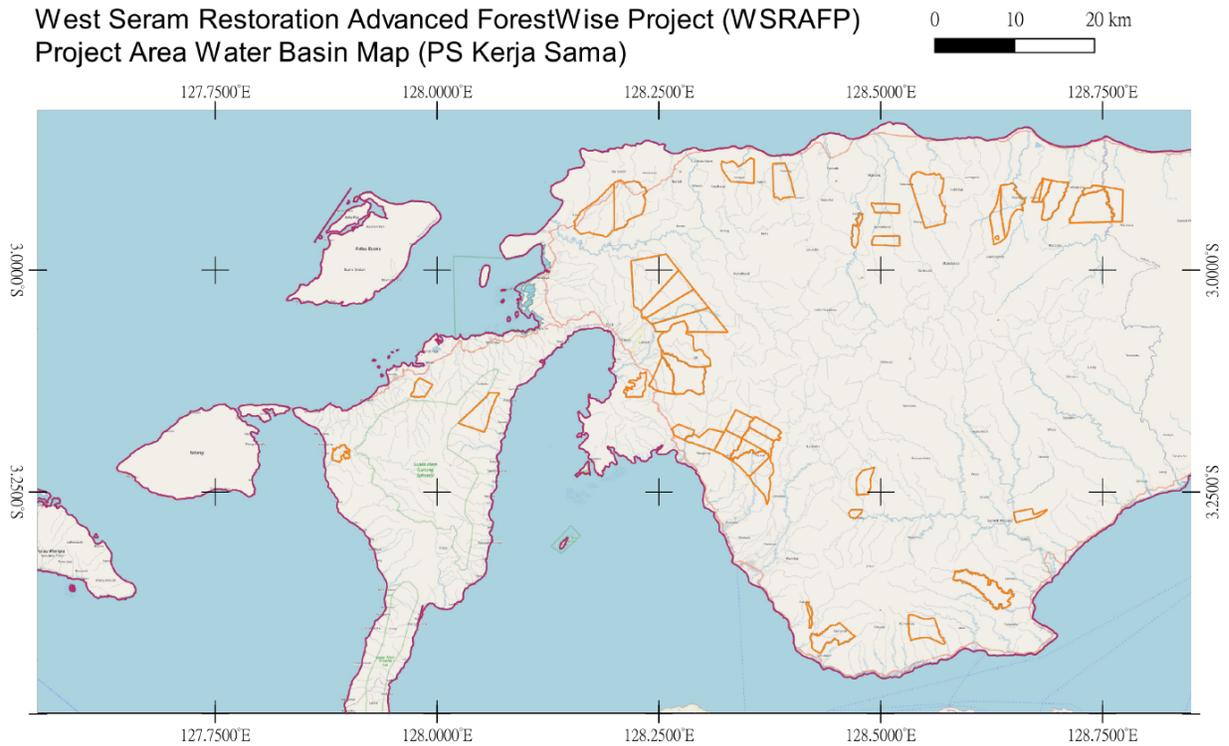


Figure 7. Map of the Water Basin within Project Area

### 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 300 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 Schmidt-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.

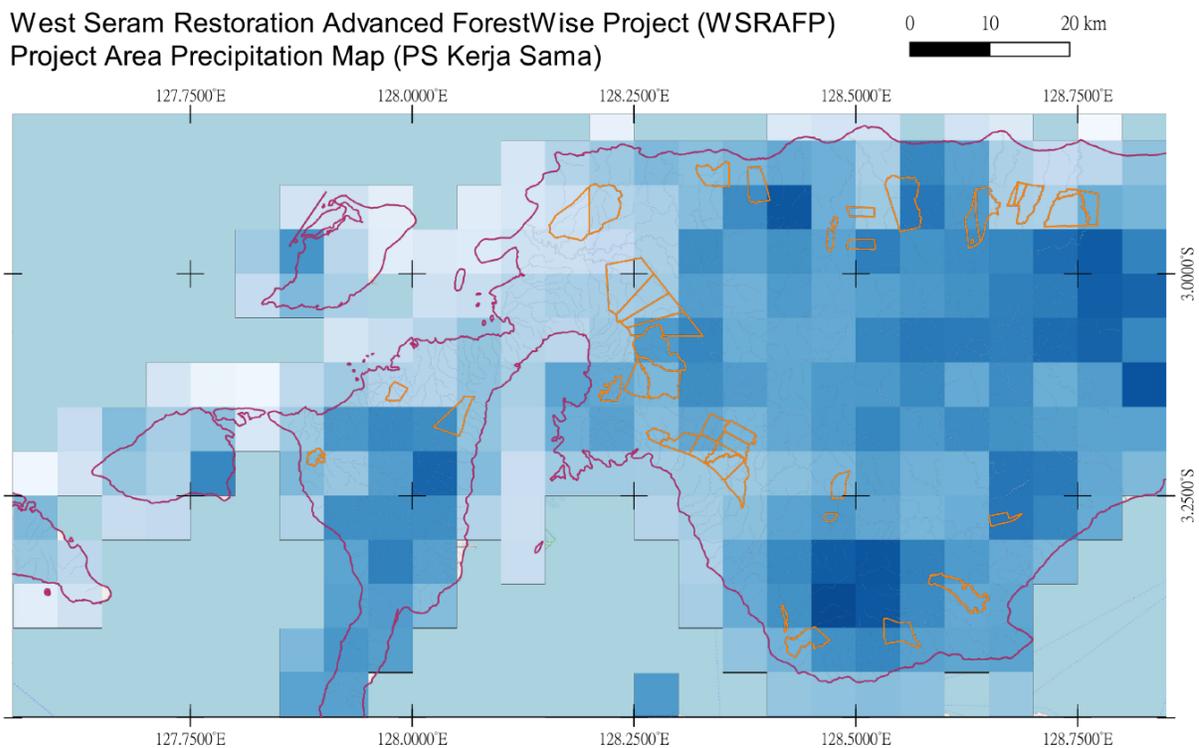


Figure 8. Precipitation Map within Project Area

### 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 40 community/village/social forest work area are dominated by forested areas, land cover conditions consist of Primary forest, secondary forest, savanna, secondary farming and non-forests and covered by clouds. Detailed land cover conditions are presented in Table 1 below.

Table 9: Vegetation Land Cover Types of the West Seram ARR Project.

No	Land Cover Class	Amount	
		Ha	%
1	Primary Dry Land Forest	385.00	1.02%
2	Secondary Dry Land Forest	31,745.00	83.82%
3	Savanna	4,503.30	11.89%
4	Non-Forest	2,212.00	5.31%
Total area		37,875.00	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 9. Vegetation Density Map within Project Area

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

##### **Communities and main settlements**

There are 10 counties Amalatu, Elpaputih, Huamual, Huamual Belakang, Huamual Belakang, Inamosol, Inamosol, Kairatu, Kairatu, Kairatu Barat, Seram Barat, Taniwel and Taniwel Timur bordering the WSRAFP with of 28 villages and with a population of 128,946 were included to define the Project zone. Most villages in Maluku, including those in West 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 West 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 28 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:**

West 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)<sup>15</sup> of Indonesia, the average monthly income per capita in West 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 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 Project Zone there are 8 clinics/hospitals with 47 doctors/medical workers and 300 nursing workers. This represents that every 3,926 persons could have one clinic/hospital and out of 28 villages there will be 11 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 like Peru, Eti, Kawa, Ariate, Lokki have reservoir for water supply and basic piping system. Most village rely on groundwater, surface water, and rainwater. The use of clean water is not only limited to household needs, but also for public, social and economic facilities. In some villages, in the process of taking water, people usually use buckets and jeregen from shelters with varying

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

distances ranging from 100 m to 500 meter using carts. In one SBIA meeting, a lady expressed an urgent need for clean water supply because after rain, the water source become very turbid to use. 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 WSRAFP with a strong emphasis on training and capacity building in rural communities.

Understanding the educational background of community members in WSRAFP 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 Project Zone community, there are 176 elementary schools with 13,111 students/1967 teachers, 100 junior middle schools with 9534 students/1206 teachers, 71 high schools with 8203 students/921 teachers in the Project zone. There is no continuous education yet.

The Employment Diagnostic Analysis in Maluku by the International Labour Organization (ILO)<sup>16</sup> 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.
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 West Seram Region, Maluku Province, Indonesia of total area of 37,875 ha, and geographical coordination is -2.8749 ~ -3.4324 S, 127.88214 ~128.7731 E.

The Project zone contain 28 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).

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<sup>16</sup> <https://www.ilo.org/media/335446/download>

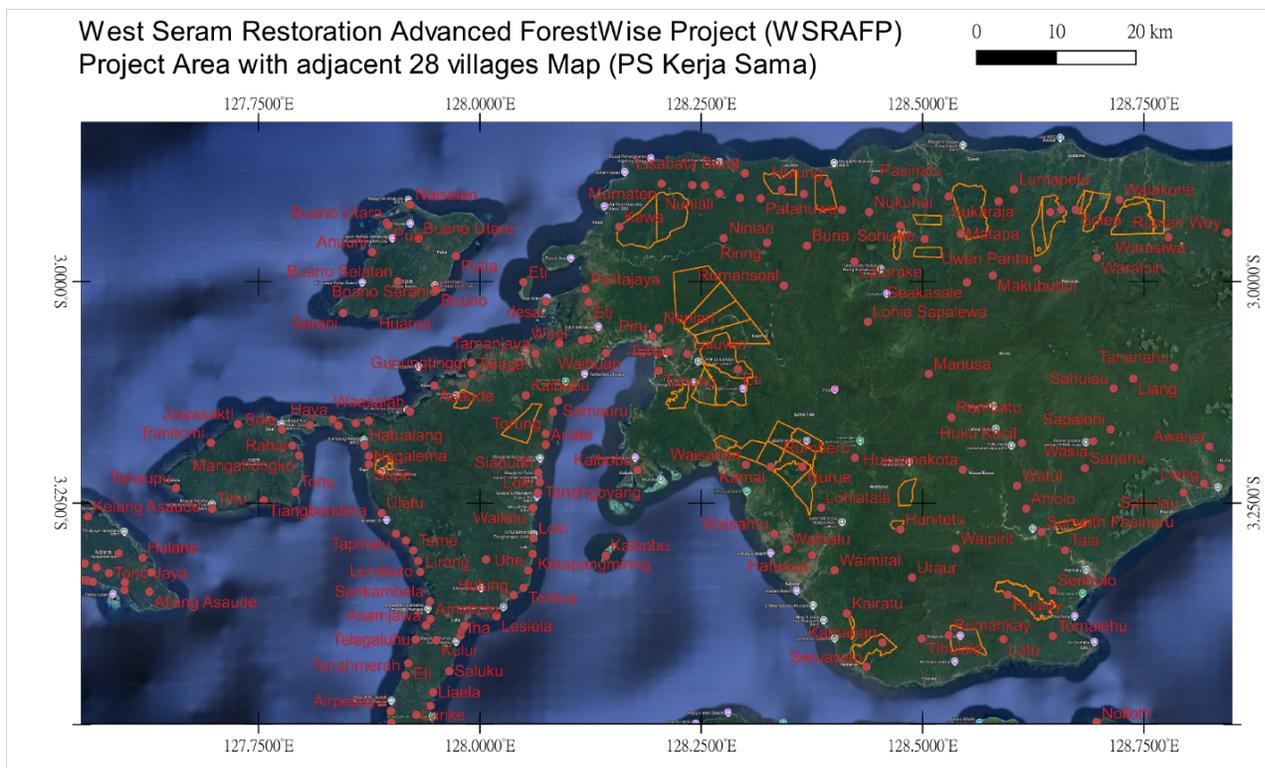


Figure 10: 28 villages around the PAA1 BLM and PAA2 GES2.

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

Table 10. Project Activities description and output, outcome and impact

Activity description	Expected climate, community, and/or biodiversity			Relevance to project's objectives
	Outputs (short term)	Outcomes (medium term)	Impacts (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 ARR activities of 30,171,291 tCO2e in crediting period from 1st March 2025 to 28 February 2055
Build a stronger enforcement of the law	Training the community for	A participatory forest protection team	The PA is well protected and managed in a	Build and maintain the Law enforcement

infrastructure and consensus by local authorities and cooperative.	enforcement of the law	with law enforcement is built for eco-protection across the PA.	comprehensive way. Deforestation, degradation and encroachment in the PA is eliminated/reduced.	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 28 villages is directly improved. Confidence of the project fortified.	Improved Community Livelihoods of 28 villages
Established solar panel systems for 28 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 28 villages to re-enforce confidence in the project.	The wellbeing of all 28 villages is directly improved. Confidence of the project fortified.	Improved Community Livelihoods of affordable clean energy in 28 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 28 villages to re-enforce confidence in the project.	The wellbeing of all 28 villages is directly improved. Confidence of the project fortified.	Improved Community Livelihoods of affordable clean energy in 28 villages
Improved Healthcare by Mobile dental service by AAD.	Build a mobile dental/oral health service system.	Construct a school bases dental/oral service and education system	The overall dental/oral health improvement from school to community.	Improved Community Livelihoods of 28 villages.
Training and employment in income generating activities by AAD, Cooperative and Technical Experts.	Build SIGS Sustainable Income Generation Scheme and training	Build 40 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 40 Sustainable Income Generation Groups (SIGG), Creating local foods in meat/egg and milk with 40 SIGG,

Training and employment in income generating activities by AAD, Cooperative and Technical Experts	Build New SIGS training on other NTFP,	Add on 40 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 40 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 West Seram ARR 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 11: Summary of Project SDG contributions.

SDG number	Contribution description	Estimated Contribution by the End of Project Lifetime	Project Target	SDG Target	SDG Indicators
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SDG 1 <b>No Poverty</b>	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 micro-finance <sup>17</sup> 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 <b>Zero Hunger</b>	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.
SDG 3 <b>Good Health and Well-Being</b>	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 28 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.

<sup>17</sup> 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 4 <b>Quality Education</b>	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 <b>Gender Equality</b>	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 <b>Clean Water and Sanitation</b>	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 <b>Affordable and clean energy</b>	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 <b>Decent Work and Economic Growth</b>	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	8.9.1 Tourism direct GDP as a proportion of total GDP and in growth rate
SDG 9 <b>Industry, Innovation and Infrastructure</b>	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	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

	is located withing PA but not within PAAs.			
SDG 13 <b>Climate Action</b>	Integrate climate change measures into national policies, strategies and planning	ARR: 37,875 Ha of Project Accounting Area and estimated reduction of 30,171,291 tCO2e in 30 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 <b>Life on Land</b>	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.	40 site will be restoration site for agarwood endangered species. Protect the 37,875 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 <i>Aquilaria malaccensis</i> (CR), <i>Aquilaria hirta</i> (VU), <i>Aquilaria cumingiana</i> (VU), <i>Aquilaria filaria</i> (VU), and <i>Gyrinops decipiens</i> (EN), <i>Gyrinops salicifolia</i> (EN), <i>Gyrinops moluccana</i> (EN), <i>Gyrinops versteegii</i> (VU), <i>Shorea selanica</i> (CR) and <i>Shorea montigena</i> (CR).	15.5	15.5.1 Red List Index
SDG 17 <b>Partnerships for the Goals</b>	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 11: The Implementation schedule for the West Seram ARR Project, showing key dates and milestones for the Project.

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

Table 12. Project Risk

Identified Risk	Potential impact of risk on climate, community and/or biodiversity benefits	Actions needed and designed to mitigate the risk
Human induced risks	<p><b>1. Illegal Logging and Charcoal Production</b></p> <p>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 WSRAFP Project Accounting Area and pose a</p>	<p>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 WSRAFP therefore provides financial, political and human</p>

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 <sup>3</sup> )	Veneer (m <sup>3</sup> )	Sawn Timber(m <sup>3</sup> )
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 m<sup>3</sup>. 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

capacity support to maintain and enhance law 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	147.26	m <sup>3</sup>	SBT
2021	Agarwood	1920	kg	
2019	Dipterocarpaceae and mix	205.9	m <sup>3</sup>	Maluku Tengah
2020	Dipterocarpaceae and mix	400	m <sup>3</sup>	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 WSRAFP 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 WSRAFP 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.

	<p><b>3. Anthropogenic Fires</b></p> <p>Another human induced threat is frequent fires; these can occur 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.</p>	<p>WSRAFP staff monitor the Project Accounting Area for the occurrence of fire, and work to reduce the risk of 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.</p> <p>The AAD has a Forest Patrol team in place which incorporates local Forestry Patrol jointly with Community watch-post Patrol Assistance in this project.</p>
<p>Natural Risks</p>	<p>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.</p> <p>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</p>	<p>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.</p> <p>The AAD has a Forest Patrol team in place which incorporates local Forestry Patrol jointly with Community watch-post Patrol Assistance in this project.</p>

	<p>forests the risk of erosion or landslides is minimized. The risk of 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.</p>	
<p>Political Risks</p>	<p>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, these two possibilities have been stopped because of the WSRAFP. 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 West Seram Forest Management Unit is one of the Proponent.</p>	<p>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.</p> <p>As a highly visible international ARR project, the likelihood that the Maluku Provincial Government would allow the WSRAFP 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.</p>
<p>Policy risks</p>	<p><b>1. Risk of reversal</b></p> <p>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.</p>	<p>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.</p>

		<p>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.</p>
	<p><b>2. Insufficient Revenues</b></p> <p>The majority of ARR 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.</p>	<p>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 WEST 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.</p>

### 2.1.21 Benefit Permanence (CCB, G1.11)

The WSRAFP 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 WSRAFP 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 WSRAFP 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 West Seram Rastoration and Advanced ForestWise Project (WSRAFP) 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 WSRAFP 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 West Seram Rastoration and Advanced ForestWise Project (WSRAFP) officially commenced on 1 March, 2025. The project area comprises 40 Community/Village/Social forestry permits located in West Seram Regency, Maluku Province, Indonesia, totaling approximately **37,875 hectares**:

- **PAA1: 2,374 Ha**
- **PAA2: 4,962 Ha**
- **PAA3: 30,538Ha**

**Combined Baseline Activity:** Prior to AAD securing rights and initiating the WSRAFP project, the combined project area (~37,875 ha) faced a un-projected Social Forestry condition with no Afforestation, Reforestation and Revegetaion program and facing the risks of uncontrolled degradation.

These 40 Community/Village/Social 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 Social Forestry as the primary objective under Indonesian law prior to this project's intervention..

**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 West Seram.

**Historical Context & Land Use:** The se 40 permits have been subject to be Social Forestry permits from 2018. 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.

**Project Intent:** The WSRAFP project, involving AAD securing management rights and implementing ARR conservation activities from 1 March 2025 onwards, was explicitly designed to halt unplanned deforestation and prevent further degradation, not to generate emissions for subsequent reduction.

### 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 ±37,875 ha project area.

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

#### **Land Use Scenarios Without the Project:**

In the absence of the WSRAFP project intervention, the following land-use scenarios were considered plausible for the project area:

1. **Degradation from Uncontrolled Activities:** A lapse in active management leads to increased illegal logging, agricultural encroachment, and potential fires, degrading the forest stock.
2. **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.
3. **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 (Afforestation, Reforestation and Revegetation ARR) represents the most credible baseline scenario.

1. **Barriers to Alternative Scenarios:** Other potential scenarios are significantly less likely:
  - **Conservation without Carbon Finance:** Implementing effective, large-scale conservation across ±37,875 ha of social forest presents prohibitive

financial barriers for local community and villages. 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 credibly operational plans, the demonstrated history of unplanned deforestation activity, the clear economic incentives for timber extraction, and the significant financial and regulatory barriers associated with alternative conservation or conversion scenarios, the continuation of undeveloped Social Forestry system represents the most credible, well-documented, and justifiable baseline scenario for the project area in the absence of the WSRAFP 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 West Seram Rastoration and Advanced ForestWise Project (WSRAFP) are demonstrably additional and would not occur under the baseline scenario of continued unplanned deforestation/degradation across the ~37,875 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 current scenario (Section 2.2.1), community engagement by the 40

community/Village/Social Forestry 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 40 social forestry permits, provides **no inherent incentive or established mechanism** for the permits holder to invest significantly in diversifying local economies towards sustainability, enhancing climate resilience for vulnerable farmers and fishers, or promoting community-led enterprises.

The WSRAFP 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 unplanned deforestation/degradation in the baseline, 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 Social Forestry conservation. While environmental regulations exist, there is **no mandate or financial driver for the permit holder to proactively manage for biodiversity conservation**, implement targeted species recovery actions, or conduct comprehensive biodiversity monitoring across the large production landscape.

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

1. **Preventing Planned Habitat Degradation:** The core additionality is **ARR** across ~37,875 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 WSRAFP 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 West Seram Rastoration and Advanced ForestWise Project (WSRAFP) 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 40 Community/Village/Social Forestry and regional administrative data. This identified the sub-districts and villages situated adjacent to or potentially overlapping with the concession areas. Relevant legal and planning documents (Permits, 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 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 13: Participants to the WSRAFP SBIA/PRA workshop and the institutions they represented

Stakeholder	Institution/ Responsible Person	#
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		Representatives
<b>Provincial Government of Indonesia</b>	Director General, Forestry Bureau, Maluku Province.	1
	Director, West Regency, Forestry Bureau, Maluku Province.	1
	Director, East Regency, Forestry Bureau, Maluku Province.	1
<b>Communities</b>	Village Chief	4
	Customary community Leader	4
	Village Representatives	58
<b>Academia</b>	Bogor Agricultural University	1
<b>Proponent</b>	AAD WSRAFP 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 West Seram Regency:  
 The total estimated population across these **28 villages** is approximately **128,976**. Average monthly incomes vary by sub-district, ranging from approx. **1,161,342 RP** to **1,326,016 RP** with an overall weighted average of approx. **1,200,000 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, (Further details in Section 4.1).
- **Indigenous Peoples (IP):** Specifically, the people residing in Kamarian and Morekau. 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 14: Communities included in the Project Accounting Area for the WSRAFP

N°	County	Village	Average Income (RP)	Total population
1	Amalatu	Rumahkay, Seriholo	1,300,000	19,727
2	Elpaputih	Sumeith Pasinaro	1,100,000	5,045
3	Huamual	Ariate	1,300,000	1,164
4	Huamual Belakang	Alang Asaude, Waesala	1,218,312	13,164
5	Inamosol	Honitetu	1,218,312	1,419
6	Kairatu	Negeri Kamarian, Negeri Seruawan	1,300,000	1,147
7	Kairatu Barat	Kamal, Lohiatala, Nuruwe, Waisarisa	1,100,000	21,644
8	Seram Barat	Eti, Kawa,, Lumoli, Negeri Morekau	1,300,000	7,443
9	Taniwel	Buria, , Kasieh, Murnaten, Niwelehu	1,300,000	4,429
10	Taniwel Timur	Lumahpelu, Makububui, Matapa, Sohuwe, Uwen Pantai, Waraloin	1,300,000	9,625

Figure 4: Map of the WSRAFP PAA1, PAA2 and PAA3 with 28 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 15: 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](http://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 on **5 November, 2024 and 28 February, 2025** 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/liason 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 40 Community/Village/ Social Forestry, 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).*

Table 16: Stakeholder Engagement

<b>Date of stakeholder consultation</b>	5 November, 2024 and 28 February, 2025
<b>Stakeholder engagement process</b>	<p>The stakeholder engagement process for the WSRAFP project prioritized direct communication and participation, respecting local customs and social structures within the West Seram communities. Key steps included:</p> <p><b>Initial Outreach &amp; Identification:</b> AAD, working with local contacts and partners, identified key community leaders (formal and customary) and representative groups within the villages potentially affected by the 40 Community/Village/Social Forest permit areas (listed in Section 2.3.2).</p> <p><b>Culturally Appropriate Communication:</b> Initial contact and invitations were made through appropriate local channels, respecting village leadership structures. Information was prepared in Bahasa Indonesia.</p> <p><b>Centralized FPIC Consultation Meeting:</b> A significant Free, Prior, and Informed Consent (FPIC) consultation meeting was held on <b>5 November, 2024 and 28 February, 2025</b>. Representatives from the majority of the villages within the project zone (Section 2.3.2) were invited and attended, alongside representatives from AAD, partners, and relevant local authorities.</p> <p><b>Meeting Content &amp; Structure:</b> The meeting included:</p> <ul style="list-style-type: none"> <li>- A clear presentation by AAD on the project's background (transition from current business as usual to ARR with biodiversity conservation), objectives (climate, community, biodiversity), planned activities (forest protection, SIGS, community support programs), anticipated timeline, and the VCS/CCB framework.</li> <li>- Explanation of potential benefits (e.g., employment, livelihood diversification, infrastructure support like water systems), costs (e.g., potential changes in forest access), and risks.</li> <li>- An open discussion and Q&amp;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.</li> <li>- Discussions were conducted respectfully, following local meeting customs where appropriate.</li> </ul> <p>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.</p>
<b>Consultation outcome</b>	<p>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,</p>

	<p>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:</p> <ul style="list-style-type: none"> <li>* Land Tenure &amp; Access: Concerns regarding how project boundaries would interact with customary land use and access rights for farming, hunting, and NTFP collection.</li> <li>* 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.</li> <li>* Benefit Sharing: Desire for transparency and equity in how project benefits (especially financial ones from carbon credits) would be distributed and managed locally.</li> <li>* Participation: Emphasis on the need for continued community involvement in decision-making throughout the project.</li> </ul> <p>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).</p>
<b>Stakeholder input</b>	<p>Community input received during these initial consultations and ongoing dialogue significantly influenced the project design: *</p> <ul style="list-style-type: none"> <li>* 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.</li> <li>• FPIC &amp; Participation: The clear need for community involvement resulted in embedding FPIC as a central process and planning for ongoing participatory mechanisms</li> <li>• Tenure &amp; 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.</li> <li>• 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.</li> </ul>

	<ul style="list-style-type: none"> <li>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.</li> </ul>
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Table 17: 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 WSRAFP 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)

Table 18: Feedback and Grievance Redress Management (FGRM) Procedure

<b>Development process</b>	<p>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, 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.</p> <p>If conflicts or grievances arise, the WSRAFP 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</p>
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	<p>feedback and grievance redress process has been publicized to communities and a copy provided to the project validator.</p> <p>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]</p>
<p><b>Grievance redress procedure</b></p>	<p><b>Process of receiving and hearing:</b> Any comment can be submitted via the following open channel:</p> <ol style="list-style-type: none"> <li>1. AAD’s website at <a href="http://www.asiaassetsdev.com">www.asiaassetsdev.com</a></li> <li>2. West Seram AAD office</li> <li>3. Community leaders and officials also act as a communication channel between PP and the local community.</li> </ol> <p><b>Process of responding and attempting to resolve grievances:</b> 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.</p> <p>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.</p> <p>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.</p>

	<p><b>Stage 3:</b> 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.</p>
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### 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 WSRAFP 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 WSRAFP project's background, objectives (climate, community, biodiversity), and activities (ARR, 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 West 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 WSRAFP 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 West Seram Rastoration and Advanced ForestWise Project (WSRAFP) 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 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 West 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 VM0047 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 – WSRAFP Project Lead**

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

**Dr. Stephen Shen (Shen Shih hung) – Advisor– AAD – WSRAFP 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 – WSRAFP 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 – WSRAFP 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 ARR 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 ARR 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 WSRAFP partners. The WSRAFP 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 West Seram Rastoration and Advanced ForestWise Project (WSRAFP) is designed and implemented in full compliance with all applicable national, provincial (Maluku), and local (West Seram 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 Nuulu 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 (±37,875 ha) is the state-granted forestry permits for Community/Village/Social Forestry, 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.

Table 19. FPIC Process

<b>Description of process for obtaining consent</b>	<p>A formal FPIC process is being implemented, adhering to international best practices and CCB/VCS requirements. Key steps include:</p> <ol style="list-style-type: none"> <li>1) Identification: Identifying all potentially affected communities, IP groups, and customary rights holders (ongoing).</li> <li>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</li> </ol>
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	<p>Bahasa Indonesia (and local facilitation if needed), well in advance of seeking consent.</p> <p>3) Consultation &amp; 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.</p> <p>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).</p> <p>5) Documentation: Maintaining thorough records of all FPIC activities (meetings, attendees, information shared, concerns raised, agreements reached).</p> <p>FPIC is treated as an ongoing process, not a one-off event.</p>
<b>Outcome of FPIC process</b>	<p>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]</p>

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

Table 20. Benefit Sharing Mechanism

<b>Process used to design the benefit sharing plan</b>	<p>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.</p>
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<p><b>Summary of the benefit sharing plan</b></p>	<p>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:</p> <p>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).</p> <p>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.</p> <p>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).</p> <p>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.</p>
<p><b>Approval and dissemination of benefit sharing plan</b></p>	<p>As documented in the contract between AAD and provincial government.</p> <p>The contract is available in the head office of the FMU and Cooperation group.</p> <p>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.</p>

### 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 West 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<sup>2</sup> 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 West 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)

**No leakage is anticipated as there are no agriculture crop production.**

Therefore, leakage emissions due to market effects are considered negligible and are accounted for as zero 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 21: Brief Overview of leakage mitigation strategies in the West Serams ARR Project.

<b>Leakage Management Activity</b>	<b>Description</b>
<b>Improved NTFP Siviculture</b>	Training will be provided to the communities on the methods and best practices involved in conservation siviculture. This program will aim to increase yields on existing community members 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.
<b>Employment of a Ranger Force</b>	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.
<b>Tree Nurseries</b>	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.
<b>Education</b>	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.
<b>Alternative-Income Generation</b>	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
<b>Micro-finance schemes</b>	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).
<b>Eco-Charcoal Training</b>	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

No additional information is anticipated.

# 3 CLIMATE

## 3.1 Application of Methodology

### 3.1.1 Title and Reference of Methodology (VCS, 3.1)

Table 22. Title and Reference of Methodology

Type (methodology, tool, module)	Reference ID (if applicable)	Title	Version
Methodology	VM0047	VM0047 Methodology for Afforestation, Reforestation and Revegetation	1.1
Module	VMD0054	VMD0054 Module for Estimating Leakage from ARR Activities	1.0
Tool	VT0001	Tool for the Demonstration and Assessment of Additionality in VCS Agriculture, Forestry and Other Land Use (AFOLU) Project Activities	3.0
Tool	N/A	AFOLU Non-Permanence Risk Tool	4.2

### 3.1.2 Applicability of Methodology (VCS, 3.1)

Table 23. Application of Methodology

Reference ID/Title	Applicability condition	Justification of conformance
VM0047 V1.1 Section 4.1(3)	Project activities increase vegetative cover	All three project activities (PAA1, PAA2 and PAA3) aim to increase vegetative cover through either direct planting.
VM0047 v1.1 Section 4.1(2)	Where area-based and census-based approaches are used together, they are applied in non-overlapping areas defined at the project start	The project only uses the area-based approach.

VM0047 v1.1 Section 4.1(3)	For lands enrolled in a project, the quantification approach is selected at the project start date and used for the entire project crediting period.	The area-based approach is applied to all land enrolled in the project.
VM0047 v1.1 Section 4.1(4)	The project start date is documented as the earliest of the following: The date on which the agreement between AAD and Community/Village/Social Forest permit holder signed. The land use change date	The start date is 1 March, 2025, which coincides with the date on which one day after the agreement is signed. This is earliest date for any land use change date.
VM0047 v1.1 Section 4.1(5)	Where projects take place on organic soils or wetlands, ARR activities are developed using a multiple project activity design, applying this methodology to account for aboveground biomass and using a Wetland Restoration and Conservation methodology (e.g., VM0036 Methodology for Rewetting Drained Temperate Peatlands) to account for other carbon pools.	The project does not take place on organic soils or wetlands.
VM0047 v1.1 Section 4.2(1)	[Area-based approach] Project activities involve direct planting activities (e.g., manual planting, broadcast seeding), indirect activities associated with assisted natural regeneration (e.g., liana cutting, weed management, or barriers that prevent animal grazing), or a combination of direct and indirect activities.	The project activities include both direct (i.e., manual planting) and indirect (i.e., assisted natural regeneration) activities.
VM0047 v1.1 Section 4.2(2)	[Area-based approach] Project proponents establish a t = 0 carbon stock estimate for all significant carbon pools. The method for establishing t = 0 estimates depends on the activity that initiates the project start date.	t=0 carbon stock estimates for all significant carbon pools have been estimated based on the activity that initiates the project start date. See Sections 3.1.6 and 3.2.

VM0047 v1.1 Section 4.2(3)	[Area-based approach] Leakage must be monitored and quantified using VMD0054. It must not be assumed to be de minimis.	Leakage is monitored and quantified using the latest version of VMD0054. See Section 3.2.3.
VM0047 v1.1 Section 4.4.1(1)	[Area-based approach] The project does not occur on lands that have met the definition of managed forest at any point in the 10-year period immediately preceding the project start date.	The project does not occur on lands that have met the definition of managed forest at any point in the 10-year period immediately preceding the project start date. This has been documented through the project area delineation process for each Project Activity Area.
VM0047 v1.1 Section 4.4.1(2)	[Area-based approach] Clearing of pre-existing woody biomass does not involve timber harvesting nor results in degradation of native ecosystems.	Any pre-existing woody biomass that is cleared will not involve timber harvesting. Only invasive species if there is any of pre-existing woody biomass and minor amounts of shrubs/bushes will be cleared as a part of site preparation and therefore will not result in the degradation of native ecosystems.
VM0047 v1.1 Section 4.4.1(3)	[Area-based approach] The project is not planting fewer than 50 planting units per hectare and could use the census-based approach.	The planting density for all PAAs exceeds 50 planting units per hectare.
VMD0054 v1.0	This module applies to estimating leakage emissions from ARR activities. Projects using this module must meet all applicability conditions of the methodology VM0047 Afforestation, Reforestation and Revegetation v1.1.	The project meets all the applicability conditions of VM0047 v1.1 (see the rows above in this table for details).
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	The project activities lead no violation of applicable law..

	registered as the VCS AFOLU project shall not lead to violation of any applicable law even if the law is not enforced.	
	2. The use of this tool to determine additionality requires the baseline methodology to provide for a stepwise approach justifying the determination of the most plausible baseline scenario. Project proponent(s)proposing new baseline methodologies shall ensure consistency between the determination of a baseline scenario and the determination of additionality of a project activity	The 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. 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 West Seram Region, Maluku Province, Indonesia of total area of 37,875 ha, and geographical coordination is -2.8749 ~ -3.4324 S, 127.88214 ~128.7731 E.

#### **Project accounting areas**

The PA was divided into 3 PAAs as follows:

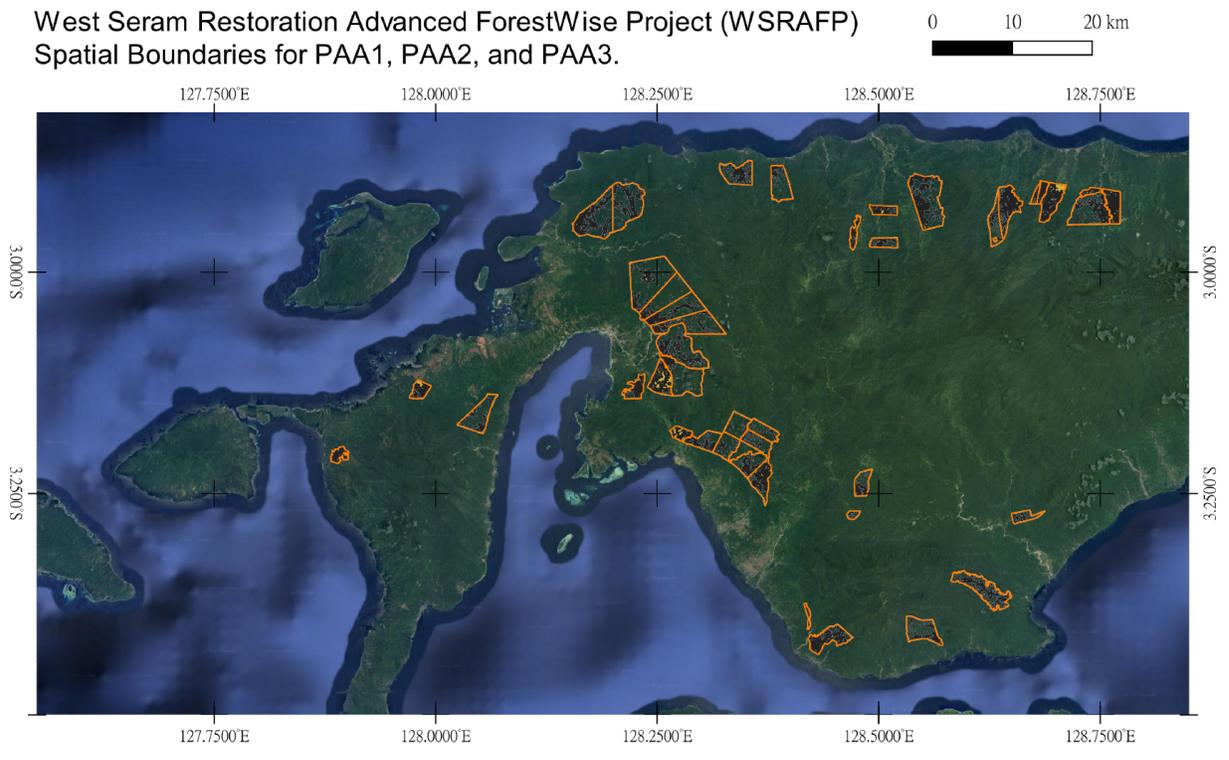
PAA1: Afforestation of approximately 2,374 ha on the Community/Village/Social Forest of Savana, Shrub and Dryland Farming Land Use area through a list of adapted fire resistant and native species.

PAA2: Reforestation of approximately 4,962 ha on the Community/Village/Social Forest

of degraded Secondary Dryland Forest and Secondary Dryland Farming Land Use area through a list of adapted fire resistant and native species.

PAA3: Reforestation and Enrichment of the Biodiversity within approximately 30,539 ha on the Community/Village/Social Forest of Primary and Secondary Dryland Forest Land Use area through a list of adapted fire resistant and native endangered species.

West Seram Restoration Advanced ForestWise Project (WSRAFP)  
Spatial Boundaries for PAA1, PAA2, and PAA3.



**Figure 6-1:** Spatial boundaries for PAA1, PAA2, and PAA3.

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

### Gases and Carbon Pools

Carbon dioxide (CO<sub>2</sub>) 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<sub>4</sub>) and nitrous oxide (N<sub>2</sub>O) are conservatively excluded from the project.

Table24: A list of the greenhouse gases considered

Source	Gas	Included?	Justification/explanation	
<b>Baseline</b>	Burning of biomass (whether by natural or anthropogenic causes)	CO <sub>2</sub>	Excluded	Conservative to exclude
		CH <sub>4</sub>	Excluded	Conservative to exclude
		N <sub>2</sub> O	Excluded	Conservative to exclude
	Emissions from nitrogen fertilizer	CO <sub>2</sub>	Excluded	Conservative to exclude
		CH <sub>4</sub>	Excluded	Conservative to exclude
		N <sub>2</sub> O	Excluded	Conservative to exclude
	Combustion of fossil fuels (in vehicles, machinery and equipment)	CO <sub>2</sub>	Excluded	Conservative to exclude
		CH <sub>4</sub>	Excluded	Conservative to exclude
		N <sub>2</sub> O	Excluded	Conservative to exclude
<b>Project</b>	Burning of biomass (whether by natural or anthropogenic causes)	CO <sub>2</sub>	Excluded	Carbon stock decreases due to burning are accounted as a carbon stock change
		CH <sub>4</sub>	Yes	The project conducts biomass burning as part of the fire management plan (i.e., a 20m prescribed burn around project areas per year). For verification and future monitoring events, emissions from burning of biomass will be monitored. This emissions source has been calculated (ex-ante) and deemed de minimis for the ex-ante calculation of estimated GHG carbon dioxide removals.

		N <sub>2</sub> O	Yes	The project conducts biomass burning as part of the fire management plan (i.e., a 20m prescribed burn around project areas per year). For verification and future monitoring events, emissions from burning of biomass will be monitored. This emissions source has been calculated (ex-ante) and deemed de minimis for the ex-ante calculation of estimated GHG carbon dioxide removals.
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Source	Gas	Included?	Justification/explanation	
	CO <sub>2</sub>	No	Conservative to exclude	
	CH <sub>4</sub>	No	Conservative to exclude	
	N <sub>2</sub> O	Yes	The project applies fertilizer for a portion of PAAs. For verification and future monitoring events, emissions from nitrogen fertilizer will be monitored. This emissions source has been calculated (ex-ante) and deemed de minimis for the ex-ante calculation of estimated GHG carbon dioxide removals.	
	Combustion of fossil fuels (in vehicles, machinery and equipment)	CO <sub>2</sub>	No	De minimis
		CH <sub>4</sub>	No	De minimis
		N <sub>2</sub> O	No	De minimis

Table 25: 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.
Dead wood (naturally accumulated)	Excluded	Following IPCC guidelines <sup>4</sup> , 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
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 Afforestation, Reforestation and Revegetation (ARR) using VM0047 Methodology for Afforestation, Reforestation and Revegetation V 1.1 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.

#### **Applicability Conditions**

- The project meets all applicability conditions detailed in Section 4 of the VM0047 v1.1 methodology: see section 3.1.2 for how the project meets the applicability conditions of VM0047 v1.1.
- The project activities will produce vegetative cover allowing for clear spatial delineation of the project area: see section 2.1.17 for description of project activities and section 2.1.16 and 3.1.3 for maps of the delineated project areas (i.e., Figures 4, 10, and 11).
- The project's performance benchmark must be updated at each verification or every five years, whichever comes first: the performance benchmark will be updated at each verification or every five years using annual measurements of the stocking index.

### 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.

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**<sup>18</sup> 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. More 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 Impact Assessment (AMDAL), corporate environmental responsibilities, and the government's role in environmental protection.

#### **Law No. 41/1999 on Forestry:**<sup>19</sup>

This is the primary forestry law in Indonesia.

Key points include:

<sup>18</sup> <https://faolex.fao.org/docs/pdf/ins160168.pdf>

<sup>19</sup> <https://jdih.kemenkeu.go.id/fulltext/1999/41tahun~1999uupenj.htm>

- 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.***

##### **a) Identify realistic and credible alternative land-use scenarios to the proposed ARR 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 WSRAFP 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 West 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. Cocoa 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 opening 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 WSRAFP 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 WSRAFP, has been performing conservation activities within the project boundary since 2022.

However, West 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 ARR 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 West 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 West 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 West 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 WSRAFP 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 143,200 Ha, 19,207 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 WSRAFP 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**<sup>20</sup> 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.

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<sup>20</sup> <https://faolex.fao.org/docs/pdf/ins160168.pdf>

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: West 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 measures. 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:

“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 WSRAFP, 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 West 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 West 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 West 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 West 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 West 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 West 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 West Seram.

#### Step 4. Common Practice Analysis

While some of the Project Activities in the WSRAFP 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 WSRAFP 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 WSRAFP 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).

Table26; 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: <sup>56</sup>: 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 WSRAFP , 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<sup>21</sup> hectares across North Sumatra and Aceh provinces, making it comparable in scale to the WSRAFP project zone (143,330 hectares).

### Essential Distinctions

#### 1. Government Support and Resources<sup>22</sup>

Gunung Leuser receives significant advantages that are not available to the WSRAFP 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<sup>23</sup>

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<sup>24</sup>

Unlike the WSRAFP project, Gunung Leuser has:

- Government budget allocation, though insufficient (IDR 36,208/ha)
- International conservation grants
- Multiple NGO partnerships providing operational support

The reason between the distinction from Gunung Leuser and WSRAFP 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 WSRAFP 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 WSRAFP 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)

<sup>21</sup> <https://asean.chm-cbd.net/protected-areas/gunung-leuser-national-park-core-sumatras-tropical-rainforest-heritage>

<sup>22</sup> <https://biodiversitylinks.org/library/resources/lessons-learned-technical-brief-multi-layered-conservation-management-in-leuser-landscape/@@download/file/Multi-layered%20Conservation%20Management.pdf>

<sup>23</sup> <https://globalconservation.org/news/leuser-ecosystem-protection-2022-23-progress-with-breaking-news>

<sup>24</sup> <https://biodiversitylinks.org/library/resources/lessons-learned-technical-brief-multi-layered-conservation-management-in-leuser-landscape/@@download/file/Multi-layered%20Conservation%20Management.pdf>

The WSRAFP does not deviate from the VCS methodology VM0047.

### 3.2 Quantification of Estimated GHG Emission Reductions and Removals

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:

#### 3.2.1 Baseline Emissions (VCS, 3.15)

##### 3.2.1.1 VM0047 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<sup>3</sup> 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	$AGB = \text{Exp} [-1.349 + 1.98 \text{Ln } D + 0.207 (\text{Ln } D)^3 - 0.0281 (\text{Ln } D)^3] \times \rho$
Other forest	Manuri et al., 2017	<p><u>Sumatera- Kalimantan</u></p> $AGB=0,167D^{2,560}G^{0,889}$ <p><u>Jawa - Bali - Nusa Tenggara - Sulawesi - Maluku</u></p> $AGB=0,151D^{2,560}G^{0,889}$ <p><u>Papua</u></p> $AGB=0,206D^{2,560}G^{0,889}$

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

Note:

- $W$  or  $B$  or  $AGB_{est}$  or  $AGB$  is aboveground biomass (kg)
- $\rho$  or  $G$  is wood density (g/cm<sup>3</sup>)
- $D$  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.
- Allometric 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).

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

V	tree volume, m <sup>3</sup>
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<sup>3</sup> ha<sup>-1</sup>. 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<sup>-3</sup>.

### 3.2.1.2 VM0047 Section 8.2 Equations List for Carbon Stocks

According to the area-based quantification approach and the carbon pools being used for the WSRAFP (i.e., woody biomass and litter) estimating gross and subsequently net emissions removals involves the following equations listed below

**Equation 1:** Carbon stock change in the project scenario in year  $t$  ( $\Delta C_{WP,t}$ ) (input for Equation 32)

**Equation 2:** Change in carbon stocks in biomass pools in project scenario through year  $t$  ( $\Delta C_{WP-biomass,t}$ ) (input for Equation 1)

**Equation 3:** Change in carbon stock in woody biomass in the project scenario through year  $t$  ( $\Delta C_{WP-woody,t}$ ) (input for Equation 2)

**Equation 4:** Average carbon stock in woody biomass in the project scenario in year  $t$  ( $C_{WP-woody,t}$ ) (input for Equation 3)

**Equation 9:** Change in carbon stock in litter in the project scenario through year  $t$  ( $\Delta C_{WP-LI,t}$ ) (input for Equation 2)

**Equation 10:** Average carbon stock in litter in the project scenario in year  $t$  ( $C_{WP-LI,t}$ ) (input for Equation 9)

**Equation 12:** Project emissions from biomass burning and fertilizer in year  $t$  ( $PE_t$ ) (input for Equation 32)

**Equation 13:** Emissions due to biomass burning in the project scenario ( $PE_{bburn,t}$ ) (input for Equation 12)

**Equation 14:** Average aboveground biomass stock subject to burning in the project scenario in the monitoring interval ending in year  $t$  ( $B_{WP,t}$ ) (input for Equation 16)

**Equation 15:** Emissions due to nitrogen fertilizer in the project scenario ( $PE_{fert,t}$ ) (input for Equation 12)

**Equation 16:** Direct nitrous oxide emissions due to fertilizer use in the project scenario in year  $t$  ( $PE_{Ndirect,t}$ ) (input for Equation 15)

**Equation 18:** Organic N fertilizer applied in the project scenario in year  $t$  ( $F_{wp,ON,t}$ ) (input for Equations 16 and 20)

**Equation 19:** Indirect nitrous oxide emissions due to fertilizer use in the project scenario in monitoring interval ending in year  $t$  ( $PE_{Nindirect,t}$ ) (input for Equation 15)

**Equation 20:** Indirect nitrous oxide emissions produced from atmospheric

deposition of N volatilized due to nitrogen fertilizer use in year  $t$

(  $Nfert_{wp,volat,t}$  ) (input for Equation 19)

Equation 21: Indirect nitrous oxide emissions produced from leaching and runoff of N, in regions where leaching and runoff occurs, due to nitrogen fertilizer use in year  $t$  (  $Nfert_{wp,leach,t}$  ) (input for Equation 19)

Equation 28: Uncertainty (  $UNC_t$  ) (input for Equation 32)

Equation 32: Net carbon dioxide removals (  $CR_t$  ) (input for Equation 34)

Equation 34: Annualized carbon dioxide removals (CRannualized)

Equation A6: Performance Benchmark (  $PB_t$  ) (input for Equation 32) Equation

10 (VMD0054 v1.0): Leakage (  $LK_t$  ) (input for Equation 32)

### 3.2.2 Project Emissions (VCS, 3.15)

#### GROSS EMISSIONS REMOVALS

In accordance with the applicability conditions of VM0047 V1.1, the increase in carbon stocks due to each PAA type in each annual cohort (instance), carbon stock changes from the start of the project through year  $t$  represent the projected (ex-ante) or actual (ex-post) gross emissions removals (t CO<sub>2</sub>e) resulting from growth of vegetation due to project activities (i.e., tree planting and/or natural revegetation) and are estimated as follows:

$$\Delta C_{WP,t} = \Delta C_{WP-biomass,t} \times 44/12 \text{ (Equation 1)}$$

1) Where:

$\Delta C_{WP,t}$  = project carbon stock change through year  $t$  (t CO<sub>2</sub>e)

$\Delta C_{WP-biomass,t}$  = change in carbon stock in biomass carbon pools in the project scenario through year  $t$  (ton Carbon)

44/12 = ratio of molecular weight of carbon dioxide to carbon (unitless)

$t = 1, 2, 3, \dots, t$  years elapsed since the project start date

Note: the Soil Organic Carbon pool is not included in this project, and therefore  $\Delta C_{WP-SOC,t}$  is omitted from Equation 1.

$$\Delta C_{WP-biomass,t} = \Delta C_{WP-woody,t} + \Delta C_{WP-LI,t} \text{ (Equation 2)}$$

Where:

$\Delta C_{WP-biomass,t}$  = change in carbon stock in biomass carbon pools in the project scenario through year  $t$  (ton Carbon)

$\Delta C_{WP-woody,t}$  = change in carbon stock in woody biomass in the project scenario through year  $t$  (ton Carbon)

$\Delta C_{WP-LI,t}$  = change in carbon stock in litter in the project scenario through year  $t$  (ton Carbon)

$t = 1, 2, 3, \dots, t$  years elapsed since the project start date

For ex-ante calculations used towards validation, the litter pool ( $\Delta C_{WP-LI,t}$ ) has conservatively been excluded from the estimated (ex-ante) emissions removals, and therefore for validation  $\Delta C_{WP-biomass,t} = \Delta C_{WP-woody,t}$ .

Towards verification, the litter pool will be included in emissions removals calculations.

Note: the non-woody biomass and dead wood pools are not included in this project, and therefore  $\Delta C_{WP-herb,t}$  and  $\Delta C_{WP-DW,t}$  are omitted from Equation 2.

## WOODY BIOMASS

The net carbon stock change in carbon pools relating to woody biomass in the project scenario using the area-based quantification approach is estimated as:

$$\Delta C_{WP-woody,t} = A \times (C_{WP-woody,t} - C_{WP-woody,t=0}) \text{ (Equation 3)}$$

Where:

$\Delta C_{WP-woody,t}$  = change in carbon stock in woody biomass in the project scenario through year  $t$  (t C)

$A$  = Area (ha)

$C_{WP-woody,t}$  = average carbon stock in woody biomass in the project scenario in year  $t$  (t C/ha)

$t = 1, 2, 3, \dots, t$  years elapsed since the project start date

$$C_{WP-woody,t} = C_{WP-woody-AB,t} \times (1 + R) \text{ (Equation 4)}$$

Where:

$C_{WP-woody,t}$  = average carbon stock in woody biomass in the project scenario year  $t$  (t C/ha)

$C_{WP-woody-AB,t}$  = average carbon stock in aboveground woody biomass in the

project scenario in year  $t$  (t C/ha)

$R$  = root to shoot ratio (t root d.m. / t shoot d.m.)

$t = 1, 2, 3, \dots, t$  years elapsed since the project start date

The change in carbon stock in woody biomass is estimated using the stock difference method (VM0047 V1.1 Reference: Bird, et. al., 2010), which estimates the difference in carbon stocks at two points in time.

For ex-ante calculations used towards validation,  $\Delta C_{WP-woody,t}$  (Equation 3) is determined using best available conservative inputs to build growth and yield curves / models. Per intervention, growth (i.e., changes in dbh over time) and yield (i.e., converting dbh into aboveground biomass using Indonesia Government UNFCCC allometric equations) curves were built for a subset of representative species planted where sufficient published data was available. For species where insufficient data was available, representative species were used as proxies (based on similarity). ex-ante allometric equations and root-to-shoot ratios used for each species modelled are shown in Table 37. Stand level (i.e., per ha) changes in aboveground biomass were generated by summing each species planted multiplied by its planting density, factoring in mortality/survival rates, replacement planting, and natural regeneration (particularly for I2 and I3). The stand level changes were then multiplied by the amount of hectares planted per intervention (as per the rollout schedule, Table 40).

Table Annex 4.3. Allometric equation used in FRL

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

## LITTER

The net carbon stock change in carbon pools relating to litter in the project

scenario using the area-based quantification approach is estimated as:

$$\Delta C_{WP-LI,t} = A \times (C_{WP-LI,t} - C_{WP-LI,t=0}) \text{ (Equation 9)}$$

Where:

$\Delta C_{WP-LI,t}$  = change in carbon stock in litter in the project scenario through year  $t$  (t C)

$A$  = Area (ha)

$C_{WP-LI,t}$  = Average carbon stock in litter in the project scenario in year  $t$  (t C/ha)

$t = 1, 2, 3, \dots, t$  years elapsed since the project start date

$$C_{WP-LI,t} = DM_{WP-LI,t} \times CF \text{ (Equation 10)}$$

Where:

$C_{WP-LI,t}$  = Average carbon stock in litter in the project scenario in year  $t$  (t C/ha)

$DM_{WP-LI,t}$  = Average litter dry mass per hectare in the project scenario in year  $t$  (t d.m./ha)

$CF$  = Carbon fraction of dry biomass (t C/t d.m.)

$t = 1, 2, 3, \dots, t$  years elapsed since the project start date

For ex-ante calculations used towards validation,  $\Delta C_{WP-LI,t}$  (Equation 9) has been conservatively excluded from emissions removals calculations.

Towards verification (i.e., ex-post based on actual growth) as per the Climate Monitoring Section (see Section 3.3) at each monitoring event and within a dedicated network of PSPs associated with each annual cohort, plot-level litter will be determined within sub-plots according to defined standard operating procedures (SOPs).

## EMISSIONS FROM PROJECT ACTIVITIES

For each intervention type in each annual cohort (instance), emissions from Project Activities may include potential impacts resulting from biomass burning and/or fertilizer use and are determined using the following equation:

$$PE_t = PE_{bburn,t} + PE_{fert,t} \text{ (Equation 12)}$$

### Biomass Burning

To determine the emissions specifically from biomass burning involves the following equation:

$$PE_{bburn,t} = A_{burn,t} \times \sum_{g=1}^G (GWP_g \times EF_g \times B_{WP,t} \times COMF \times 10^{-3}) \text{ (Equation 13)}$$

Where:

$PE_{bburn,t}$  = Project emissions due to biomass burning in year  $t$  (t CO<sub>2</sub>e)  $A_{burn,t}$  = Area burned in the monitoring interval ending in year  $t$  (ha)  $GWP_g$  = Global warming potential for gas  $g$  (dimensionless)

$EF_g$  = Emission factor for gas  $g$  (kg gas/t d.m. burned)

$B_{WP,t}$  = Average aboveground biomass stock subject to burning in the project scenario in the monitoring interval ending in year  $t$  (t d.m./ha)

$COMF$  = Combustion factor (dimensionless)

$t = 1, 2, 3, \dots, t$  years elapsed since the project start date

$g = 1, \dots, G$  greenhouse gases (methane and nitrous oxide) (dimensionless)

$10^{-3}$  = Conversion of kg CO<sub>2</sub>e to tCO<sub>2</sub>e

The average aboveground biomass stock subject to burning is estimated as follows:

$$B_{WP,t} = (C_{WP-woody-AB,t-\Delta t} + C_{WP-herb,t-\Delta t} + C_{WP-DW,t-\Delta t} + C_{WP-LI,t-\Delta t}) \times (1/CF) \text{ (Equation 14)}$$

Where:

$B_{WP,t}$  = Average aboveground biomass stock subject to burning in the project scenario in the monitoring interval ending in year  $t$  (t d.m./ha)

$C_{WP-woody-AB,t-\Delta t}$  = Average carbon stock in aboveground woody biomass in the project scenario in year  $t - \Delta t$  (t C/ha)

$C_{WP-herb,t-\Delta t}$  = Average carbon stock in non-woody biomass in the project scenario in year  $t$

--  $\Delta t$  (t C/ha)

$C_{WP-DW,t-\Delta t}$  = Average carbon stock in dead wood in year  $t - \Delta t$  (t C/ha)

$C_{WP-LI,t-\Delta t}$  = Average carbon stock in litter in the project scenario in year  $t - \Delta t$

(t C/ha)

*CF = Carbon fraction of dry biomass (t C/t d.m.)*

*t = 1, 2, 3, ..., t years elapsed since the project start date Δt = Length of monitoring interval ending in year t (years)*

*For ex-ante calculations used towards validation,  $PE_{bburn,t}$  (Equation 14) was calculated based on a 20m buffer around the project areas, which is burned annually as part of the fire management plan of the project. For I1 and I3, this 20m buffer was based on the delineated Year 1 project areas where activities have already commenced. The ratio of area burned (i.e., the 20m buffer) to the project area was then used to estimate the area burned in future years. For I2, a 20m buffer was generated around the representative proportion of planting areas for Years 2-5 (as described in Section 3.1.5.2 and as shown in Figure 13). The estimates of area burned are conservative estimates that may exaggerate the extent of area being burned annually. Default IPCC values were used for all parameters in Equation 16, as described in Section 3.3.1.*

*For ex-ante projections and towards project validation: the significance of emissions due to biomass burning were calculated using the procedure in Appendix 2 of VM0047 v1.1 and were deemed de minimis as they (combined with all other emissions sources) represented less than 5% of the total amount of carbon removals expected from the project.*

*Towards verification, as trees continue to grow within annual cohorts wherein tree planting and / or rewilding has occurred, and as fire management practices are continued, the incidence of fire is expected to decrease while resilience towards fire is expected to increase - if and when fire does occur within the project area, the extent and impact will be quantified and factored into the calculation of climate benefits as per the details provided in the climate monitoring plan (see Section 3.3) - calculations of  $PE_{bburn,t}$*

*(Equation 13) will then be calculated (as described above).*

## **Fertilizer Application**

*Where nitrogen fertilizer is applied due to the project activity, nitrous oxide emissions are calculated as:*

$$PE_{fert,t} = PE_{Ndirect,t} + PE_{Nindirect,t} \text{ (Equation 15)}$$

*Where:*

$$PE_{fert,t} = \text{Project emissions from nitrogen fertilizer in year } t \text{ (t CO}_2\text{e)}$$

$PE_{Ndirect,t}$  = Direct nitrous oxide emissions due to fertilizer use in the project scenario in year  $t$  (t CO<sub>2</sub>e)

$PE_{Nindirect,t}$  = Indirect nitrous oxide emissions due to fertilizer use in the project scenario in monitoring interval ending in year  $t$  (t CO<sub>2</sub>e)

$t = 1, 2, 3, \dots, t$  years elapsed since the project start date

$$PE_{Ndirect,t} = (F_{wp,ON,t}) \times EF_{Ndirect} \times 44/28 \times GWP_g \text{ (Equation 16)}$$

Where:

$PE_{Ndirect,t}$  = Direct nitrous oxide emissions due to fertilizer use in the project scenario in year  $t$  (t CO<sub>2</sub>e)

$F_{wp,ON,t}$  = Organic N fertilizer applied in the project scenario in year  $t$  (t N)

$EF_{Ndirect}$  = Emission factor for nitrous oxide emissions from N additions due to synthetic fertilizers, organic amendments and crop residues (t N<sub>2</sub>O-N/t N applied)

$GWP_g$  = Global warming potential for gas  $g$  (here, nitrous oxide) (dimensionless)

44/28 = Ratio of molecular weight of N<sub>2</sub>O to molecular weight of N (applied to convert N<sub>2</sub>O-N emissions to N<sub>2</sub>O emissions) (unitless)

$t = 1, 2, 3, \dots, t$  years elapsed since the project start date

Note: no synthetic fertilizer is used in this project, therefore  $F_{wp,SN,t}$  is omitted from Equation 16.

$$F_{wp,ON,t} = M_{wp,OF,t} \times NC_{wp,OF,t} \text{ (Equation 18)}$$

Where:

$F_{wp,ON,t}$  = Organic N fertilizer applied in the project scenario in year  $t$  (t N)

$M_{wp,OF,t}$  = Mass of N-containing organic fertilizer applied in the project scenario in the monitoring interval ending in year  $t$  (t fertilizer)

$NC_{wp,OF,t}$  = N content of organic fertilizer applied in the project scenario in year  $t$  (t N/t fertilizer)

$t = 1, 2, 3, \dots, t$  years elapsed since the project start date

$$PE_{Nindirect,t} = N_{fertwp,volat,t} + N_{fertwp,leach,t} \text{ (Equation 19)}$$

Where:

$PE_{N_{indirect},t}$  = Indirect nitrous oxide emissions due to fertilizer use in the project scenario in monitoring interval ending in year  $t$  (t CO<sub>2</sub>e)

$N_{fertwp,volat,t}$  = Indirect nitrous oxide emissions produced from atmospheric deposition of N volatilized due to nitrogen fertilizer use in year  $t$  (t CO<sub>2</sub>e)

$N_{fertwp,leach,t}$  = Indirect nitrous oxide emissions produced from leaching and runoff of N, in regions where leaching and runoff occurs, due to nitrogen fertilizer use in year  $t$  (t CO<sub>2</sub>e)

$N_{fertwp,volat,t} = (F_{wp,ON,t} \times FraC_{GASM}) \times EF_{Nvolat} \times 44/28 \times GWP_g$  (Equation 20) Where:

$N_{fertwp,volat,t}$  = Indirect nitrous oxide emissions produced from atmospheric deposition of N volatilized due to nitrogen fertilizer use in year  $t$  (t CO<sub>2</sub>e)

$F_{wp,ON,t}$  = Organic N fertilizer applied in the project scenario in year  $t$  (t N)

$FraC_{GASM}$  = Fraction of all organic N added to soils that volatilizes as NH<sub>3</sub> and NO<sub>x</sub> (dimensionless)

$EF_{Nvolat}$  = Emission factor for nitrous oxide emissions from atmospheric deposition of N on soils and water surfaces (t N<sub>2</sub>O-N/(t NH<sub>3</sub>-N + NO<sub>x</sub>-N volatilized))

$GWP_g$  = Global warming potential for gas  $g$  (here, nitrous oxide) (dimensionless)

$44/28$  = Ratio of molecular weight of  $N_2O$  to molecular weight of  $N$  (applied to convert  $N_2O-N$  emissions to  $N_2O$  emissions) (unitless)

$t = 1, 2, 3, \dots, t$  years elapsed since the project start date

Note: no synthetic fertilizer is used in this project, therefore  $F_{wp,SN,t}$  and  $FracGASF$  are omitted from Equation 20.

$$Nfert_{wp,leach,t} = (F_{wp,ON,t}) \times Frac_{LEACH} \times EF_{Nleach} \times 44/28 \times GWP_g \text{ (Equation 21)}$$

Where:

$Nfert_{wp,leach,t}$  = Indirect nitrous oxide emissions produced from leaching and runoff of  $N$ , in regions where leaching and runoff occurs, due to nitrogen fertilizer use in year  $t$  ( $t$   $CO_2e$ )

$F_{wp,ON,t}$  = Organic  $N$  fertilizer applied in the project scenario in year  $t$  ( $t$   $N$ )

$Frac_{LEACH}$  = Fraction of synthetic or organic  $N$  added to soils that is lost through leaching and runoff, in regions where leaching and runoff occurs (dimensionless)

$EF_{Nleach}$  = Emission factor for nitrous oxide emissions from leaching and runoff ( $t$   $N_2O-N/t$   $N$  leached and runoff)

$GWP_g$  = Global warming potential for gas  $g$  (here, nitrous oxide) (dimensionless)

$44/28$  = Ratio of molecular weight of  $N_2O$  to molecular weight of  $N$  (applied to convert  $N_2O-N$  emissions to  $N_2O$  emissions) (unitless)

$t = 1, 2, 3, \dots, t$  years elapsed since the project start date

Note: no synthetic fertilizer is used in this project, therefore  $F_{wp,SN,t}$  is omitted from Equation 21.

For ex-ante calculations used towards validation,  $F_{wp,ON,t}$  (Equation 15) is determined based on estimates of the amount of fertilizer applied over the first monitoring period. Fertilizer will only be applied to I1 and I2, with no fertilizer being used for I3. The fertilizer applied will be organic chicken manure (as described in Section 3.3.1, and in Table 57). Default

IPCC values were used for non-measured parameters in Equations 16, 18, 20, and 21 as described in Section 3.3.1. The significance of emissions due to fertilizers were calculated using the procedure in Appendix 2 of VM0047 v1.1 and were deemed de minimis as they (combined with all other emissions sources) represented less than 5% of the total amount of carbon removals expected from the project.

Towards verification, the amount of fertilizer applied will be monitored and measured in accordance with the monitoring plan (see Section 3.3.3 for details). Calculations of  $PE_{fert,t}$  (**Equation 15**) will be conducted as described above for the ex-ante calculations.

### 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 WSRAFP project area and cannot access other forest resources, so activity transfer leakage does not apply to WSRAFP. 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 VMD0045, market leakage is determined taking into account that national deforestation on Community/Village/Social Forest due to project implementation. The extent of leakage depends on the areas of the country's forest resources that may be displaced by other Community/Village/Social Forest activities. If deforestation 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 deforested, resulting in lower emissions.

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

#### **UNCERTAINTY**

Within the context of an ARR project, uncertainty may be associated with numerous sources, including change in carbon stocks, measurement error, emissions from project activities, the spatial boundaries of project activities, and the performance benchmark. Uncertainty ( $UNC_i$ ) in carbon pools is quantified and deducted from gross emissions removals along with leakage ( $LK_i$ ), emissions from project activities (biomass burning and/or fertilizer use), and in reference to the performance benchmark towards determining net emissions

removals. For each intervention type in each annual cohort (instance), uncertainty within carbon pools is calculated by propagating errors associated with estimates of included pools as:

$$UNC_t = \text{MIN} \left( 100\%, \text{MAX} \left( 0, \left( T \times \sqrt{\frac{SE_{p,t=0}^2 + SE_{p,t}^2 - (2 \times \rho \times SE_{p,t=0} \times SE_{p,t})}{\Delta C}} \right) - 0.10 \right) \times 100 \right)$$

**(Equation 28)**

Where:

$UNC_t$  = Uncertainty in cumulative removals through year  $t$  (percent)(%)

$T$  = Critical value of a student's two-tailed t-distribution for significance level  $\alpha = 0.1$

$SE_{p,t=0}$  = Standard error of the mean carbon stock estimate at time  $t = 0$  (t CO<sub>2</sub>e)

$SE_{p,t}$  = Standard error of the mean carbon stock estimate at time  $t$  (t CO<sub>2</sub>e)

$\rho$  = Correlation coefficient (rho) between carbon stocks at  $t = 0$  and  $t$  (used only for permanent plots; term is set to zero for independent

$\Delta C$  = Mean change in carbon stocks between  $t = 0$  and  $t$  (t CO<sub>2</sub>e )

For ex-ante calculations used towards validation,  $UNC_t$  (Equation 28), the minimum uncertainty deduction of 10% is applied.

Towards verification, uncertainty in pools derived from field measurements (i.e., the aboveground woody biomass and litter pools) with 90 percent confidence interval is calculated as the standard error of the averaged plot measurement multiplied by the T value for the 90 percent confidence level.

Beyond uncertainty within carbon pools, the uncertainty associated with measurement error is assessed through the QA/QC procedures described in the Climate Monitoring section (see Section 3.3). For emissions from project activities (i.e., biomass burning and / or use of nitrogen fertilizer): conservative parameters are applied and therefore uncertainty is set at 0. For the estimation of intervention-specific areas associated with annual cohorts (i.e., instances) wherein actual project activities occur, uncertainty is assumed to be 0 as represented by complete and accurate geospatial boundaries and carefully applying QA/QC procedures. Performance benchmark values are also assumed to have no (0) uncertainty.

**NET EMISSIONS REMOVALS**

In addition to the performance benchmark (i.e., crediting baseline), emissions from project activities (i.e., biomass burning and/or fertilizer application), the impact of leakage ( $LK_t$ ), and uncertainty ( $UNC_t$ ) are deducted from gross estimates to arrive at net emissions removals. For each intervention type in each annual cohort (instance), using the area-based quantification approach, net emissions removals are calculated with the following equation:

$$CR_t = \left( MIN \left( \Delta C_{WP,t}, \Delta C_{WP,t} \times (1 - PB_t) \right) \times (1 - UNC_t) \right) - PE_t - LK_t \\ - \left( \left( MIN \left( \Delta C_{WP,t-x}, \Delta C_{WP,t-x} \times (1 - PB_{t-x}) \right) \times (1 - UNC_{t-x}) \right) - PE_{t-x} - LK_{t-x} \right)$$

**(Equation 32)**

Where:

$CR_t$  = Carbon dioxide removals from the project activity in from year  $t$  to  $t-1$  (t CO<sub>2</sub>e)

$\Delta C_{WP,t}$  = Project carbon stock change through year  $t$  (t CO<sub>2</sub>e)

$PB_t$  = Performance benchmark for the monitoring interval ending in year  $t$  (percent)(%)

$LK_t$  = Leakage through year  $t$  (t CO<sub>2</sub>e)

$PE_t$  = Project emissions from biomass burning and fertilizer in year  $t$  (t CO<sub>2</sub>e)

$UNC_t$  = Uncertainty in cumulative removals through year  $t$  (percent)(%)

During the first monitoring period, the extents in ha that have occurred and/or are planned for each intervention are shown in *Table 40* - these extents were used in ex-ante modeling and do not include any planned harvest.

Table 28. Rollout schedule per intervention per year for the first monitoring period (i.e., 2024 to 2028).

Year	Project Year	PAA 1 (ha)	PAA 2 (ha)	PAA 3 (ha)	Total (ha)
2025	1	174	262	539	975
2026	2	500	800	4000	5,300
2027	3	600	1,300	8,000	9,900

2028	4	600	1,300	10,000	11,600
2029	5	500	1,300	8,000	9,800
Total (ha)		2,374	4,962	30,539	35,875

Towards validation,  $CR_t$  (Equation 32) is projected ex-ante for each intervention separately based on the expected net emissions removals associated with planting and rewilding activities within the first monitoring period over the entire crediting period (i.e., 30 years). Intervention-specific estimates are combined to determine total net CO<sub>2</sub>e benefits - a summary of combined projected gross and net emissions removals are provided in *Table 45* with full details outlined in the supporting document: “*Forecast GHG Removals and VCU Issuances*”.

Towards verification, the actual net emissions removals of planting and rewilding activities across all existing annual cohorts (i.e., instances) will be monitored according to the Climate Monitoring Plan (see Section 3.3).

To calculate annualized carbon dioxide removals ( $CR_{annualized}$ ), the total removals ( $CR_t$ ) in the monitoring interval are divided by the length of the monitoring interval ( $x$ ):

$$CR_{annualized} = \frac{CR_t}{x} \quad \text{(Equation 34)}$$

Where:

$CR_{annualized}$  = Annualized carbon dioxide removals (t CO<sub>2</sub>e / year)

$CR_t$  = Carbon dioxide removals from the project activity in from year  $t$  to  $t-1$  (t CO<sub>2</sub>e)

$x$  = Length of the monitoring period (years)

### 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%.

Table 29. Risk Allocation

State the non-permanence risk rating (%)	17%
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Has the non-permanence risk report been attached as either an appendix or a separate document?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
For ARR and IFM projects with harvesting, state, in tCO <sub>2</sub> e, the Long-term Average (LTA).	Not applicable as there is no harvesting in this project.
Has the LTA been updated based on monitored data, if applicable?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Not applicable as there is no harvesting in this project.
State, in tCO <sub>2</sub> e, the expected total GHG benefit to date.	0
Is the number of GHG credits issued below the LTA?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Not applicable as there is no harvesting in this project.

Table 30. Estimated gross and net emissions removals and VCU issuance over the crediting period for all interventions combined. Estimated net removals calculated as gross removals minus uncertainty, leakage, project, and baseline emissions. Estimated VCU issuance calculated as estimated net removals minus buffer pool allocation.

Vintage period	Estimated baseline emissions (tCO <sub>2</sub> e)	Estimated project emissions (tCO <sub>2</sub> e)	Estimated gross project removals (tCO <sub>2</sub> e)	Estimated uncertainty deduction (tCO <sub>2</sub> e)	Estimated leakage emissions (tCO <sub>2</sub> e)	Estimated net removals (tCO <sub>2</sub> e)	Estimated net reductions (tCO <sub>2</sub> e)
01-Mar-2025 to 31-Dec-2025	0	0	429	73	9	347	0
01-Jan-2026 to 31-Dec-2026	0	0	6,459	1,098	129	5,232	0
01-Jan-2027 to 31-Dec-2027	0	0	35,294	6,000	706	28,588	0

01-Jan-2028 to 31-Dec-2028	0	0	99,467	16,909	1,989	80,568	0
01-Jan-2029 to 31-Dec-2029	0	0	208,732	35,484	4,175	169,073	0
01-Jan-2030 to 31-Dec-2030	0	0	363,150	61,736	7,263	294,152	0
01-Jan-2031 to 31-Dec-2031	0	0	548,062	93,171	10,961	443,930	0
01-Jan-2032 to 31-Dec-2032	0	0	759,617	129,135	15,192	615,290	0
01-Jan-2033 to 31-Dec-2033	0	0	994,385	169,045	19,888	805,452	0
01-Jan-2034 to 31-Dec-2034	0	0	1,193,905	202,964	23,878	967,063	0
01-Jan-2035 to 31-Dec-2035	0	0	1,396,888	237,471	27,938	1,131,479	0
01-Jan-2036 to 31-Dec-2036	0	0	1,530,106	260,118	30,602	1,239,386	0
01-Jan-2037 to 31-Dec-2037	0	0	1,652,865	280,987	33,057	1,338,821	0
01-Jan-2038 to 31-Dec-2038	0	0	1,717,418	291,961	34,348	1,391,109	0
01-Jan-2039 to 31-Dec-2039	0	0	1,783,000	303,110	35,660	1,444,230	0
01-Jan-2040 to 31-Dec-2040	0	0	1,781,406	302,839	35,628	1,442,939	0
01-Jan-2041 to 31-Dec-2041	0	0	1,770,225	300,938	35,405	1,433,882	0
01-Jan-2042 to 31-Dec-2042	0	0	1,807,535	307,281	36,151	1,464,103	0
01-Jan-2043 to 31-Dec-2043	0	0	1,730,664	294,213	34,613	1,401,838	0

01-Jan-2044 to 31-Dec-2044	0	0	1,710,031	290,705	34,201	1,385,125	0
01-Jan-2045 to 31-Dec-2045	0	0	1,672,979	284,406	33,460	1,355,113	0
01-Jan-2046 to 31-Dec-2046	0	0	1,639,238	278,670	32,785	1,327,783	0
01-Jan-2047 to 31-Dec-2047	0	0	1,629,727	277,054	32,595	1,320,079	0
01-Jan-2048 to 31-Dec-2048	0	0	1,632,159	277,467	32,643	1,322,049	0
01-Jan-2049 to 31-Dec-2049	0	0	1,630,020	277,103	32,600	1,320,316	0
01-Jan-2050 to 31-Dec-2050	0	0	1,561,949	265,531	31,239	1,265,179	0
01-Jan-2051 to 31-Dec-2051	0	0	1,544,740	262,606	30,895	1,251,239	0
01-Jan-2052 to 31-Dec-2052	0	0	1,523,240	258,951	30,465	1,233,824	0
01-Jan-2053 to 31-Dec-2053	0	0	1,507,887	256,341	30,158	1,221,388	0
01-Jan-2054 to 31-Dec-2054	0	0	1,551,124	263,691	31,022	1,256,410	0
01-Jan-2055 to 31-Dec-2055	0	0	265,806	45,187	5,316	215,303	0
Total	0	0	37,248,507	6,332,246	744,970	30,171,291	0
Average	0	0	1,241,617	211,075	24,832	1,005,710	0

### 3.3 Monitoring

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

Table 31. Data and Parameters of Validation

Data / parameter	A
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<b>Data unit</b>	Ha
<b>Description</b>	Project area
<b>Source of data</b>	Calculated from field measurements and GIS data
<b>Value applied</b>	37,875 ha
<b>Justification of choice of data or description of measurement methods and procedures applied</b>	<p>The project areas were delineated on the ground by trained field teams using smartphone devices with GPS capabilities. The methods and procedures differ based on project interventions, described below:</p> <p><b>PAA 1</b></p> <p>Farms enrolled in the project were mapped with the guidance of the farm owners. Only areas eligible for VCUs were mapped (i.e., areas where forest cover will increase). For each farm mapped, a series of photographs and qualitative descriptions of current land cover was documented. Additionally, a survey of historical land use and land cover with the land owner was conducted to ensure 1) no recent tree cover loss has occurred, and 2) the area could support an agroforestry system. These surveys, photographs, and boundaries were thoroughly reviewed to ensure the area mapped is eligible based on:</p> <ul style="list-style-type: none"> <li>• existing land cover,</li> <li>• historical land use, and</li> <li>• location (i.e., within the CREMA)</li> </ul> <p>Final area boundaries were then cleaned to ensure no overlap with neighbouring farms and boundaries smoothed from artefacts due to GPS error using GIS.</p> <p><b>PAA 2</b></p> <p><b>PAA 3</b></p> <p>The larger rewilding extent (i.e., 2,051 ha) was mapped by the field teams on the ground. As the area is too large to collect data in the same rigorous manner, an alternative approach was taken. A classification of satellite imagery using contemporary ground-truthed reference data was conducted by Leverhulme to assess the contemporary extent of closed canopy forest, open canopy forest, and non-forest areas. Only areas representing the</p>
<b>Purpose of data</b>	Calculation of project emissions using the area-based quantification approach

<b>Comments</b>	<p>While available at validation for the first instance, this parameter will also be monitored and updated with each new annual cohort (i.e., instance) in the grouped project.</p> <p>Note that all estimated emissions removals listed in this document are based on the rollout schedule provided in <i>Table 40</i>, and not based only on the area already planted and/or rewilded.</p>
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<b>Data / parameter</b>	<i>R</i>
<b>Data unit</b>	Dimensionless
<b>Description</b>	Root to shoot ratio (i.e., ratio of belowground (root) biomass to aboveground biomass, per unit area or per stem)
<b>Source of data</b>	IPCC Guidelines for National Greenhouse Gas Inventories, 2006, Volume 4: Agriculture, Forestry and Other Land Use, Chapter 4: Forest Land, Table 4.4.
<b>Value applied</b>	$BGB = 0.37 \times AGB$
<b>Justification of choice of data or description of measurement methods and procedures applied</b>	IPCC default value for Tropical rainforest
<b>Purpose of data</b>	Calculation of baselin and project emissions using the area-based and census-based quantification approaches
<b>Comments</b>	

<b>Data / parameter</b>	<i>CF</i>
<b>Data unit</b>	tC/t.d.m.
<b>Description</b>	Carbon fraction of dry biomass
<b>Source of data</b>	<i>IPCC 2006 Guidelines for National Greenhouse Gas Inventories</i>

<b>Value applied</b>	0.47
<b>Justification of choice of data or description of measurement methods and procedures applied</b>	IPCC is a reputable source approved under the VCS
<b>Purpose of data</b>	Calculation of project emissions using the area-based and census-based quantification approaches
<b>Comments</b>	N/A

<b>Data / parameter</b>	$Frac_{GASM}$
<b>Data unit</b>	Dimensionless
<b>Description</b>	Fraction of all organic N added to soils that volatilizes as $NH_3$ and $NO_x$
<b>Source of data</b>	Table 11.3, Chapter 11 in Volume 4 of the <i>2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories</i>
<b>Value applied</b>	0.21
<b>Justification of choice of data or description of measurement methods and procedures applied</b>	IPCC is a reputable source approved under the VCS
<b>Purpose of data</b>	Calculation of project emissions using the census-based and/or area-based quantification approaches
<b>Comments</b>	N/A

<b>Data / parameter</b>	$EF_{Nvolat}$
<b>Data unit</b>	t $N_2O$ -N/(t $NH_3$ -N + $NO_x$ -N volatilized)
<b>Description</b>	Emission factor for nitrous oxide emissions from atmospheric deposition of N on soils and water surfaces

<b>Source of data</b>	Table 11.3, Chapter 11 in Volume 4 of the <i>2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories</i>
<b>Value applied</b>	0.01
<b>Justification of choice of data or description of measurement methods and procedures applied</b>	IPCC is a reputable source approved under the VCS
<b>Purpose of data</b>	Calculation of project emissions using the census-based and/or area-based quantification approaches
<b>Comments</b>	N/A

<b>Data / parameter</b>	$Frac_{LEACH}$
<b>Data unit</b>	Dimensionless
<b>Description</b>	Fraction of synthetic or organic N added to soils that is lost through leaching and runoff
<b>Source of data</b>	Table 11.3, Chapter 11 in Volume 4 of the 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories
<b>Value applied</b>	0.24
<b>Justification of choice of data or description of measurement methods and procedures applied</b>	IPCC is a reputable source approved under the VCS
<b>Purpose of data</b>	Calculation of project emissions using the census-based and/or area-based quantification approaches
<b>Comments</b>	

<b>Data / parameter</b>	$EF_{Nleach}$
<b>Data unit</b>	t N <sub>2</sub> O-N/t N leached and runoff

<b>Description</b>	Emission factor for nitrous oxide emissions from leaching and runoff
<b>Source of data</b>	Table 11.3, Chapter 11 in Volume 4 of the <i>2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories</i>
<b>Value applied</b>	0.011
<b>Justification of choice of data or description of measurement methods and procedures applied</b>	IPCC is a reputable source approved under the VCS
<b>Purpose of data</b>	Calculation of project emissions using the census-based and/or area-based quantification approaches
<b>Comments</b>	N/A

<b>Data / parameter</b>	<i>COMF</i>
<b>Data unit</b>	Dimensionless
<b>Description</b>	Combustion factor
<b>Source of data</b>	Default mean values in Table 2.6 of IPCC <i>2019 Refinement to the 2006 Guidelines for National Greenhouse Gas Inventories</i>
<b>Value applied</b>	Default mean value of 0.74 (Tropical/sub-tropical grassland, early dry season) taken from Table 2.6, Chapter 2 in Volume 4 of the 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories
<b>Justification of choice of data or description of measurement methods and procedures applied</b>	IPCC is a reputable source approved under the VCS. Areas burned fall into the Savanna and grassland category.
<b>Purpose of data</b>	Calculation of project emissions using the census-based and/or area-based quantification approaches
<b>Comments</b>	N/A

<b>Data / parameter</b>	$EF_{g=1}$
<b>Data unit</b>	kg/t d.m. burned
<b>Description</b>	Emission factor for gas $g=1$ (i.e., methane)
<b>Source of data</b>	Table 2.5, Chapter 2, Volume 4 of the <i>IPCC 2006 Guidelines for National Greenhouse Gas Inventories</i> (see Appendix 2: Emission factors for various types of burning for CH <sub>4</sub> and N <sub>2</sub> O)
<b>Value applied</b>	Default mean value of 2.3 (Savanna and grassland) taken from Table 2.5, Chapter 2 in Volume 4 of the 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories
<b>Justification of choice of data or description of measurement methods and procedures applied</b>	IPCC is a reputable source approved under the VCS. Areas burned fall into the Savanna and grassland category.
<b>Purpose of data</b>	Calculation of project emissions using the census-based and/or area-based quantification approaches
<b>Comments</b>	N/A

<b>Data / parameter</b>	$EF_{g=2}$
<b>Data unit</b>	kg/t d.m. burned
<b>Description</b>	Emission factor for gas $g=2$ (i.e., Nitrous oxide)
<b>Source of data</b>	Table 2.5, Chapter 2, Volume 4 of the <i>IPCC 2006 Guidelines for National Greenhouse Gas Inventories</i> (see Appendix 2: Emission factors for various types of burning for CH <sub>4</sub> and N <sub>2</sub> O)
<b>Value applied</b>	Default mean value of 0.21 (Savanna and grassland) taken from Table 2.5, Chapter 2 in Volume 4 of the 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories
<b>Justification of choice of data or description of measurement</b>	IPCC is a reputable source approved under the VCS. Areas burned fall into the Savanna and grassland category.

<b>methods and procedures applied</b>	
<b>Purpose of data</b>	Calculation of project emissions using the census-based and/or area-based quantification approaches
<b>Comments</b>	N/A

<b>Data / parameter</b>	$GWP_{g=1}$
<b>Data unit</b>	Dimensionless
<b>Description</b>	Global warming potential for gas $g=1$ (i.e., methane)
<b>Source of data</b>	Value for Methane (100-year GWP) applied, taken from Table 8.A.1 in the IPCC Fifth Assessment Report (AR5). IPCC. 2013. Fifth Assessment Report. <a href="https://www.ipcc.ch/report/ar5/wg1/">https://www.ipcc.ch/report/ar5/wg1/</a>
<b>Value applied</b>	28
<b>Justification of choice of data or description of measurement methods and procedures applied</b>	IPCC is a reputable source approved under the VCS
<b>Purpose of data</b>	Calculation of project emissions using the census-based and/or area-based quantification approaches
<b>Comments</b>	N/A

<b>Data / parameter</b>	$GWP_{g=2}$
<b>Data unit</b>	Dimensionless
<b>Description</b>	Global warming potential for gas $g=2$ (i.e., Nitrous oxide)
<b>Source of data</b>	Value for Nitrous oxide (100-year GWP) applied, taken from Table 8.A.1 in the IPCC Fifth Assessment Report (AR5). IPCC. 2013. Fifth Assessment Report. <a href="https://www.ipcc.ch/report/ar5/wg1/">https://www.ipcc.ch/report/ar5/wg1/</a>
<b>Value applied</b>	265

<b>Justification of choice of data or description of measurement methods and procedures applied</b>	IPCC is a reputable source approved under the VCS
<b>Purpose of data</b>	Calculation of project emissions using the census-based and/or area-based quantification approaches
<b>Comments</b>	N/A

<b>Data / parameter</b>	$p_{j,h}$
<b>Data unit</b>	Unit of production, varies by commodity
<b>Description</b>	Production in the project area for commodity $j$ in year $h$ of the historical reference period
<b>Source of data</b>	FAOSTAT
<b>Value applied</b>	N/A.
<b>Justification of choice of data or description of measurement methods and procedures applied</b>	No agroforestry production in PAAs.
<b>Purpose of data</b>	Calculation of foregone production
<b>Comments</b>	N/A

<b>Data / parameter</b>	$H$
<b>Data unit</b>	Years
<b>Description</b>	Number of years within historical reference period used to determine baseline production within the project area

<b>Source of data</b>	N/A
<b>Value applied</b>	N/A
<b>Justification of choice of data or description of measurement methods and procedures applied</b>	There is no crop production the PAAs.
<b>Purpose of data</b>	Calculation of foregone production
<b>Comments</b>	N/A

<b>Data / parameter</b>	$Op_{j,h}$
<b>Data unit</b>	Unit of production, varies by commodity
<b>Description</b>	Production units of commodity j in the leakage mitigation area in year h of the historical reference period.
<b>Source of data</b>	N/A
<b>Value applied</b>	N/A
<b>Justification of choice of data or description of measurement methods and procedures applied</b>	No leakage mitigation activities have taken place due to the crop production in PAAs.
<b>Purpose of data</b>	Calculation of leakage mitigation for foregone production
<b>Comments</b>	N/A

### 3.3.2 Data and Parameters Monitored (VCS, 3.16)

Table 32. Data and Parameters Monitored

<b>Data / parameter</b>	$C_{WP-woody-AB,t}$
<b>Data unit</b>	t C/ha

<b>Description</b>	Average aboveground woody biomass stocks in the project scenario in year $t$ (area-based quantification)
<b>Source of data</b>	Field measurement
<b>Description of measurement methods and procedures to be applied</b>	<p>Measured via plot-based sampling at the Permanent Sample Plots (PSPs).</p> <p><b>Plot Summary</b></p> <p>PSPs measure 30x30m, with 3 subplots of 10x10m in two corners and the center of the main plot (<i>Figure 19</i>).</p> <p><b>Measurement Summary</b></p> <p>All trees with dbh &gt; 10.0cm will be measured in the main plot. Trees (saplings) with dbh from 2m to 10m will be measured in the three subplots. Stepwise measurement procedure is as in Section #:</p> <p><b>Allometric Equation(s) Applied</b></p> <p>Trees <math>\geq 1.3</math>m tall: calculated using the Chave et al. (2014)<sup>109</sup> pan-tropical allometric equation:</p> <ul style="list-style-type: none"> <li>• <math>AG = 0.0673 \times (\rho D^2 H)^{0.976}</math> <ul style="list-style-type: none"> <li>◦ <math>\rho</math> = wood density of tree species</li> <li>◦ <math>D</math> = diameter at breast height (cm)</li> <li>◦ <math>H</math> = height (m)</li> </ul> </li> </ul> <p>Trees &lt; 1.3m tall: calculated using the Adu-Bredu et al. 2021<sup>110</sup> allometric equation:</p> <ul style="list-style-type: none"> <li>• <math>AG = 2.5102 \times (\rho h d^2)^{0.3398}</math></li> <li>• Where wood density is unavailable: <math>AG = 1.9574 \times (h d^2)^{0.3626}</math></li> </ul> <p>Selecting these equations involved careful inventory, comparison, and consideration of all available options by a panel of Ghanaian experts with decades of hands-on experience measuring trees across a variety of forest types and applying allometric equations based on field measurements. Given that no specific equations are currently available for the target species associated with interventions, these selections can easily be justified as widely tested and used, conservative, and best available among options.</p>

<sup>109</sup> Chave et al. (2014). Improved allometric models to estimate the aboveground biomass of tropical trees. *Global Change Biology*, 20(10): pgs. 3177-3190. Retrieved from: <https://www.researchgate.net/publication/262197290> Improved allometric models to estimate the aboveground biomass of tropical trees

<b>Frequency of monitoring/recording</b>	At least every five (5) years and at most every one (1) year after the start of a particular annual cohort. The WSRAFP will endeavor to establish and remeasure PSPs every two (2) years; however, the exact revisit time will reflect logistical constraints and resources and conform with monitoring period lengths (i.e. ensuring that the most recent measurements occur as close to the end of monitoring periods as possible while still allowing staggered PSP measurement/remeasurement to spread effort/resources across years). Measurement will occur approximately at the same time of year during each year measured.
<b>Value applied</b>	N/A (to be measured during the monitoring period)
<b>Monitoring equipment</b>	<ul style="list-style-type: none"> <li>● Waterproof sheets</li> <li>● GPS</li> <li>● Markers</li> <li>● Compass</li> <li>● PVC pipes</li> <li>● Tapes (DBH tape, linear tapes, carpenter's tape)</li> <li>● Calipers</li> <li>● Laser clinometer</li> <li>● Height poles</li> <li>● Aluminum number tags and nails</li> </ul>
<b>QA/QC procedures to be applied</b>	<p>To ensure the collection of reliable field data, the following measures shall be taken:</p> <ol style="list-style-type: none"> <li>1. The Team members will be taken through field inventory training prior to collection of plot data.</li> <li>2. All field measurements shall be checked by a qualified person (the Field Team Leader) in cooperation with the field team to correct any errors in techniques.</li> </ol>
<b>Purpose of data</b>	Calculation of project emissions using the area-based quantification approach
<b>Calculation method</b>	Calculated as the average of sample measurements
<b>Comments</b>	A full description of the Permanent Sampling Plots and parameters measured is provided in section 3.3.3.

<sup>110</sup> Adu-Bredu et al. (2021). Influence of Site Condition and Soil Properties on Carbon Stocks in the Savannah Agro-Ecological Zone of Ghana. Ghana J. Forestry, (30): pgs. 47-66. Retrieved from: [https://www.academia.edu/106336231/Influence\\_of\\_site\\_condition\\_and\\_soil\\_properties\\_on\\_carbon\\_stocks\\_in\\_Ghana](https://www.academia.edu/106336231/Influence_of_site_condition_and_soil_properties_on_carbon_stocks_in_Ghana)

<b>Data / parameter</b>	$U_{p,t}$
<b>Data unit</b>	Percent
<b>Description</b>	Percentage uncertainty (expressed as 90 percent confidence interval as a percentage of the mean) in carbon stock estimate of pool $p$ in the project scenario in year $t$
<b>Source of data</b>	Calculations from sampled field measurements
<b>Description of measurement methods and procedures to be applied</b>	Uncertainty in pools derived from field measurements with 90 percent confidence interval calculated as the standard error of the averaged plot measurement multiplied by the t value for the 90 percent confidence level
<b>Frequency of monitoring/recording</b>	At least every five (5) years and at most every one (1) year after the start of a particular annual cohort. The WSRAFP will endeavor to establish and remeasure PSPs every two (2) years; however, the exact revisit time will reflect logistical constraints and resources and conform with monitoring period lengths (i.e. ensuring that the most recent measurements occur as close to the end of monitoring periods as possible while still allowing staggered PSP measurement/remeasurement to spread effort/resources across years). Measurement will occur approximately at the same time of year during each year measured.
<b>Value applied</b>	N/A (to be measured during the monitoring period)
<b>Monitoring equipment</b>	N/A
<b>QA/QC procedures to be applied</b>	N/A
<b>Purpose of data</b>	Calculation of project emissions using the census-based and/or area-based quantification approaches
<b>Calculation method</b>	Confidence interval calculated by applying unbiased estimators appropriate to sample design.
<b>Comments</b>	Pools $p$ include woody biomass and litter.

<b>Data / parameter</b>	$A_{burn,t}$
<b>Data unit</b>	Ha

<b>Description</b>	Area burned in the monitoring interval ending in year $t$
<b>Source of data</b>	Field measurements and GIS analysis
<b>Description of measurement methods and procedures to be applied</b>	For each monitoring year, all annual cohorts will be regularly monitored using freely available landscape-level products (e.g., Global Forest Watch Fire Alert System to monitor potential fires) derived from satellite imagery. Any loss alerts issued within the boundaries of established instances (i.e., within specific annual cohorts wherein interventions have already begun) will be further investigated referring to finer spatial resolution satellite imagery (i.e., viewable through Google Earth Pro) and (as needed) investigated on the ground by field teams – CREMA M&E farm plots, biodiversity plots, and dronescapes will further be used to monitor reversals. If and when actual losses within the boundaries of established instances are confirmed, the extent of impact will be delineated through a combination of satellite imagery and ground reconnaissance. Following validation, monitoring of the project area for disturbance events will occur annually, with annual disturbance maps published on the DMP.
<b>Frequency of monitoring/recording</b>	Annually
<b>Value applied</b>	N/A (to be measured during the monitoring period)
<b>Monitoring equipment</b>	GIS and GPS
<b>QA/QC procedures to be applied</b>	Any loss alerts issued within the boundaries of established instances (i.e., within specific annual cohorts wherein interventions have already begun) will be further investigated referring to finer spatial resolution satellite imagery (i.e., viewable through Google Earth Pro) and (as needed) investigated on the ground by field teams.
<b>Purpose of data</b>	Calculation of project emissions using the area-based quantification approach
<b>Calculation method</b>	Calculated from field measurements and GIS data
<b>Comments</b>	N/A
<b>Data / parameter</b>	$M_{wp,OF,t}$
<b>Data unit</b>	tfertilizer

<b>Description</b>	Mass of N-containing organic fertilizer applied in the project scenario in the monitoring interval ending in year $t$
<b>Source of data</b>	Field measurement
<b>Description of measurement methods and procedures to be applied</b>	Weight of organic chicken manure will be taken before being applied to the nursery plants and seedlings.
<b>Frequency of monitoring/recording</b>	Annually
<b>Value applied</b>	N/A (to be measured during the monitoring period)
<b>Monitoring equipment</b>	Scale
<b>QA/QC procedures to be applied</b>	All use of fertilizer to be documented with key information such as date and location applied.
<b>Purpose of data</b>	Calculation of project emissions using the census-based and/or area-based quantification approaches.
<b>Calculation method</b>	Direct weighing
<b>Comments</b>	N/A

<b>Data / parameter</b>	$NC_{wp,OF,t}$
<b>Data unit</b>	t N/t fertilizer
<b>Description</b>	N content of organic fertilizer applied in the project in year $t$
<b>Source of data</b>	Value taken from Indonesia reference
<b>Description of measurement methods and procedures to be applied</b>	Value taken from published literature in Indonesia.
<b>Frequency of monitoring/recording</b>	Annually

<b>Value applied</b>	0.0189 (i.e., 1.89%)
<b>Monitoring equipment</b>	N/A
<b>QA/QC procedures to be applied</b>	N/A
<b>Purpose of data</b>	Calculation of project emissions using the census-based and/or area-based quantification approaches
<b>Calculation method</b>	N/A
<b>Comments</b>	N/A
<b>Data / parameter</b>	$DM_{WP-LI,t}$
<b>Data unit</b>	t d.m./ha
<b>Description</b>	Average litter dry mass per hectare in the project scenario in year $t$

<b>Source of data</b>	Field measurements
<b>Description of measurement methods and procedures to be applied</b>	<p>Litter is measured in the five (5) quadrants within the main PSPs. All ground floor litter &lt;2cm diameter is measured. Parameters measured are:</p> <ul style="list-style-type: none"> <li>● <b>In the field:</b> <ul style="list-style-type: none"> <li>○ Total Fresh mass (TF<sub>m</sub>) - see the Total Fresh mass table below for a detailed description of measuring Total Fresh mass.</li> <li>○ Sample Fresh mass (SF<sub>m</sub>) - see the Sample Fresh mass table below for a detailed description of measuring Sample Fresh mass.</li> </ul> </li> <li>● <b>In the lab:</b> <ul style="list-style-type: none"> <li>○ Dried mass (SD<sub>m</sub>) - see the Dried mass table below for a detailed description of measuring Dried mass.</li> </ul> </li> </ul> <p>Stepwise details of measurements are as follows:</p> <p><b>In the field:</b></p> <ol style="list-style-type: none"> <li>1. Start with the quadrat in the SW corner</li> <li>2. Collect all ground floor litter &lt;2cm diameter within the first subplot (SW corner)       <ol style="list-style-type: none"> <li>a. Ensure no soil is included</li> </ol> </li> <li>3. Measure and record the Total fresh mass (TF<sub>m</sub>) to one decimal point in gramme using the scale</li> <li>4. Collect a 100g sample of the fresh mass, place in sample container and label as PLOTNAME-QUADRATNAME       <ol style="list-style-type: none"> <li>a. E.g., IV1-2024-01-SW</li> </ol> </li> <li>5. Repeat steps 2-4 for each subplot, moving in a clockwise direction (i.e., SW → NW → NE → SE → C)</li> </ol> <p><b>In the lab:</b></p> <ol style="list-style-type: none"> <li>1. Oven dry the samples at 70°C to constant weight to arrive at dried mass (m<sub>d</sub>).</li> </ol> <p>Biomass of the litter is calculated as (Adu-Bredu et al., 2021; Amankwah et al., 2024)</p> $L_b = \frac{1}{n} \sum_{i=1}^n \left( \frac{TF_i}{A_i} \times CFr \right) \times 10000$ <p>Where:</p> <p>L<sub>b</sub> (Mg C ha<sup>-1</sup>) = Litter biomass;        n = number of quadrats;        A<sub>q</sub> = Size of quadrat (m<sup>2</sup>);        CFr = Carbon Fraction.</p>
<b>Frequency of monitoring/recording</b>	<p>At least every five (5) years and at most every one (1) year after the start of a particular annual cohort. The WSRAFP will endeavor to establish and remeasure PSPs every two (2) years; however, the exact revisit time will reflect logistical constraints and resources and conform with monitoring period lengths (i.e. ensuring that the most recent measurements occur as close to the end of monitoring periods as possible while still allowing staggered PSP measurement/remasurement to spread effort/resources across</p>

	years). Measurement will occur approximately at the same time of year during each year measured.
<b>Value applied</b>	N/A (to be measured during the monitoring period)
<b>Monitoring equipment</b>	<ul style="list-style-type: none"> <li>• Waterproof sheets</li> <li>• GPS</li> <li>• Markers</li> <li>• Compass</li> <li>• PVC pipes</li> <li>• 50x50cm quadrants</li> <li>• Electric scale</li> <li>• Plastic container</li> <li>• Hand gloves</li> </ul>
<b>QA/QC procedures to be applied</b>	<p>To ensure the collection of reliable field data, the following measures shall be taken:</p> <p>The Team members will be taken through field inventory training prior to collection of plot data.</p> <p>All field measurements shall be checked by a qualified person (the Field Team Leader) in cooperation with the field team to correct any errors in techniques.</p> <p>To ensure reliable lab work, the following measures shall be taken:</p> <p>Should make sure that soil is excluded from the samples. Only litter within the quadrant should be considered.</p> <p>The oven-dried samples should be immediately placed in a desiccator to cool down before weighing. This is to prevent resorption of moisture.</p> <p>All lab work shall be checked by a qualified person (the Lab Team Leader) in cooperation with the lab team to correct any errors in techniques.</p>
<b>Purpose of data</b>	Calculation of project emissions using the area-based quantification approach
<b>Calculation method</b>	Calculated as the average of sample measurements
<b>Comments</b>	N/A
<b>Data / parameter</b>	<i>dbh</i>
<b>Data unit</b>	centimeters (cm)

<b>Description</b>	Diameter at breast height
<b>Source of data</b>	Field measurement
<b>Description of measurement methods and procedures to be applied</b>	Dbh is measured using a diameter tape and recorded to one decimal point. If a trunk is malformed at breast height or there is a buttress, the measurement is carried at 30 cm above the end of the deformation. In such situations, the point of measurement (POM) must be indicated in the POM column of the field recording form. If a tree is forked below breast height of 1.3m, then each fork is recorded and measured as an individual tree.
<b>Frequency of monitoring/recording</b>	At least every five (5) years and at most every one (1) year after the start of a particular annual cohort. The WSRAFP will endeavor to establish and remeasure PSPs every two (2) years; however, the exact revisit time will reflect logistical constraints and resources and conform with monitoring period lengths (i.e. ensuring that the most recent measurements occur as close to the end of monitoring periods as possible while still allowing staggered PSP measurement/remeasurement to spread effort/resources across years). Measurement will occur approximately at the same time of year during each year measured.
<b>Value applied</b>	N/A (to be measured during the monitoring period)
<b>Monitoring equipment</b>	Diameter Tape
<b>QA/QC procedures to be applied</b>	<p>The following measures shall be taken:</p> <ol style="list-style-type: none"> <li>1. Should make sure that the diameter tape does not slant;</li> <li>2. Measurement should not be made over bumps on the stem;</li> <li>3. Measurement should be made slightly below the bumps.</li> <li>4. Diameter is measured at a fixed height of 1.3 m above the ground level. If the ground level cannot be defined, the breast height is determined as 1.3 m from the seeding point.</li> </ol>
<b>Purpose of data</b>	Calculation of project emissions
<b>Calculation method</b>	N/A
<b>Comments</b>	N/A

<b>Data / parameter</b>	<i>h</i>
<b>Data unit</b>	Meters (m)
<b>Description</b>	Tree height
<b>Source of data</b>	Field measurement
<b>Description of measurement methods and procedures to be applied</b>	<p>The height shall be measured using height measuring tools in meters and recorded to one decimal point. Total tree height refers to the vertical distance from ground to the tip of the tree.</p> <p>Bole height is also measured as height to the base of the living crown. The crown base refers to the lowest living branch.</p> <p>To overcome errors in the measurement of the height of leaning trees, horizontal distance from the centre of the tree stump to the ground projected tip of the tree is also measured (base length). This will be used to deduce the actual tree height.</p>
<b>Frequency of monitoring/recording</b>	At least every five (5) years and at most every one (1) year after the start of a particular annual cohort. The WSRAFP will endeavor to establish and remeasure PSPs every two (2) years; however, the exact revisit time will reflect logistical constraints and resources and conform with monitoring period lengths (i.e. ensuring that the most recent measurements occur as close to the end of monitoring periods as possible while still allowing staggered PSP measurement/remeasurement to spread effort/resources across years). Measurement will occur approximately at the same time of year during each year measured.
<b>Value applied</b>	N/A (to be measured during the monitoring period)
<b>Monitoring equipment</b>	Hypsometer and height measuring rod.
<b>QA/QC procedures to be applied</b>	The height measuring personnel should be well trained with the use of the hypsometer. Only one person should be made to take the height measurement. A second person should be trained to provide assistance.
<b>Purpose of data</b>	Calculation of project emissions
<b>Calculation method</b>	N/A
<b>Comments</b>	N/A

<b>Data / parameter</b>	$TF_m$
<b>Data unit</b>	Grams (g)
<b>Description</b>	Fresh mass of litter
<b>Source of data</b>	Field measurement
<b>Description of measurement methods and procedures to be applied</b>	Calculated as samples multiplied by the total area.
<b>Frequency of monitoring/recording</b>	At least every five (5) years and at most every one (1) year after the start of a particular annual cohort. The WSRAFP will endeavor to establish and remeasure PSPs every two (2) years; however, the exact revisit time will reflect logistical constraints and resources and conform with monitoring period lengths (i.e. ensuring that the most recent measurements occur as close to the end of monitoring periods as possible while still allowing staggered PSP measurement/remeasurement to spread effort/resources across years). Measurement will occur approximately at the same time of year during each year measured.
<b>Value applied</b>	N/A (to be measured during the monitoring period)
<b>Monitoring equipment</b>	N/A
<b>QA/QC procedures to be applied</b>	Should make sure that soil is excluded from the samples. Only litter within the quadrant should be considered.
<b>Purpose of data</b>	Calculation of project emissions
<b>Calculation method</b>	N/A
<b>Comments</b>	N/A

<b>Data / parameter</b>	$SF_m$
<b>Data unit</b>	Grams (g)
<b>Description</b>	Sampled fresh mass of litter

<b>Source of data</b>	Field measurement
<b>Description of measurement methods and procedures to be applied</b>	Five quadrats of size 0.25 m <sup>2</sup> (0.5m x 0.5m) are laid close to the four corners and the center of the sample plot. The litter in the quadrats are collected at the appropriate time and weighed. The litter is composed of dead leaves, seed, flowers and twigs of size less than 2.0cm diameter.
<b>Frequency of monitoring/recording</b>	At least every five (5) years and at most every one (1) year after the start of a particular annual cohort. The WSRAFP will endeavor to establish and remeasure PSPs every two (2) years; however, the exact revisit time will reflect logistical constraints and resources and conform with monitoring period lengths (i.e. ensuring that the most recent measurements occur as close to the end of monitoring periods as possible while still allowing staggered PSP measurement/remeasurement to spread effort/resources across years). Measurement will occur approximately at the same time of year during each year measured.
<b>Value applied</b>	N/A (to be measured during the monitoring period)
<b>Monitoring equipment</b>	Digital weighing balance (scale)
<b>QA/QC procedures to be applied</b>	Should make sure that soil is excluded from the samples. Only litter within the quadrant should be considered.
<b>Purpose of data</b>	Calculation of project emissions
<b>Calculation method</b>	N/A
<b>Comments</b>	N/A

<b>Data / parameter</b>	$SD_m$
<b>Data unit</b>	Grams (g)
<b>Description</b>	Dried mass of litter
<b>Source of data</b>	Field measurement
<b>Description of measurement methods and</b>	The fresh samples are taken to the laboratory for oven drying. The samples are oven dried at 70 oC for 48 hours to constant weight.

<b>procedures to be applied</b>	
<b>Frequency of monitoring/recording</b>	At least every five (5) years and at most every one (1) year after the start of a particular annual cohort. The WSRAFP will endeavor to establish and remeasure PSPs every two (2) years; however, the exact revisit time will reflect logistical constraints and resources and conform with monitoring period lengths (i.e. ensuring that the most recent measurements occur as close to the end of monitoring periods as possible while still allowing staggered PSP measurement/remeasurement to spread effort/resources across years). Measurement will occur approximately at the same time of year during each year measured.
<b>Value applied</b>	N/A (to be measured during the monitoring period)
<b>Monitoring equipment</b>	Drying oven, desiccators and digital scale (weighing balance)
<b>QA/QC procedures to be applied</b>	The oven-dried samples should be immediately placed in a desiccator to cool down before weighing. This is to prevent resorption of moisture.
<b>Purpose of data</b>	Calculation of project emissions
<b>Calculation method</b>	N/A
<b>Comments</b>	N/A

<b>Data / parameter</b>	$SI_{control,t}$ and $SI_{wp,t}$
<b>Data unit</b>	t/ha
<b>Description</b>	Stocking index in scenario (remote control plot $j$ or remote project plot $i$ ) at time $t$
<b>Source of data</b>	The dataset used for the Stocking Index is the Above-ground biomass stock data product from Chloris Geospatial ( <a href="https://www.chloris.earth/data/#top">https://www.chloris.earth/data/#top</a> ). This product provides annual estimates of dry biomass stock and change in live woody vegetation, starting from the year 2000. The dataset is updated annually, with the most recent year of data available being 2024. The dataset is spatially explicit and wall-to-wall, with quantified uncertainty at the pixel- and site-level. It is designed to measure biomass losses (carbon emissions) from deforestation and

	degradation, and biomass gains (carbon removals) from vegetation growth, at 30m resolution.
<b>Description of measurement methods and procedures to be applied</b>	N/A
<b>Frequency of monitoring/recording</b>	Annually
<b>Value applied</b>	Various
<b>Monitoring equipment</b>	GIS software (i.e., QGIS)
<b>QA/QC procedures to be applied</b>	The dataset applied is significantly correlated with aboveground biomass (i.e., it is an estimate of aboveground biomass), as demonstrated in Baccini et al. 2012 <sup>111</sup> and Baccini et al. 2017. <sup>112</sup> Additionally, the dataset has been validated with direct measurements from the project region (collected from within the project ecoregion; ecoregion defined at the biome level following Olson et al. 2001). <sup>113</sup>
<b>Purpose of data</b>	Selection of remote control plots and derivation of performance benchmark for the area-based approach
<b>Calculation method</b>	The methods used by Chloris Geospatial to calculate their Above-ground biomass stock product are available in Baccini et al. 2012 <sup>31</sup> and Baccini et al. 2017 <sup>32</sup> .
<b>Comments</b>	Should a more accurate remote sensing metric become available over the project area over time, the remote sensing metric used for

<sup>31</sup> A. Baccini, S. J. Goetz, W. S. Walker, N. T. Laporte, M. Sun, D. Sulla-Menasha, J. Hackler, P. S. A. Beck, R. Dubayah, M. A. Friedl, S. Samanta and R. A. Houghton (2012). Estimated carbon dioxide emissions from tropical deforestation improved by carbon-density maps. *Nature Climate Change* 2. DOI: 10.1038/NCLIMATE1354. Retrieved from: <https://www.nature.com/articles/nclimate1354>

<sup>32</sup> Baccini, A., Walker, W., Carvalho, L., Farina, M., Sulla-Menasha, D., Houghton, R.A. (2017). Tropical forests are a net carbon source based on aboveground measurements of gain and loss. *Science*. DOI: 10.1126/science.aam5962. Retrieved from: <https://www.science.org/doi/10.1126/science.aam5962>

<sup>33</sup> Olson, D.M., Dinerstein, E., Wikramanayake, E.D., Burgess, N.D., Powell, G.V.N., Underwood, E.C., D'amico, J.A., Itoua, I., Strand, H.E., Morrison, J.C., Loucks, C.J., Allnutt, T.F., Ricketts, T.H., Kura, Y., Lamoreux, J.F., Wettengel, W.W., Hedao, P. and Kassem, K.R. (2001). Terrestrial Ecoregions of the World: A New Map of Life on Earth: A new global map of terrestrial ecoregions provides an innovative tool for conserving biodiversity. *BioScience* 51(11): 933-938. [https://doi.org/10.1641/0006-3568\(2001\)051\[0933:TEOTWA\]2.0.CO;2](https://doi.org/10.1641/0006-3568(2001)051[0933:TEOTWA]2.0.CO;2)

	<p>monitoring SI ex-post may be changed, ensuring that the following apply:</p> <ol style="list-style-type: none"> <li>1) the new metric offers equivalent or better accuracy (in terms of correlation with terrestrial carbon stocks)</li> <li>2) The new metric can be harmonized with the previous metric, applying procedures from peer-reviewed literature to ensure data continuity and remove sources of misalignment (e.g., geometric, radiometric, and/or spectral artifacts) introduced by the new metric; and</li> <li>3) The procedure to harmonize the new metric incorporates temporally coincident observations of both (previous and new) remote sensing metrics from the project and control plots from within an overlap interval of at least two years, or as prescribed by the procedure.</li> </ol>
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<b>Data / parameter</b>	<i>IS</i>
<b>Data unit</b>	Percent

<b>Description</b>	Share of leakage resulting in increased supply outside the project area
<b>Source of data</b>	VMD0054 v1.0
<b>Description of measurement methods and procedures</b>	Default value of 0.75 (75 percent) for agricultural commodities or 1.00 (100 percent) for fuelwood. Where the default value is not applied, evidence justifying the use of a different value must be provided. Such evidence may include government-approved or peer-reviewed studies relevant to the agricultural commodity and region in which the project is located.
<b>Frequency of monitoring/recording</b>	At each monitoring event
<b>QA/QC procedures to be applied</b>	N/A
<b>Purpose of data</b>	Estimation of area of new land brought into production
<b>Calculation method</b>	N/A
<b>Comments</b>	N/A

<b>Data / parameter</b>	$\Delta C_{biomass}$
<b>Data unit</b>	t C/ha
<b>Description</b>	The change in forest biomass carbon stocks equal to the regional average stock where the project is located.
<b>Source of data</b>	Published studies with data from the country in which the project is located where such data are available, or derived from Table 3A.1.4 of the IPCC Good Practice Guidance for Land Use, Land-Use Change and Forestry (IPCC 2003) where such data are not available.
<b>Description of measurement methods and procedures</b>	$\Delta C_{biomass}$ must reference the following data sources as available in the order listed, (e.g., if two data sources are available the data source nearest the top of the list must be used): <ul style="list-style-type: none"> <li>• mean carbon stocks in forest biomass in the region; or</li> <li>• mean carbon stocks in forest biomass in the country where the project is located and must be obtained from published studies or official government statistics; or</li> <li>• mean carbon stocks in forest biomass derived from above-ground biomass estimates in Table 3A.1.4 of the IPCC Good Practice Guidance for Land Use, Land-Use Change and Forestry (IPCC 2003) if such information is not available.</li> </ul>

	<p>Determined based on data available at the time of the assessment and reflecting area-weighted mean stocks in above- and belowground biomass, dead wood and litter pools at the nearest date to the assessment date. If biomass is present in tonnes of dry biomass per hectare, then carbon stocks should be determined using a carbon fraction default value of 0.47. If only aboveground biomass stocks are reported, then belowground biomass stocks should be estimated using allometric equations contained in Table 4.A.4 of IPCC (2003), unless verifiable information is provided to justify a different value. Similarly, if data presented include tree biomass only, then the carbon stocks in deadwood and litter must be estimated by multiplying the sum of aboveground and belowground biomass stocks by a factor of 1.1.</p>
<b>Frequency of monitoring/recording</b>	At each monitoring event
<b>QA/QC procedures to be applied</b>	All data will be collected from appropriate and reliable sources, any analysis/processing/calculations of data will be conducted by a qualified team member and reviewed by their superior. All sources of error/uncertainty will be noted and accounted for.
<b>Purpose of data</b>	Calculation of leakage emissions
<b>Calculation method</b>	N/A
<b>Comments</b>	N/A

<b>Data / parameter</b>	$SOC_{REF}$
<b>Data unit</b>	tC/ha
<b>Description</b>	Soil organic carbon (SOC) stock corresponding to the reference condition in native ecosystems by climate region and soil type applicable to the land receiving the displaced activity
<b>Source of data</b>	Table 2.3 of the 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories
<b>Description of measurement methods and procedures</b>	Where soils vary across the region of production, a weighted average (based on relative commodity production) or the highest, most conservative value may be used.
<b>Frequency of monitoring/recording</b>	At each monitoring event

<b>QA/QC procedures to be applied</b>	All data will be collected from appropriate and reliable sources, any analysis/processing/calculations of data will be conducted by a qualified team member and reviewed by their superior. All sources of error/uncertainty will be noted and accounted for.
<b>Purpose of data</b>	To calculate change in carbon stocks on new lands brought into production
<b>Calculation method</b>	N/A
<b>Comments</b>	N/A

<b>Data / parameter</b>	$f_{LU}, f_{MG}, f_{IN}$
<b>Data unit</b>	Dimensionless
<b>Description</b>	Relative SOC stock change factors applicable to the displaced production over 20 years for land use, management practices and inputs respectively
<b>Source of data</b>	Table 5.5 (displaced crops, referencing tree crops in the case of fuelwood) and Table 6.2 (displaced grazing) of the 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories
<b>Description of measurement methods and procedures</b>	N/A
<b>Frequency of monitoring/recording</b>	At each monitoring event
<b>QA/QC procedures to be applied</b>	N/A
<b>Purpose of data</b>	Calculation of leakage emissions
<b>Calculation method</b>	N/A
<b>Comments</b>	N/A

### 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 WSRAFP 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 WSRAFP ARR project will be updated accordingly. These activities, and their frequency are shown in Table 16.

Table 33: The three primary monitoring activities, the frequency that they will be performed and the method to be used.

Activity	Frequency	Method
<b>Forest Patrols and Perimeter Observation</b>	Monthly	Patrol team inspects perimeter of Project Accounting Area on the ground and via helicopter
<b>Plot Measurements</b>	Bi-annually	Sampling teams visit a portion of plots in project and proxy areas
<b>Identification of significant disturbance</b>	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

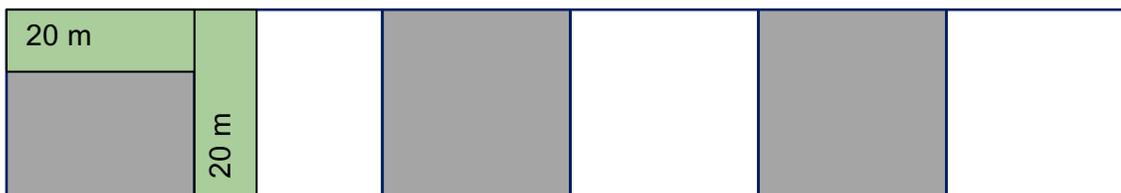
- Forestry Department Ranger Lead – responsible for carrying out patrol, noting all relevant patrol data and observations in field patrol forms, and conducting ground-truthing of any identified areas with disturbances
- Watch Post Supports – community support personnel that can contribute to patrol logs 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

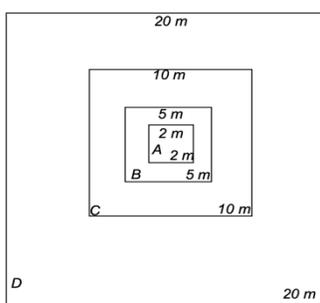
#### **VM0047 Summary of sampling procedures for the project accounting areas, with a copy of a sampling protocol used to carry out measurements.**

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 VM0047 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<sup>2</sup>. Height <1M
- b. Sapling with a minimum area of 25 m<sup>2</sup>. 5M>Height>=1M
- c. Pole with a minimum area of 100 m<sup>2</sup>. DBH< 10cm, Height >=5M
- d. Trees with a minimum area of 400 m<sup>2</sup>. DBH >=10cm.

Figure 16. Indonesia MoEF standard Forest Field Plot dimension protocol

A nested square sample plot design was used for the WSRAFP. 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 WSRAFP 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

### 4.1 Without-Project Community Scenario

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

##### **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, Nauulu, 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. The population includes Muslim, Christian, and Animist communities, and the island has experienced conflicts and displacement in the past (**Error! Reference source not found.**, James Douglas Langston et. al. 2020).

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 WSRAFP all have indigenous **Negeri** structure.

Approximately 1.1 million people live in the administrative districts that include Seram and its surrounding islands; 40 percent of these people reside in the provincial capital located on neighboring Ambon island (**Error! Reference source not found.**, James Douglas Langston et. al. 2020,). The remainder of the population, 656 000 people, live at population density of approximately 30 persons per km<sup>2</sup> in administrative centers located on Seram's coastline (Liswanti, 2012). The population density across the island varies from 859 persons per km<sup>2</sup> in Masohi City to 2 persons per km<sup>2</sup> in North Seram with a high level of language diversity and a history of trade interactions that have shaped its social landscape.

Increasing rural populations and in-migration in Seram are contributing to the spread of settlements across lowland forest areas. Large-scale investments are supported by government infrastructures. Land-use and tenure systems are changing, with varied positive and negative effects on local social-ecological systems. The distance from markets and administrative centers, continuing economic and social recovery from conflict on Seram, and lack of institutional capacity to direct incoming investments in ways that benefit locals and help ensure long-term, sustainable

development or use of natural resources pose challenges in dealing with incoming investments that are likely to transform Seram's landscapes.

**New Community Sustainable Development start:**

The West Seram 40 Community/Village/Social Forest Permit originally has no sustainable agroforestry project and activities. AAD is implementing the WSRAFP of Afforestation of 2,374 Ha (PAA1), Reforestation of PAA2 (4,962 Ha), Reforestation and Revegetation of PAA3 (30,539 Ha), with Agarwood restoration SIGS in 40 Community/Village/Social Forest. The community is at a new transformation turning point.

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

Seram is Indonesia's 8th largest island and has rich lands and mineral resources, and rich threatened species, marine and terrestrial biodiversity (**Error! Reference source not found.** Critical Ecosystem Partnership Fund, 2014). It is the largest island of Maluku province, historically known as the center of the Spice Islands. Vestiges of separatist movements remain in Seram since Indonesia declared independence from the Dutch. The people of Seram include Muslim, Christian, and some Animist communities. In 1999, violence spread across the Maluku province resulting in thousands of deaths and the displacement of tens of thousands of people (Rao & Vidyattama, 2017). The Malino II Accord, signed in 2002, helped to mediate tensions and stabilize social systems in Seram. However, conflict discouraged investment and inhibited economic development (Rao & Vidyattama, 2017). In rural areas, livelihoods are still reliant upon natural resource extraction from forests and marine environments. In the years following the 2002 peace accords, continuing small conflicts have risen over land, perpetuated by legal ambiguity over land and natural resources. Administrative borders have been finalized at village and district levels. Provincial Government has been initiating long term 10 years planning in FMU4 since 2020 and has signed agreement with AAD seeking resources and technology to work with the local communities to develop ecosystem conservation with Sustainable Income Generation Scheme (SIGS) as the harmonization platform to ease the tension between 3 ethnic communities.

Historical trade interactions have shaped the social landscape in ways that are still visible today. West Seram coastal areas and the adjacent islands are more integrated into market based political-economies brought by colonial and regional trading networks. The residents of the inland swamps and mountains of West Seram have remained less integrated. They relied on intermediaries to exchange sago products, resin, rattan, bush meat and other products for manufactured goods (Stark, 1996). Although recorded history shows that Seram's population is divided, with an interior population of subsistence farmers remaining underdeveloped, and a coastal population that is well-connected and engaged in the trade in spices and other manufactured goods, this is changing rapidly (Ellen, 2000).

In addition to the ethnic categorization of community groups, in term of land use, there are those directly exploiting forests and other natural resources including poachers, illegal loggers, and NTFP collectors. Also included here are the secondary users to whom the first group sells these items including end-users (like restaurants) and middlemen. Other groups in this category are those that

indirectly benefit by taking advantage of the situation, which may be including community chief receiving benefits to allow these illegal activities to happen, local community members who may gain some form of employment e.g., as loggers, exploitative employers paying low wages, and micro-lenders lending at exorbitant interest rates. In this regards, the Government and Local Authorities may lose out on potential tax and other income from resource exploitation in their areas of jurisdiction.

Finally, are workers (including immigrants) who are unable to negotiate good terms due to the nature of the jobs while credit seekers suffer the high interest rates. This is likely to affect the youth and women most adversely, as they have been found to have higher unemployment rates than men in this area. This is why AAD can help with SIGS and Micro-Finance.

#### 4.1.3 High Conservation Values (CCB, CM1.2)

Table 34. High Conservation Values

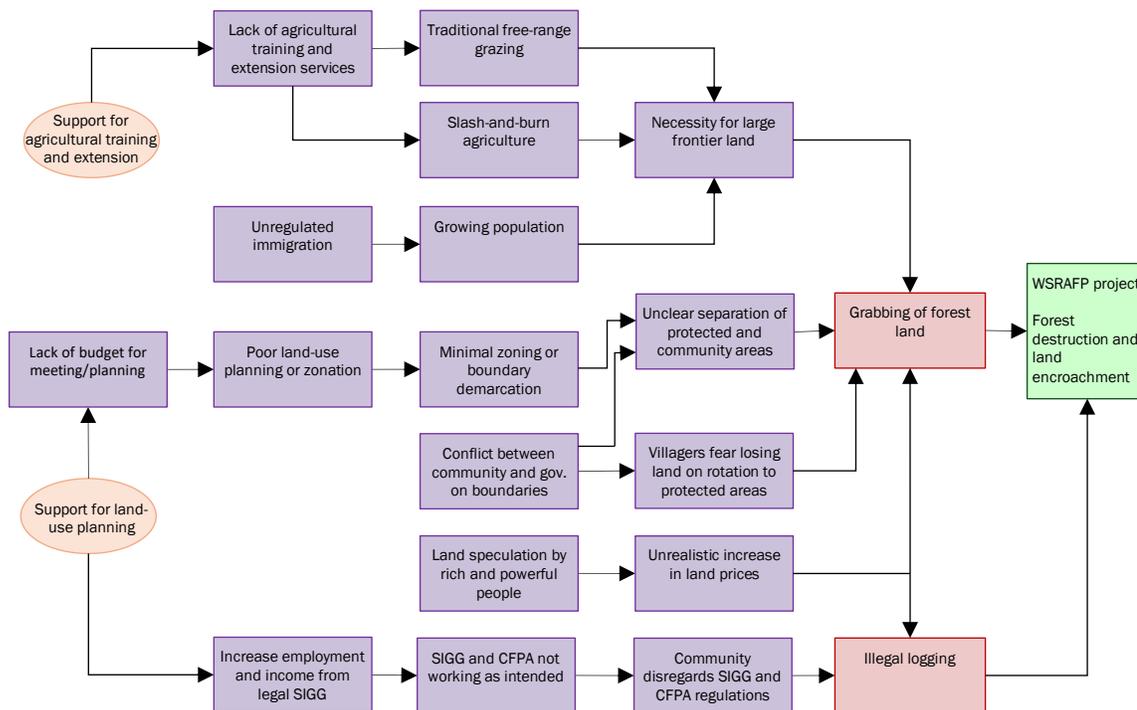
<b>High Conservation Value</b>	<p><b>Specify HCV for community</b></p> <p>Evaluate whether the project zone includes any of the following high conservation values (HCVs) related to community well-being</p> <ul style="list-style-type: none"> <li>a) Areas that provide critical ecosystem services;</li> <li>b) Areas that are fundamental for the livelihoods of communities;</li> <li>c) Areas that are critical for the traditional cultural identity of communities</li> </ul>
<b>Qualifying Attribute</b>	<p>(a). HCV on provision of critical ecosystem services: HCVs under this category include forests and communities critical to water catchment. The WSRAFP is building 56 clean water wells with filtering system and reservoirs in 56 village. The community will also protect the source of water shed including the surrounding forest conservation. These water catchment services and forest conservation are the main priority of the WSRAFP, and activities are designed for community to ensure greater protection of their water source ecosystem. This inherently provides positive effects on these high conservation values, and no negative effects are anticipated because of the project.</p> <p>(b). None</p> <p>(c). Part of PARA1 close to Piru area has been identified to be a critical area to preserve the local culture of Agarwood plantation and restoration. Agarwood is high value and becoming critical to the local community..</p>
<b>Focal Area</b>	<p>(a). 56 clean water wells with filtering system in 56 villages' upstream watershed area.</p>

(c). Part of PARA 1 with coordinate west -3.118976, 128.244376 to east -3.125611,128.263876, South -3.133574, 128.251497 to North -3.108466,128.257980 area has been designed to preserve and restore the community-based agarwood plantation culture.

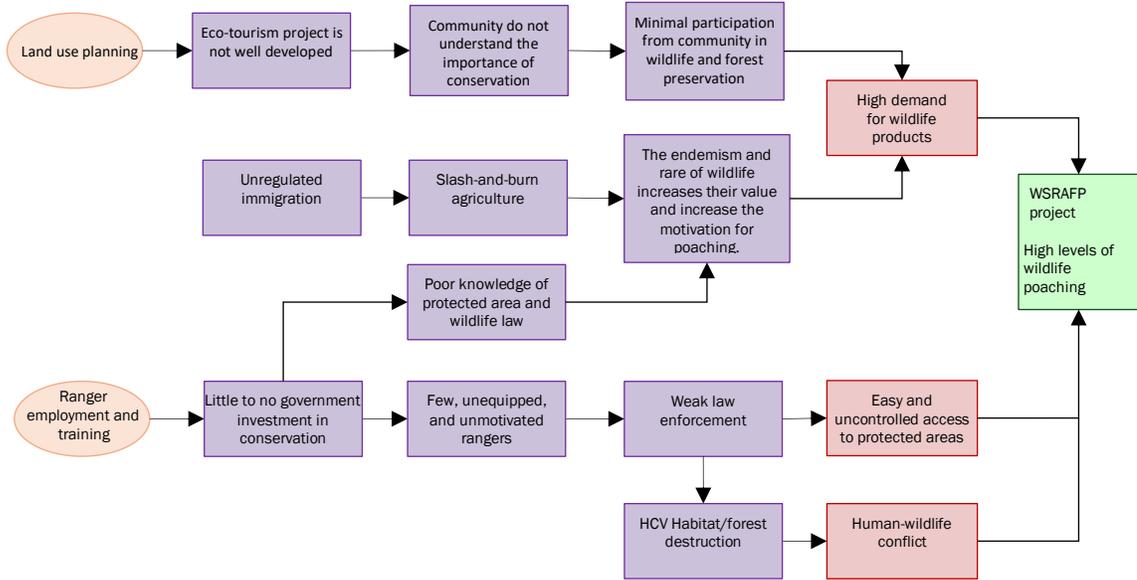
4.1.4 Without-Project Scenario: Community (CCB, CM1.3)

During the SBIA community workshop, after the working groups had identified and prioritized the Focal Issues, they then analyzed them further 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 19). 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) Forest destruction and land encroachment



b) Wildlife poaching and HCV Restoration



c) Poor community livelihoods

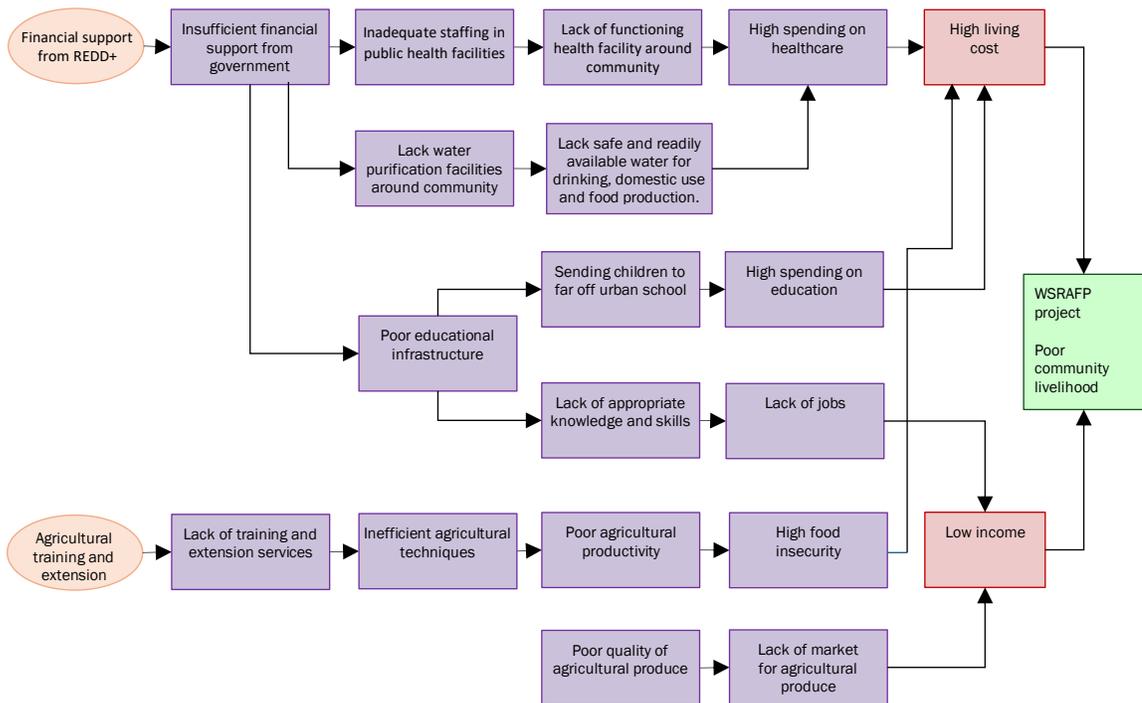


Figure 19: Problem Flow diagrams produced for the Focal Issues during the SBIA community workshops in the WSRAFP

Legend Table



Next, the work groups projected what would happen with the major direct threats (in pink on the PFDs) identified for each Focal Issue in the short-to-medium term (5-10 yrs.) in the absence of the REDD+ project (Table 17).

Table 35: Future without-project projections of the key contributing factors to the Focal Issues identified during the WSRAFP SBIA community workshops

a. Forest destruction and land encroachment

Focal issue aspect	5-10 years	What will drive the change
Forest land grabbing	Worsen	<ul style="list-style-type: none"> <li>High cost of land: due to increase in number of newcomers/land speculators to the area, demand in land will increase and people will sell land at higher price.</li> <li>High rate of unemployment: people with no permanent job will encroach further inside the forest either for slash and burnt agriculture or for land grabbing for sale or for both.</li> <li>Rich and powerful land speculators: speculators hire poor unemployed villagers to clear forest and grab land and sell the land to them at low price. Land speculators never have to face the laws since they are not the ones who clear the forest but the poor. Land speculators make a lot of money from re-selling land.</li> <li>Blur forest boundaries delineated: local people just cut as much forest and they can then plant on the land with short-term crops then falsely claim working on the land for longer than 5 years, the length that required for legal land ownership recognition.</li> <li>Low capacity of land management agencies: due to lack of equipment and capacity, most local land management agencies are not able to recognize if an encroached forest land is an old plantation or land is inside protected area or in community area. Thus, they cannot build case against illegal forest land grabbers.</li> </ul>
Illegal logging	Worsen	<ul style="list-style-type: none"> <li>Increased demand in timber: Both local and other islands of Indonesia. Population and Real Estate development continue to grow in the country thus demand in timber will be in continuous increase.</li> <li>Logging become more lucrative: since the demand in timber is higher, loggers can sell timber at good price and make big money out of illegal logging business.</li> <li>Insufficient man power and action taken by authorities and other stakeholders to stop illegal logging or illegal transport of timber.</li> <li>Loggers build good roads inside protected area so they can cut</li> </ul>

		more trees deeper inside forest where they can find further good timber to cut
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**b. Wildlife poaching and HCV Restoration**

Focal issue aspect	5-10 years	What will drive the change
<b>High demand in wildlife bush-meat and exotic birds</b>	Worsen	<ul style="list-style-type: none"> <li>• High demand in wildlife, parts and bush-meat by local communities: There are some chicken/goat/cattle raising in Seram island but are not in substantial quantities. The local communities sometimes rely on bush-meat thus motivate poachers to work harder and catch and kill many more wildlife as possible</li> <li>• High demand in Exotic birds catching for cash.</li> <li>• Demand in Exotic birds for export</li> <li>• New poachers come from elsewhere to poach in the West Seram</li> <li>• Growing poacher-middlemen-trader networking: when the business of wildlife poaching/trading is going well, more people will involve and get benefit from it thus networks will be formed, get bigger and become better in many ways, physically, financially, tactically and logistically</li> </ul>
<b>Illegal easy un- controlled access into protected area forest</b>	Worsen	<ul style="list-style-type: none"> <li>• Forest destruction: the cutting and burning of forest makes the forest become less dense, and make it more easily accessible by people, especially by poachers</li> <li>• Trails inside the forest: trails make poachers get inside the forest easier than going across naturally dense forest</li> <li>• More snares brought in the forest: the more passages make across forest, forest will become more damaged and become more open and easier to put snares</li> </ul>
<b>Lack of wildlife habitat</b>	Worsen	<ul style="list-style-type: none"> <li>• Forest land encroachment: as forest land is cleared and grab, forest is converted into agriculture, residential land or other type of land use thus wildlife has smaller habitat to live inside</li> <li>• Forest fires for hunting: poachers burn forest for hunting purposes. When wildlife come to cleared area where forest is all burnt out, they are become more visible which is easier for poachers to spot and kill/catch them. Furthermore, some wildlife is attracted by the smell of forest freshly burnt ashes.</li> <li>• Weak law enforcement: rangers of limited working capacity, not sufficiently well equipped and well-motivated with limited financial support cannot provide effective protection to the forest.</li> </ul>

c. Poor community livelihoods

Focal issue aspect	5-10 years	What will drive the change
<b>High living cost</b>	Remain unchanged	<ul style="list-style-type: none"> <li>● No nearby functioning health post: so people need to seek health care services at distant bigger towns thus need to spend money on travelling, food and accommodation.</li> <li>● Lack of teacher in commune: so children have to go far-away schools so parents have to cover big expense to send children to school.</li> <li>● Lack of water purification/supply system: Villagers don't have safe and readily available water for drinking, domestic use and food production.</li> </ul>
<b>Low income</b>	Remain unchanged	<ul style="list-style-type: none"> <li>● Lack of education and skill – with no education, villagers do not have ability to take better paid jobs or to create family/small business</li> <li>● Lack of agriculture technique – without proper technique, people's crop become less productive with mediocre quality thus less competitive in markets</li> <li>● Population growth – when number of people increase and resources remain the same, resources become scarce</li> </ul>

## 4.2 Net Positive Community Impacts

### 4.2.1 Expected Community Impacts (CCB, CM2.1)

The major project activities can be grouped into the following ten areas (see details in Section 8). All the community-focused activities which the project plans to implement were identified during SBIA community workshops described earlier (see Section 2.1.6). Most of these are designed to help create greater awareness, capacity and financial security in the communities through ForestWise Agarwood Restoration Silviculture System (FWARS) to form a Sustainable Income Generating Scheme (SIGS), reducing the need to undertake unsustainable resource extraction from the Project Accounting Area. They include:

1. Building the New ForestWise Agarwood Restoration Silviculture (FWARS) System;
2. Participatory Building a Sustainable Agri-Ecosystem Land Uses by FWARS as the Sustainable Income Generating Scheme (SIGS)
3. Direct Employment and Training on Sustainable Income Generating Scheme (SIGS)
4. Strengthening Community Organizations
5. Improve Health Facilities and Care
6. Improve safety and ready availability of drinking water

7. Community-based Agarwood NTFP Eco-Tourism Development
8. Micro-finance
9. Enhanced Security and Law Enforcement
10. Sensitization and Awareness Raising
11. Education.

### Theory of Change Statements

Based on the extensive experience of the project proponent in working on biodiversity conservation and community projects in the WSRAFP landscape, a literature review, and from information obtained from the SBIA workshops held, we applied the theory of change approach to justify our project rationale and to produce indicators for the CCB monitoring plan. The theory of change is a hypothesis about how a project intends to achieve its stated objectives, or a roadmap of how it plans to get from project activities to project impacts (Richards & Panfil, 2011). As such, we developed a theory of change for each of the three Focal Issues (see details in the Result Chains under Section 2.1.17).

The assumptions we make about the cause-and-effect relationships were made explicit in the Result Chain diagrams developed by community members during the SBIA workshops, from which the theories of change statements are based. Indicators were developed for key results and assumptions; monitoring of assumptions was included to enable us identify points of deviation early enough. In other words, the indicators outlined in the Monitoring Plan (see Section 4.4) will enable measuring progress towards achieving the desired project activity outcomes and impacts from project activities and strategies.

- **Focal Issue 1: Poor Community Livelihoods:** IF there are adequate and functional health facilities, IF education is improved through better facilities and access through bursary schemes, IF there is safe and readily available water through water purification system, and IF there is improved food security from Sustainable Income Generation Scheme agriculture, THEN the communities will have higher incomes and improved livelihoods.
- **Focal Issue 2: Forest Destruction and Land Encroachment:** IF participatory land use planning is conducted and land tenure security strengthened, IF immigration and land allocations are strictly controlled, and IF the Community Forest Protection Area (CFPA) is developed following proper processes, THEN land grabbing, illegal logging and NTFP collection will be strictly controlled and the forest well preserved.
- **Focal Issue 3: Wildlife Poaching and HCV Restoration:** IF community-based eco-tourism is developed, IF the sensitization and awareness-raising is conducted among communities around the Project Accounting Area, and IF security and law enforcement are strengthened, THEN the both poaching and demand in wildlife and bush-meat will decline as will habitat loss, thereby leading to improved wildlife populations in the WSRAFP.

### Improved Livelihoods

Table 36. Anticipated impacts for specific stakeholder groups

<b>Community group</b>	<b>Local Residents</b>
<b>Impact(s)</b>	Enhanced ecosystem goods and services and improved livelihoods through better education, health and food security
<b>Type of benefit/cost/risk</b>	Predicted direct benefit
<b>Change in well-being</b>	Potentially major improvement in livelihoods including education, health and food security

<b>Community group</b>	<b>Government &amp; Local Authorities</b>
<b>Impact(s)</b>	Better execution of their mandate, revenue collection and improved relations with the citizens
<b>Type of benefit/cost/risk</b>	Predicted direct benefit
<b>Change in well-being</b>	Potentially moderate gains in revenue but major gains in community relations

<b>Community group</b>	<b>Local Residents-Youth and women</b>
<b>Impact(s)</b>	Availability of jobs, alternative SIGS and education
<b>Type of benefit/cost/risk</b>	Predicted direct benefit
<b>Change in well-being</b>	Potentially major impact on youth and women groups

<b>Community group</b>	<b>Local Residents-Poachers and illegal loggers</b>
<b>Impact(s)</b>	Reduced income
<b>Type of benefit/cost/risk</b>	Predicted direct cost
<b>Change in well-being</b>	Potentially significant loss of livelihood sources

<b>Community group</b>	<b>Local Residents-Immigrants</b>
------------------------	-----------------------------------

Impact(s)	Fewer opportunities to gain access to free or cheap land and natural resources
Type of benefit/cost/risk	Predicted indirect cost
Change in well-being	Potentially moderate impact on their well-being and ability to sustain themselves in the new areas

Community group	Local cooperative group
Impact(s)	Increase funds for training, lessons, and micro-finance
Type of benefit/cost/risk	Predicted direct benefit
Change in well-being	Potentially moderate gains in revenue but major gains in community relations

#### 4.2.2 Negative Community Impact Mitigation (VCS, 3.19; CCB, CM2.2)

There are no negative community Impact for the local legal members. Although there some impact on poachers and illegal loggers, their benefit from poaching and logging is not legal and cannot be identified as “well-being” as per the requirement of CCB.

#### 4.2.3 Net Positive Community Well-Being (VCS, 3.19; CCB, CM2.3, GL1.4)

*The project implements UN 17 SDGs, the net positive wellbeing is illustrated in section 2.1.18 in achieving the following 12 SDGs. This includes No Poverty, Zero Hunger, Good Health and Well-Being, Quality Education, Gender Equality, Clean Water and Sanitation, Affordable and clean energy, Decent Work and Economic Growth, Industry, Innovation and Infrastructure, Climate Action, Life on Land: and Partnerships for the Goals. Out of the 12 SDGs, only Climate Action and Life on Land are not net positive community wellbeing.*

*Also, as mentioned in Section 4.2.1, anticipated net well-being impacts of the project are shown as follow.*

Table 37. Anticipated well-being impact

Community group	Anticipated well-being impact	Net impact
All communities in the project	Enhanced ecosystem goods and services and improved livelihoods through better education, health and food security	Positive
Government & Local Authorities	Better execution of their mandate, revenue collection and improved relations with the citizens	Positive
Youth and women	Availability of jobs, alternative SIGS and education	Positive

Poachers and illegal loggers	Reduced income	Positive
Immigrants	Fewer opportunities to gain access to free or cheap land and natural resources	Positive
Local cooperative group	Increase funds for training, lessons, and micro-finance	Positive

#### 4.2.4 High Conservation Values Protected (CCB, CM2.4)

- HCV on provision of critical ecosystem services:** HCVs under this category include forests and communities critical to water catchment. The WSRAFP is building 56 clean water wells with filtering system and reservoirs in 56 village. The community will also protect the source of water shed including the surrounding forest conservation. These water catchment services and forest conservation are the main priority of the WSRAFP, and activities are designed for community to ensure greater protection of their water source ecosystem. This inherently provides positive effects on these high conservation values, and no negative effects are anticipated because of the project.
- HCV on Areas that are critical for the traditional cultural identity of communities:** Part of PARA1 close to Piru area has been identified to be a critical area to preserve the local culture of Agarwood plantation and restoration. Agarwood is high value and becoming critical to the local community because of illegal poaching. This inherently provides positive effects on these high conservation values, and no negative effects are anticipated because of the project.

The project will monitor for any negative impacts on HCVs.

### 4.3 Other Stakeholder Impacts

#### 4.3.1 Impacts on Other Stakeholders (VCS, 3.18, 3.19; CCB, CM3.1)

The project activities are unlikely to have any long-term impacts on the well-being of other stakeholders, though there are other stakeholder groups who are predicted to suffer potential costs of illegal activities from implementation of project activities.

- Poachers and illegal loggers:** although these are illegal activities for the large part, those genuinely undertaking them for basic livelihood support will not be offered or considered for direct employment when job opportunities arise e.g., as eco-guards. Nonetheless, they will also enjoy the other general community benefits like access to community educational grants schemes, improved health access and agricultural training to help move them away from illegal activities.
- Traders, middlemen and employers:** while this group might see diminished profits from illegal trade in the short term, we believe they will enjoy greater stability in the long-term from conducting legitimate business, reduced run-ins with the law, employees and community, and overall greater social capital and license to operate in the area.
- Immigrants:** similar to the traders above, this group might suffer some costs in the short term

through increased scrutiny and fewer chances for accessing ‘free’ land and jobs, but will also gain from greater stability by being recognized and accepted as legitimate members in the community once they come in through legal avenues.

#### 4.3.2 Mitigation of Negative Impacts on Other Stakeholders (VCS, 3.18, 3.19; CCB, CM3.2)

There are no legal and formal mitigation on the negative impacts on other stakeholders, and therefore no mitigations are required.

#### 4.3.3 Net Impacts on Other Stakeholders (VCS, 3.18, 3.19; CCB, CM3.3)

There are no negative impacts on other stakeholders.

### 4.4 Community Impact Monitoring

#### 4.4.1 Community Monitoring Plan (CCB, CM4.1, CM4.2, GL1.4, GL2.2, GL2.3, GL2.5)

The selection of appropriate indicators is invaluable to the impact assessment process, as 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). 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. Again, our theory of change logic in the Result Chain diagrams (see Section 2.1.17) provided us with a good basis for selecting indicators that factor in attribution. We selected a total of 43 indicators for monitoring the social impacts of the WSRAFP, including 20 Output, 13 Outcome and 10 Impact indicators (Table 18).

We then decided on the best sampling methods to use to collect these data, keeping in mind the need to achieve acceptable levels accuracy, precision and cost effectiveness whilst retaining transparency and simplicity. From this, a monitoring plan was designed to collect information on the identified indicators. The WSRAFP shall use two major data sources for the selected indicators: Internal reporting systems and Household-level surveys. The executor to generate these indicators is listed in the Table 18 below. In addition, Focal Group Discussions during SBIA workshops will be used to validate findings and obtain any further information/clarification, while Government Institutions will be visited for secondary data and general community statistics. In-house reporting will mainly collect input and output indicators (and some outcome too), while the other methods will mainly assess outcome and impact indicators.

Social Impact Assessment: Monitoring Plan

Table 38: The WSRAFP Social impact assessment 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 WSRAFP	SIA001	# of forest protection training meetings held with participation and support from Cooperative and local authorities	Output	Internal report	AAD/Cooperative/FMU4	Quarterly	Village office
			SIA002	# participants in SIGS and forest protection training meetings	Output	Internal report	AAD/Cooperative/FMU4	Quarterly	Village office
			SIA003	# of rangers employed	Output	FMU4 report	FMU IV	annually	FMU4 Office
			SIA004	# and type of equipment provided including ranger outposts	Output	FMU4 report	FMU IV	Annually	FMU4 Office
			SIA005	# of community watch-post assembled	Output	FMU4 report	AAD/Cooperative/FMU4	Quarterly	Village office
			SIA006	Volume of timber and logs confiscated from outside loggers by FMU4 Patrol Team rangers	Output	FMU4 report	FMU IV	Quarterly	FMU4 Office
			SIA007	# of chainsaws confiscated from outside loggers	Output	FMU4 report	FMU IV	Quarterly	FMU4 Office
			SIA008	# of legal cases submitted against forest criminals by WSRAFP patrol rangers	Output	FMU4 report	FMU IV	Quarterly	FMU4 Office
			SIA009	# of forest fire extinguished by WSRAFP rangers	Output	FMU4 report	FMU IV	Annually	Project Accounting Area
			SIA010	# of Training and support for sustainable eco-charcoal techniques	Output	Internal report	AAD/Cooperative	Annually	Village office

	<i>Decrease in encroachment and land-grabbing</i>	<i>By 2027, reduce the number of encroachment and land-grabbing by half in the WSRAFP</i>	<b>SIA011</b>	# of land encroachment cases stopped by WSRAFP rangers	Output	FMU4 report	FMU IV	Annually	Project Accounting Area
<b>Wildlife and HCV Fauna/Flora poaching and conservation</b>	<i>Decrease Wild Agarwood and other HCV fauna/Flora Poaching</i>	<i>By 2027, reduce the number of wildlife poaching incidents by half in the WSRAFP</i>	<b>SIA012</b>	# patrols undertaken, including coverage and distances	Output	FMU4 report	FMU IV	Quarterly	Project Accounting Area
			<b>SIA013</b>	# of hunting tools removed/confiscated by WSRAFP forest rangers	Output	FMU4 report	FMU IV	Annually	Project Accounting Area
			<b>SIA014</b>	# poacher cases resulting in convictions	Output	FMU4 report	FMU IV	Annually	FMU4 Office
			<b>SIA015</b>	# of SIGGs for Agarwood and Other NTFP Biodiversity Conservation Training	Outcome	Internal report	AAD/Cooperative	Quarterly	Village office
			<b>SIA016</b>	# community members who have undergone agarwood-planting training	Output	Internal report	AAD/Cooperative	Annually	Village office
			<b>SIA017</b>	# female community members who have undergone agarwood-planting training	Output	Internal report	AAD/Cooperative	Annually	Village office
			<b>SIA018</b>	# of community members who have undergone Agarwood Planting Inoculation Training	Output	Internal report	AAD/Cooperative	Annually	Village office
			<b>SIA019</b>	# female community members who have undergone agarwood-Inoculation training	Output	Internal report	AAD/Cooperative	Annually	Village office
			<b>SIA020</b>	# of community members participating in Agarwood and NTFP future/online eco-tourism activities	Outcome	Internal report	AAD/Cooperative	Annually	AAD/Cooperative Office
		<b>SIA021</b>	# of female community members participating in Agarwood and NTFP future/online eco-tourism activities	Outcome	Internal report	AAD/Cooperative	Annually	AAD/Cooperative Office	
		<i>By 2027, Agarwood and other NTFP Community Biodiversity Ecotourism Sites established and promoted</i>							

			<b>SIA022</b>	# tourism promotion (include online) initiatives undertaken	Outcome	Internal report	AAD/Cooperative	Annually	AAD/Cooperative Office
			<b>SIA023</b>	# of visitors visiting the community online Agarwood NTFP eco-tourism facilities	Outcome	Internal report	AAD/Cooperative	Annually	AAD/Cooperative Office
			<b>SIA024</b>	Amount of revenue accruing from Agarwood eco-tourism activities in the area	Impact	Internal report	AAD/Cooperative	Annually	AAD/Cooperative Office
	Greater appreciation and awareness of wildlife benefits	By 2027, 25% more community members demonstrate greater appreciation for wildlife and conservation	<b>SIA025</b>	# of awareness and sensitization training meetings	Outcome	Internal report	AAD/Cooperative/FMU4	Annually	Village office
			<b>SIA026</b>	# of community members attending awareness and sensitization training meetings	Output	Internal report	AAD/Cooperative	Annually	Village office
			<b>SIA027</b>	# of community members attending awareness and sensitization training meetings	Output	Internal report	AAD/Cooperative	Annually	Village office
			<b>SIA028</b>	# households with greater awareness about importance or conservation	Outcome	Internal survey	AAD/Cooperative	Annually	Village office
	Improve community livelihoods	Reduced cost of living	By 2027, 10% of community members with direct livelihood benefits from the WSRAFP	<b>SIA029</b>	# schools constructed, repaired or equipped	Impact	Internal report	AAD/Cooperative	Annually
<b>SIA030</b>				# Amount of money allocated to bursary schemes	Impact	Internal report	AAD	Annually	Project Accounting Area
<b>SIA031</b>				# students benefiting from bursary schemes	Impact	Internal report	AAD	Annually	Project Accounting Area
<b>SIA032</b>				# schoolgirl benefiting from bursary schemes	Impact	Internal report	AAD	Annually	Project Accounting Area
Clean Drinking Water and General Health		By 2034, 100% of Villages share the clean and safe drinking water	<b>SIA033</b>	# of water purification system in each Commune	Impact	Internal report	AAD	Annually	Project Accounting Area

			<b>SIA034</b>	Reservoir vs population ratio in Project zone	Impact	Internal report	AAD	Annually	Project Accounting Area
			<b>SIA035</b>	Amount of money allocated to Disaster Reserve Fund / Emergency Relief Fund	Impact	Internal report	AAD	Annually	Project Accounting Area
			<b>SIA036</b>	% community members benefiting from WSRAFP-related health schemes	Outcome	Internal report	AAD	Annually	Project Accounting Area
			<b>SIA037</b>	% female community members benefiting from WSRAFP-related health schemes	Outcome	Internal report	AAD	Annually	Project Accounting Area
	<i>Higher income levels</i>	<i>By 2027, 10% of community members earning income directly from the WSRAFP and associated activities</i>	<b>SIA038</b>	# of Sustainable Income Generating Groups (SIGGs) with Forest Protection Goal and NTFP established in community areas	Outcome	Internal report	AAD/Cooperative	Annually	Project Accounting Area
<b>SIA039</b>			# of community members directly employed by the WSRAFP SIGGs	Outcome	Internal report	AAD/Cooperative	Annually	Project Accounting Area	
<b>SIA040</b>			# of female community members directly employed by the WSRAFP SIGGs	Outcome	Internal report	AAD/Cooperative	Annually	Project Accounting Area	
<b>SIA041</b>			# community members who have accessed the microfinance scheme	Output	Scheme's records	AAD/Cooperative	Annually	Project Accounting Area	
<b>SIA042</b>			# of Chicken/Goat or other NTFP raised/ generated and made available to community	Impact	Internal report	AAD/Cooperative	Annually	Project Accounting Area	
	<i>Improved well-being</i>		<b>SIA043</b>	# social well-being program in the area	Outcome	Internal report	AAD	Annually	Project Accounting Area
			<b>SIA044</b>	Amount of money allocated to social well-being program	Impact	Internal report	AAD	Annually	Project Accounting Area

SMART objective: Specific, Measurable, Achievable, Relevant and Time-bound.

#### 4.4.2 Monitoring Plan Dissemination (CCB, CM4.3)

The WSRAFP 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 workshops.

### 4.5 Optional Criterion: Exceptional Community Benefits

WSRAFP will create 97 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 11,890 community members through dental/oral education enhancement/training mobile service and telehealth/telemedicine health/hygiene facilities enhancement to 3,567 community members (SDG3: Good Health and Well-Being). These 97 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). WSRAFP will Achieve 12 SDGs by building 56 clean water reservoir and filter system in 56 project accounting area villages (SDG6: Clean Water and Sanitation), which will greatly improve the community members wellbeing.

# 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 WSRAFP project zone, the other 5 islands are all inside the WSRAFP Project Accounting Area. This paves the way for the WSRAFP biodiversity backbone building.

Table 38. Restoration of critical endangered species

<p><b>Critically Endangered <i>Aquilaria malaccensis</i>, Vulnerable <i>Aquilaria hirta</i>, <i>Aquilaria cumingiana</i>, <i>Aquilaria filaria</i>, <i>Gyrinops versteegii</i> and Endangered <i>Gyrinops decipiens</i>, <i>Gyrinops salicifolia</i>, <i>Gyrinops moluccana</i> Across the Maluku Province</b></p>	<p>The WSRAFP’s core of ARR will protect the forest in West Seram and ARR by setting up of 40 site 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.</p> <p>The Objectives and Benefits of WSRAFP is not only protect the forest but also to establish the world class Agarwood Sanctuary.</p> <p>In PAA1 (2,374 Ha), PAA2 (4,962 Ha), PAA3 (30,539 Ha) area, Agarwood encroachment is monitored through the FMU6</p>
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	patrol team and community watch-post. The nature Agarwood habitats will also be tagged with GPS and put into the protection location list.
<b><i>Shorea selanica</i> (Critically Endangered)</b> <b><i>Shorea montigena</i> (Critically Endangered)</b> <b>At West Seram</b>	<p>The WSRAFP 's core of ARR will protect the forest in West 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 West 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.</p> <p>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.</p>
<b><i>Cacatua moluccensis</i> (VU)</b> <b><i>Lorius domicella</i> (EN)</b> <b><i>Lorius domicella</i> (EN)</b> <b><i>Pteropus chrysoproctus</i> (VU)</b> <b>Across the West Seram area</b>	<p>The WSRAFP 's core of ARR will protect the forest in West Seram and ARR by setting up Agarwood Plantation on 40 Community/Cillage/Social Forest to increase Biodiversity and PAA1, PAA2 and PAA3, 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.</p>

### 5.1.2 High Conservation Values (CCB, B1.2)

Table 39. High Conservation Value Focal Area

<b>High conservation value</b>	HCV 1.2 Critically Endangered Species HCV 1.3 Areas that Contain Habitat for Viable Populations of Endangered, Restricted Range or Protected Species
<b>Qualifying attribute</b>	Seram Island is the natural habitat for Agarwood <i>Aquilaria malaccensis</i> (CR), <i>Aquilaria hirta</i> (VU), <i>Aquilaria cumingiana</i> (VU), <i>Aquilaria filaria</i> (VU), and <i>Gyrinops decipiens</i> (EN), <i>Gyrinops salicifolia</i> (EN), <i>Gyrinops moluccana</i> (EN) and <i>Gyrinops versteegii</i> (VU).
<b>Focal area</b>	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 40. IUCN Endangered status of species in the WSRAFP Project zone

Birds		
<i>Cacatua moluccensis</i>	VU	Global
<i>Lorius domicella</i>	EN	Global
<i>Lorius domicella</i>	EN	Global
<i>Pteropus chrysoproctus</i>	VU	Regional
<i>Monarcha boanensis</i>	CR	Global
Plants		
<i>Shorea selanica</i>	CR	Global
<i>Shorea montigena</i>	CR	Global
<i>Aquilaria malaccensis,</i>	CR	Global
<i>Aquilaria hirta</i>	VU	Global
<i>Aquilaria cumingiana</i>	VU	Global
<i>Aquilaria filaria</i>	VU	Global
<i>Gyrinops decipiens</i>	EN	Global
<i>Gyrinops salicifolia</i>	EN	Global
<i>Gyrinops moluccana</i>	EN	Global
<i>Gyrinops versteegii</i>	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**

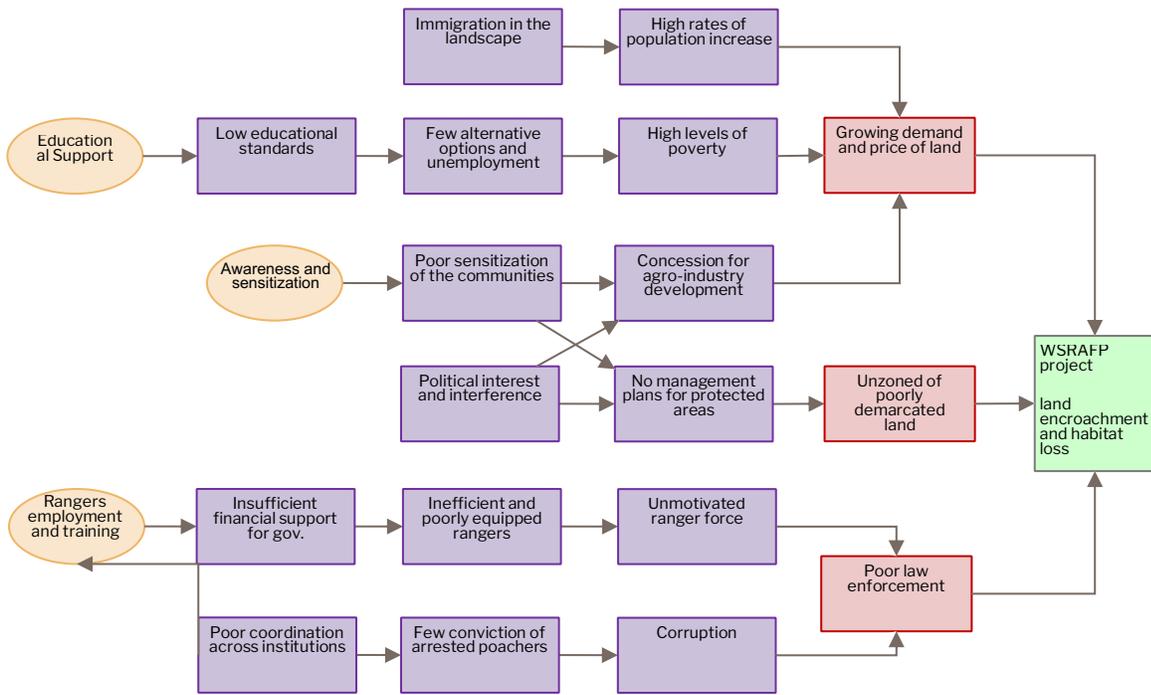
The SBIA/PRA workshops identify the most important biodiversity and key threats as **Focal Issues**, as followings:

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.

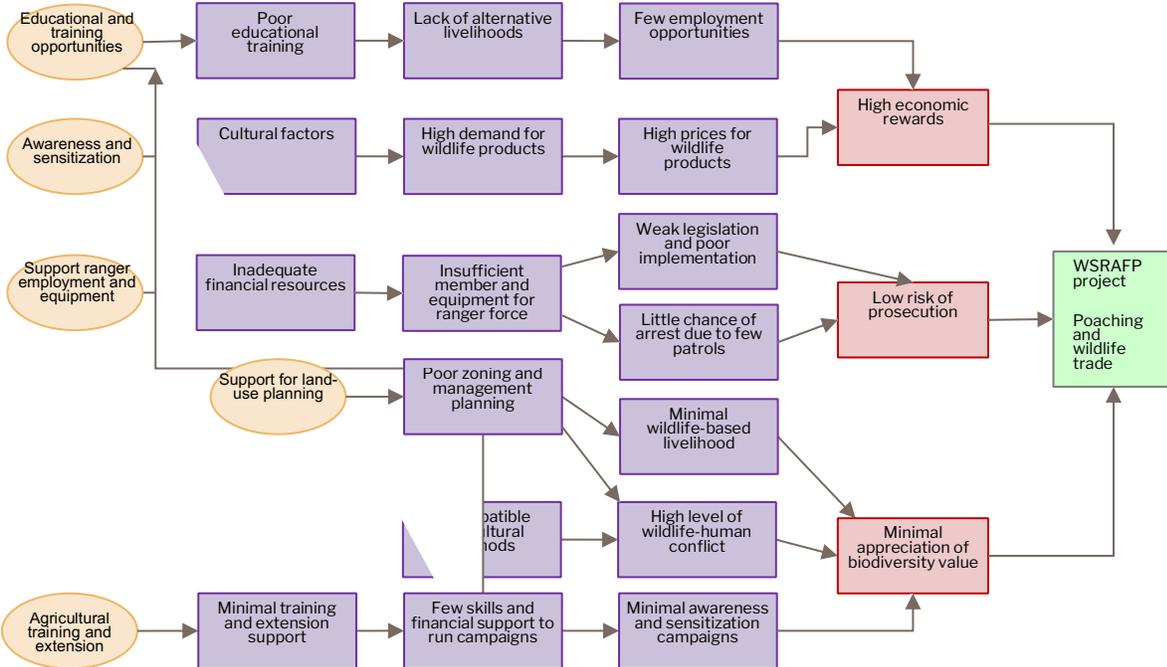
#### **Problem Flow Diagrams**

After establishing the fundamental issues that the project should focus on to achieve the overarching ARR 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.

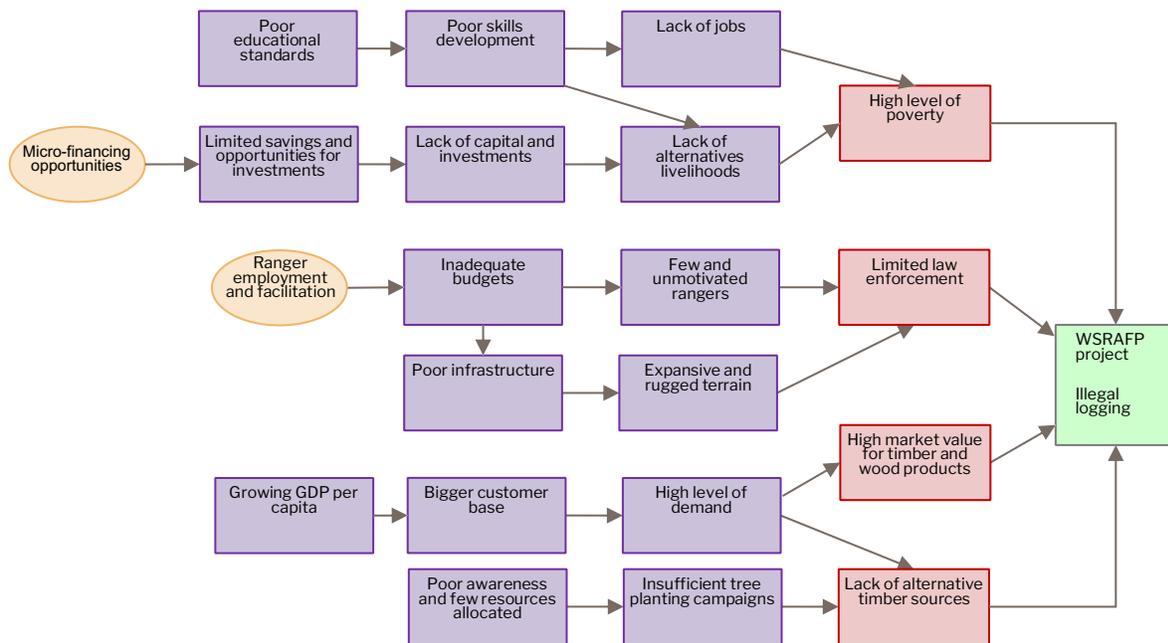
- a) Land encroachment



b) Wildlife poaching and trade



c) Illegal logging



**Legend Table**



Figure 21: Problem Flow diagrams produced for the Focal Issues during the SBIA/PRA workshop for the WSRAFP

**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 ARR project (Table 20).

Table 41: Future without-project projections of the key contributing factors to the Focal Issues identified during the WSRAFP 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?
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Poor law enforcement	Worsen	<ul style="list-style-type: none"> <li>• Fewer rangers on patrol – fewer patrols conducted</li> <li>• Less budget for law enforcement implementation</li> <li>• Lack of capacity for implementing effective law enforcement</li> <li>• Less trust from international communities</li> <li>• Increased gray area of Government</li> </ul>
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	<ul style="list-style-type: none"> <li>• Population growth</li> <li>• Need for land for Industrial agriculture product</li> <li>• Economic Development</li> </ul>

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	<ul style="list-style-type: none"> <li>• Increasing demand from increasing number of consumers</li> <li>• Lack of alternative livelihoods</li> </ul>
Low risk of being prosecuted	Worsen	<ul style="list-style-type: none"> <li>• Fewer poachers are detected and arrested due to poor law enforcement</li> <li>• Increased gray area of Government</li> </ul>
Lack of awareness of biodiversity value	Worsen	<ul style="list-style-type: none"> <li>• Lack of consistent and informative awareness and sensitization campaigns delivered by Government or NGOs</li> </ul>

c. Illegal logging

Direct Factor	In 5-10 years, will condition improve, worsen, or remain unchanged?	What will drive the change?
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Poor law enforcement	Worsen	<ul style="list-style-type: none"> <li>• Fewer rangers on patrol – fewer patrols conducted</li> <li>• Less budget for law enforcement implementation</li> <li>• Lack of capacity for implementing effective law enforcement</li> <li>• Less trust from international communities</li> </ul> Increased corruption
Poverty	Worsen	<ul style="list-style-type: none"> <li>• Population increase</li> <li>• Poor agriculture techniques</li> <li>• Unemployment and lack of alternative livelihoods</li> </ul>
High demand for timber and Agarwood (both local and international)	Worsen	<ul style="list-style-type: none"> <li>• Population growth leading increase in demand</li> <li>• Income of people increase lead to demand timber</li> <li>• High price of timber</li> <li>• High price of Agarwood</li> </ul>

## 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 Unplanned deforestation from PAA1 of 2,374 Ha, PAA2 of 4,962 Ha and PAA3 of 30,539 Ha. 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)

Table 42. Biodiversity Changes

<b>Biodiversity element</b>	Avoid Deforestation and Forest Degradation to save the habitat of biodiversity of endangered flora and fauna.
<b>Estimated change</b>	<p>The 40 biodiversity restoration plantation in Afforestation of 2,374 Ha (PAA1), Reforestation of PAA2 (4,962 Ha), Reforestation and Revegetation of PAA3 (30,539 Ha) will preserve the natural habitat of Agarwood <i>Aquilaria malaccensis</i>(CR), <i>Aquilaria hirta</i> (VU), <i>Aquilaria cumingiana</i>(VU), <i>Aquilaria filaria</i> (VU), and <i>Gyrinops decipiens</i> (EN), <i>Gyrinops salicifolia</i> (EN), <i>Gyrinops moluccana</i> (EN) and <i>Gyrinops versteegii</i> (VU) <i>Shorea selanica</i> (CR) and <i>Shorea montigena</i> (CR) by WSRAFP Forest protection Patrol and implementing community SIGS.</p> <p>Restoration Forestation of 40 biodiversity restoration plantation of Agarwood species, <i>Sesbania sesban</i>, <i>Samanea saman</i>, <i>Shorea selanica</i>, <i>Shorea montigena</i>. in Project Zone. The nature Agarwood habitats will also be tagged with GPS and put into the protection location list.</p> <p>The Objectives and Benefits of WSRAFP are not only protect the forest but also to establish the world class Agarwood Sanctuary.</p>
<b>Justification of change</b>	The WSRAFP 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 WSRAFP , 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 West 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 WSRAFP 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 WSRAFP plantation system spread around the 20 villages not only provide the HCV Agarwood Forest (in addition to the ARR 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 ARR, increased carbon capture/sequestration by Agarwood/Sesbania Plantation, at the same time adapt to these anticipated changes by maintaining the 40 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 West Seram Forest Landscape, the WSRAFP 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)

Table 43. Species Used

Species introduced	Classification	Justification for use	Adverse effects and mitigation
<i>Aquilaria malaccensis</i>	native	Restoration	None
<i>Aquilaria hirta</i>	native	Restoration	None
<i>Aquilaria cumingiana</i>	native	Restoration	None
<i>Aquilaria filaria</i>	native	Restoration	None
<i>Gyrinops decipiens</i>	native	Restoration	None
<i>Gyrinops salicifolia</i>	native	Restoration	None
<i>Gyrinops moluccana</i>	native	Restoration	None
<i>Gyrinops versteegii</i>	native	Restoration	None
<i>Sesbania sesban</i>	native	Companion Planting to eliminate chemical fertilizer	None
<i>Samanea saman</i>	native	Companion Planting to eliminate chemical fertilizer	None
<i>Shorea selanica</i>	native	Restoration	None

<i>Shorea montigena</i>	native	Restoration	None
<i>Robinia pseudoacacia</i>	Non-Native	Companion Planting to eliminate chemical fertilizer, Fire Resistant	None
<i>Melaleuca leucadendra</i>	native	Restoration, NTFP	None
<i>Eucalyptus deglupta</i>	native	Restoration	None

### 5.2.6 Invasive Species (VCS, 3.19; CCB, B2.5)

Table 44. Invasive Species Used

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)

Table 45. GMO Species Used

<b>Name</b>	No chemical fertilizers used
<b>Justification of use</b>	N/A
<b>Potential adverse effect</b>	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 WSRAFP. Thirdly, the complementary governmental patrol and community watch-post provide a positive safeguard to the forest and the biodiversity preservation.

Table 46. Negative offsite impact

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 47: Project biodiversity impact assessment for monitoring plan.

Focal Issue	Key results	SMART Objective	Indicator or Code	Indicator	Indicator type	Data collection method	Who?	When?	Where?
<b>Forest destruction and land encroachment</b>	Decrease in illegal logging	By 2027, reduce the number of illegal logging incidents by half in the WSRAFP	<b>BIA001</b>	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 WSRAFP	<b>BIA002</b>	Same as SIA011	Same as SIA	Same as SIA	Same as SIA	Same as SIA	Same as SIA
<b>Wildlife and HCV Fauna/Flora poaching and conservation</b>	Decrease Wild Agarwood and other HCV fauna/Flora Poaching and trade	By 2027, reduce the number of wildlife poaching incidents by half in the WSRAFP	<b>BIA003</b>	Same as SIA012 to SIA014	Same as SIA	Same as SIA	Same as SIA	Same as SIA	Same as SIA
	other Fauna/Flora		<b>BIA004</b>	# of Agarwood confiscated from outside poachers by FMU6 Patrol Team rangers	Outcome	FMU6 report	FMU IV	Annually	Project Accounting Area
			<b>BIA005</b>	# 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	<b>BIA006</b>	Same as SIA025 to SIA028	Same as SIA	Same as SIA	Same as SIA	Same as SIA	Same as SIA

			<b>BIA007</b>	<i># of awareness, sensitization training with special focus on HCV Fauna and Flora into school systems.</i>	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	<b>BIA008</b>	Same as SIA015-SI023	Same as	Same as	Same as	Same as	Same as
			<b>BIA009</b>	<i># and species of wild agarwood and other HCV identified and protected in the PAAs</i>	Impact	Internal report	FMU IV, School	Quarterly	Project Accounting Area
			<b>BIA010</b>	<i># of SIGS Agarwood HCV Flora restoration plantation established</i>	Impact	Internal report	AAD/Cooperative/ FMU6	Annually	Project Accounting Area
			<b>BIA011</b>	<i># and species and Agarwood and Shorea trees planted</i>	Outcome	Internal report	AAD/Cooperative/ FMU6	Annually	Project Accounting Area
			<b>BIA012</b>	<i># of Fauna species rescued and released</i>	Outcome	FMU6 report	FMU IV	Annually	Project Accounting Area
		By 2028, Agarwood and other NTFP Community Biodiversity Ecotourism Sites established and promoted	<b>BIA013</b>	Same as SIA020-SIA022	Same as SIA	Same as SIA	Same as SIA	Same as SIA	Same as SIA
<b>Improve community livelihoods</b>	Reduced cost of living	By 2027, 10% of community members with direct livelihood benefits from the WSRAFP	<b>BIA014</b>	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 WSRAFP and associated activities	<b>BIA015</b>	<i># of Chicken/Goat Agarwood SIGGs formed</i>	Outcome	Internal report	AAD/Cooperative	Annually	Project Accounting Area

			<b>BIA016</b>	<i># of Shorea dammar resin SIGGs formed</i>	Outcome t	Internal report	AAD/Cooperative	Annually	Project Accounting Area
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SMART objective: Specific, Measurable, Achievable, Relevant and Time-bound.

#### 5.4.2 Biodiversity Monitoring Plan Dissemination (CCB, B4.3)

The WSRAFP 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 WSRAFP 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)

Table 48. Trigger Species Population

<b>Trigger species</b>	Shorea selanica IUCN 2023: T33146A125627493 and Shorea montigena IUCN 2023: T33146A125627493 <a href="https://www.iucnredlist.org/species/33146/125627493">https://www.iucnredlist.org/species/33146/125627493</a> <a href="https://www.iucnredlist.org/species/33426/125628716">https://www.iucnredlist.org/species/33426/125628716</a>
<b>Population trend at start of project</b>	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.
<b>Without-project scenario</b>	Out of 90 sample plots, only one plot has identified its presence. Without the WSRAFP project, the Shorea population will continue to be threatened.
<b>With-project scenario</b>	With WSRAFP 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.

<b>Trigger species</b>	<p>Critically Endangered <i>Aquilaria malaccensis</i> T32056A2810130, Vulnerable <i>Aquilaria hirta</i> T32056A2810130, <i>Aquilaria cumingiana</i> T38068A88301841, <i>Aquilaria filaria</i> T88305747A88305753, <i>Gyrinops versteegii</i> (Submitted to IUCN by CITES) and Endangered <i>Gyrinops decipiens</i> (Submitted to IUCN by CITES), <i>Gyrinops salicifolia</i> T88307237A88307241, <i>Gyrinops moluccana</i> (Submitted to IUCN by CITES).</p> <p><a href="https://www.iucnredlist.org/species/32056/2810130">https://www.iucnredlist.org/species/32056/2810130</a></p> <p><a href="https://www.iucnredlist.org/species/34561/2853368">https://www.iucnredlist.org/species/34561/2853368</a></p> <p><a href="https://www.iucnredlist.org/species/38068/88301841">https://www.iucnredlist.org/species/38068/88301841</a></p> <p><a href="https://www.iucnredlist.org/species/88305747/88305753">https://www.iucnredlist.org/species/88305747/88305753</a></p> <p><a href="https://www.iucnredlist.org/species/88307237/88307241">https://www.iucnredlist.org/species/88307237/88307241</a></p>
<b>Population trend at start of project</b>	<p>These species have been found scattered in Maluku islands. Agarwood Encroachment has been reported but no specific species have been identified.</p>
<b>Without-project scenario</b>	<p>Out of 90 sample plots, only one plot has identified its presence. Without the WSRAFP project, the Agarwood population will continue to be threatened.</p>
<b>With-project scenario</b>	<p>With WSRAFP 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 Sanctuary. This is the cord of WSRAFP .</p>

# 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
<i>Identify communities and any community groups within them, any cross-cutting community groups, and list other stakeholders.</i>	Please refer to table a-c in section 2.3.2 for each stakeholder's rights, interest, and overall relevance to the project.
Amalatu County	Communities included or adjacent to the Project Accounting Area for the WSRAFP
Elpaputih County	Communities included or adjacent to the Project Accounting Area for the WSRAFP
Huamual County	Communities included or adjacent to the Project Accounting Area for the WSRAFP
Huamual Belakang County	Communities included or adjacent to the Project Accounting Area for the WSRAFP
Inamosol County	Communities included or adjacent to the Project Accounting Area for the WSRAFP
Kairatu County	Communities included or adjacent to the Project Accounting Area for the WSRAFP
Kairatu Barat County	Communities included or adjacent to the Project Accounting Area for the WSRAFP
Seram Barat County	Communities included or adjacent to the Project Accounting Area for the WSRAFP
Taniwel County	Communities included or adjacent to the Project Accounting Area for the WSRAFP
Taniwel Timur County	Communities included or adjacent to the Project Accounting Area for the WSRAFP

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

## APPENDIX 2: REFERENCE

1. Anna Yuliana Wattimena, Marlita Herlin Makaruku, Asri Subkhan Mahulette, Martha Amba, Esther Kembauw., 2023, HAMLET-BASED NUTMEG CULTIVATION AND PRODUCTION SYSTEM IN CENTRAL SERAM DISTRICT, MALUKU, INDONESIA. *International Journal of Multidisciplinary Sciences and Arts*, Volume 2, Number 1, 27-33.
2. Ariane Cosiaux. 2014., Local uses of tree species and contribution of mixed tree gardens to livelihoods in Saleman., Village near Manusela National Park, Seram Island, Maluku (Indonesia), Pp54.
3. Ahmad Budiaman, Linda Audia. 2022. Timber Leftover After Logging Natural Forests in Indonesia: A Systematic Review. *JOURNAL OF ENVIRONMENTAL SCIENCE*. Vol. 20 Issue 2 (2022) : 427-436
4. CITES Report 2022: Agarwood-producing taxa (*Aquilaria* spp. and *Gyrinops* spp.) THE HISTORY AND CHALLENGES OF AGARWOOD AND CITES. CONVENTION ON INTERNATIONAL TRADE IN ENDANGERED SPECIES OF WILD FAUNA AND FLORA. Nineteenth meeting of the Conference of the Parties Panama City (Panama), 14 – 25 November 2022. CoP19 Doc. 62.2 (Rev. 1) pp16.
5. CoP19 Inf. 5. 2022. THE HISTORY AND CHALLENGES OF AGARWOOD AND CITES. CONVENTION ON INTERNATIONAL TRADE IN ENDANGERED SPECIES OF WILD FAUNA AND FLORA. Nineteenth meeting of the Conference of the Parties Panama City (Panama), 14 – 25 November 2022.
6. Critical Ecosystem Partnership Fund (2014) Ecosystem Profile: Wallacea Biodiversity Hotspot. Burung Indonesia, Bogor.
7. Dahlanuddin Hasniati and Max Shelton 2002. *Sesbania grandiflora*: a successful tree legume in Lombok, Indonesia.
8. Dodo, D.; Hidayat, S. The structure, composition, and threatened plants in the Kinarum protected forest, south Kalimantan, Indonesia. *Biodiversitas* 2020, 21, 2603–2618. [CrossRef]
9. FAO. Situation and Outlook of the Forestry Sector in Indonesia. Volume 1: Issues, Findings and Opportunities; Ministry of Forestry, Government of Indonesia, Food and Agriculture Organization of the United Nations: Jakarta, Indonesia, 1990.
10. Gibson, L.; Lee, T.M.; Koh, L.P.; Brook, B.W.; Gardner, T.A.; Barlow, J.; Peres, C.A.; Bradshaw, C.J.A.; Laurance, W.F.; Lovejoy, T.E.; et al. Primary forests are irreplaceable for sustaining tropical biodiversity. *Nature* 2011, 478, 378–381. [CrossRef] [PubMed]
11. Duke J.A. (1983). *Sesbania grandiflora*. Handbook of Energy Crops (unpublished), Topical Forages Factsheet: *Sesbania sesban*.
12. Erik Meijaard, Truly Santika, Sugeng Budiharta, Ahmad Kusworo, Elizabeth A. Law, Rachel Friedman, Joseph A. Hutabarat, Tito P. Indrawan, Julie Sherman, Freya A. V. St. John and Matthew J. Struebig. 2021. Toward improved impact evaluation of community forest management in Indonesia. *Conservation Science and Practice*. 2021;3:e189:1-14.
13. Gray, T.N.E., Hughes, A.C., Laurance, W.F., Long, B., Lynam, A.J., O’Kelly, H., Ripple, W.J., Seng, T., Scotson, L. & Wilkinson, N.M. (2017). The wildlife snaring crisis: an insidious and pervasive threat to biodiversity in Southeast Asia. *Biod. Cons.* DOI 10.1007/s10531-017-1450-5

14. Hall, R., 2011, Australia-SE Asia collision: plate tectonics and crustal flow, in Hall, R., Cottam, M.A., and Wilson, M.E.J., eds., *The SE Asian Gateway: History and Tectonics of the Australia-Asia Collision*, Geological Society of London Special Publication 355, 75–109.
15. Hall, R., 2012, Late Jurassic-Cenozoic reconstructions of the Indonesian region and the Indian Ocean: Tectonophysics, 570–571, 1–41.
16. Irnayuli R. Sitepu, Erdy Santoso, Sulisty A. Siran, and Maman Turjaman. 2011. FRAGRANT WOOD GAHARU: When the wild can no longer provide. ITTO PD425/06 Rev. 1 (I): Production and Utilization Technology for Sustainable Development of Gaharu (Gaharu) in Indonesia.
17. IUCN <https://www.iucnredlist.org/search/list?query=aquilaria&searchType=species>
18. IUCN <https://www.iucnredlist.org/search?query=Gyrinops&searchType=species>
19. James Douglas Langston, Rebecca Anne Riggs, Agni Klintuni Boedhihartono, Agustinus Kastanya and Jeffrey Sayer. An island in transition: governing conservation and development in Seram, Indonesia. 2020. *Singapore Journal of Tropical Geography*. Pp19.
20. Jen-Ping Chung, Kai-Hsien Chen. Developing an in vitro quasi-symbiotic culture system of *Aquilaria malaccensis* with potentially beneficial microbes on agarwood resinous formation. *Plant Cell, Tissue and Organ Culture (PCTOC)* 2018, 133:193–202.
21. Jonathan Pownall and Robert Hall, 2014, Neogene Extension on Seram: a New Tectonic Model for the Northern Banda Arc. *PROCEEDINGS, INDONESIAN PETROLEUM ASSOCIATION, Thirty-Eighth Annual Convention & Exhibition, May 2014"*
22. Liswanti N (2012) Building a shared vision: Scenarios for collaborative land use planning in Central Moluccas Regency, Indonesia. *The Futures of Agriculture*. Brief No. 39. Global Forum on Agricultural Research, Rome.
23. Lutfy Abdullah, Ruliyana Susanti, Joeni Setijo Rahajoe, Tika Dewi Atikah, Subarudi Subarudi, Rosita Dewi, Ika Heriansyah, Muhammad Abdul Qirom, Kusuma Rahmawati, Asep Hidayat., Feasibility of Agarwood Cultivation in Indonesia: Dynamic System Modeling Approach. *Forest* 2022, 13, 1869. Kai-Hsien Chen. Agarwood Fingerprint Mass Spectra Library Establishment for Adulteration Identification. *Sinetics Accreditation International Taiwan Ltd.* 2018 SBIR Grant Report. The Ministry of Economy, Taiwan, ROC.
24. Kai-Hsien Chen. Taiwan Agarwood Intelligent Platform and Wise Marketing. *Sinetics Accreditation International Taiwan Ltd.* 2017 SIIR Grant Report : The Ministry of Economy, Taiwan., ROC.
25. Klompé, T.H.F., 1954, The structural importance of the Sula Spur (Indonesia): *Indonesian Journal of Natural Sciences*, 110, 21–40.
26. KPMG Feasibility Report 2021 December, Seram Island Forest Conservation and Agarwood Farming. Pp 52. KPMG Taiwan.
27. Kuldeep Singh, · Rajesh Gera, 2021. Mechanism and application of *Sesbania* root-nodulating bacteria: an alternative for chemical fertilizers and sustainable development. *Archives of Microbiology* (2021) 203:1259–1270.
28. Michael Richards, Steven Panfil 2011. *Social and Biodiversity Impact Assessment (SBIA) Manual for REDD+ Projects*. pp103.
29. Maria M. Sahuilawane, Sunardi, and Johan Iskandar ICYES 2023. Implementation of Sasi which impact on the sustainability of ecosystem services in Maluku. *Web of Conferences*

- 495, 01005 (2024)
30. Max Shelton. 2017. Indonesian farm dollars can grow on trees.
  31. Max Shelton. 1999. Tropical forage tree legumes in agroforestry systems. FAO. ([www.fao.org/WAICENT/FAOINFO/AGRICULT/AGP/AGPC/doc/Present/Shelton/default.htm](http://www.fao.org/WAICENT/FAOINFO/AGRICULT/AGP/AGPC/doc/Present/Shelton/default.htm))
  32. Michaux B., 2010, Biogeology of Wallacea: geotectonic models, areas of endemism, and natural biogeographical units. *Biological Journal of the Linnean Society* 101, 193–212.
  33. Mispa Christian Science Paisina, Adonia Ivone Laturette, Novyta Uktolseja, 2021, Hak Milik Atas Tanah Adat Di Wilayah Kepulauan. *PAMALI: Pattimura Magister Law Review Vol 1, No 2 (2021): 62-72.*
  34. MoEF. The State of Indonesia's Forests 2020; Ministry of Environment and Forestry: Jakarta, Indonesia, 2021.
  35. Monthly wage 2024 Maluku and Indonesia. <https://www.bps.go.id/en/statistics-table/1/MjlzOSMx/average-of-net-income-per-month-of-self-employed-by-province-and-age-group--thousand-rupiah---2024.html>
  36. Myers R, Intarini D, Sirait MT, Maryudi A., 2017, Claiming the forest: inclusions and exclusions under Indonesia's 'new' forest policies on customary forests. *Land Use Policy* 66, 205–13.
  37. Myers N, Mittermeier RA, Mittermeier CG, Da Fonseca GA, Kent J (2000) Biodiversity hotspots for conservation priorities. *Nature* 403, 853–8.
  38. NATIONAL FOREST REFERENCE LEVEL FOR DEFORESTATION, FOREST DEGRADATION AND ENHANCEMENT OF FOREST CARBON STOCK., 2022. Submission by Indonesia., In the Context of Decision 12/CP.17 para 12 UNFCCC. Pp100.
  39. PATRICH PHILL EDRICH PAPILAYA1, I NENGAH SURATI JAYA, TEDDY RUSOLONO and NINING PUSPANINGSIH. Land change-based forest management scenario in the typology of island clusters in Maluku Province, Indonesia. *Biodiversita*. September 2021., 22 (9): 3756-3763,
  40. Jonathan M. Pownall, Robert Hall., 2014, ne Extension on Seram: A New Tectonic Model for the Northern Banda Ar.
  41. PC14 Doc. 9.2.2 Annex 2. 2003. Review of Significant Trade *Aquilaria malaccensis* (November 2003) CITES report.
  42. Pownall JM, Forster MA, Hall R, Watkinson IM., 2017, Tectonometamorphic evolution of Seram and Ambon, eastern Indonesia: insights from 40Ar/39Ar geochronology. *Gondwana Research* 44, 35–53.
  43. Rachman Effendi, Tien Wahyuni, Donny Wicaksono, Darwo Darwo, Yunita Lisnawati, Mawazin Mawazin, Nina Mindawati, Asmanah Widarti, Bayu Arief Pratama, Julianus Kinho, Satria Astana 5, Reducing Poverty and Building Peace for a Better Maluku. 2011. ILO/UNIDO Pelagadong Project Report.
  44. RAHARJO Simon H. T., HETHARIE Helen, AUGUSTYN Gelora H., and PESIRERON Maritje. 2017. Cassava and Sweet Potato in Western Seram, Maluku Province: Diversity, Cultivation and Utilization. *OCCASIONAL PAPERS No.58*. March 2017., 51-62.
  45. Reeve AH, Haryoko T, Poulsen MK, Fabre P-H, Jønsson KA., 2014, New ornithological records from Buru and Seram, south Maluku, Indonesia, 1995–2012. *Forktail* 30, 10–22.
  46. Regulation of Manpower, Transmigration and Cooperative of the Republic of Indonesia No: PER. 01/MEN/120 8 Regarding Occupational Safety and Health in Logging and Transporting

Timber.

47. Rezza aji pratama., Clove farmers in Indonesia's "Spice Island" Facing Increasing Uncertainty in a Changing Climate. 27 May 2020. Maluku, Indonesia.
48. Rinaldi Imanuddin and Maman Turjaman. *Forests* 2022, 13, 1869: 1-19."
49. Sex Ratio by Regency\_City in Maluku-2022-2024. <https://maluku.bps.go.id/id/statistics-table/2/MTA3Izl=/rasio-jenis-kelamin-menurut-kabupaten-kota-di-maluku.html>
50. Stein Kristiansen, Arief Budiman & Satyawan Pudyatmoko (2023) Ecosystem Guardians or Threats? Livelihood Security and Nature Conservation in Maluku, Indonesia, *Bulletin of Indonesian Economic Studies*, 59:1, 119-143,
51. Sunderlin, W.D.; Resosudarmo, I.A.P. Rates and Causes of Deforestation in Indonesia: Towards a Resolution of the Ambiguities; Center for International Forestry Research: Bogor, Indonesia, 1996.
52. Synthesis Report: Building a Resilient Tropical Rainforest Heritage of Sumatra for Climate Change Mitigation and Biodiversity Conservation. UNESCO. World Heritage Convention., Man and Biosphere Programme. 2017. PP 22.
53. Tatik Kartika, Ita Carolita and Johannes Manalu, DETERMINATION OF FOREST AND NON-FOREST IN SERAM ISLAND MALUKU PROVINCE, *International Journal of Remote Sensing and Earth Sciences* Vol.13 No.1 June 2016: 19-26.
54. Technical Report 1: Biophysical Report. 2021. Ministry of Environment and Forestry, Agency for Standardization of Environment and Forestry Instruments. Center For Standardization of Sustainable Forest Management Instruments. Forest Resource and Development Agency. Pp16.
55. Technical Report 2: Forest Structure, Carbon Land and Land Use Data Activities. 2021. Ministry of Environment and Forestry, Agency for Standardization of Environment and Forestry Instruments. Center For Standardization of Sustainable Forest Management Instruments. Forest Resource and Development Agency. Pp15.
56. Technical Report 3: Permanence and Leakage Identification from Human Activities. 2021. Ministry of Environment and Forestry, Agency for Standardization of Environment and Forestry Instruments. Center For Standardization of Sustainable Forest Management Instruments. Forest Resource and Development Agency. Pp11.
57. Technical Report 4: Data Simulation. 2021. Ministry of Environment and Forestry, Agency for Standardization of Environment and Forestry Instruments. Center For Standardization of Sustainable Forest Management Instruments. Forest Resource and Development Agency. Pp15.
58. Thompson J. P. 2015. *Sesbania sesban* (sesban). CABI Compendium.
59. Tim Amdal Unpatti. 2017. Studi Amdal Pemanfaatan Hasil Penataan dan Pemulihan Lingkungan pada Lokasi Bekas Pertambangan Tanpa Ijin (PETI) di Gunung Botak dan Gogrea Kabupaten Buru, Ambon.
60. Todd R. Johnson, Amin Budiarto, James Halperin, Celly Catharina, Angga Rachmansah, Mohamad Ridlo, Ahmad Hafizh Adyas and Mispan Indarjo. INDONESIA TROPICAL FOREST AND BIODIVERSITY ANALYSIS (FAA 118 & 119) Report for Country Development Cooperation Strategy (CDCS): 2021-2025. USAID/Indonesia.
61. Tri Mulyaningsih and dan Isamu Yamada., NOTES OF Aquilaria AND Gyrinops (THYMELAEACEAE) IN HALMAHERA ISLAND MOLUCCAS INDONESIA. 2020.,

- BioWallacea Jurnal Ilmiah Ilmu Biologi Supplement No 1:1-3. Januari.
62. Tri Mulyaningsih and Isamu Yamada., New and Noteworthy Records of Eaglewood from Buru, Moluccas, Indonesia. 2019., Proceedings of the 2nd International Conference on Bioscience, Biotechnology, and Biometrics 2019. 020005:1-5.
  63. Truly Santika, Erik Meijaard, Sugeng Budiharta, Elizabeth A. Law, Ahmad Kusworo, Joseph A. Hutabarat, Tito P. Indrawan, Matthew Struebig, and Kerrie A. Wilsona, Sugeng Raharjo, Imanul Huda, Sulhani, Andini D. Ekaputri, Soni Trison, Madeleine Stigner, Community forest management in Indonesia: Avoided deforestation in the context of anthropogenic and climate complexities. *Global Environmental Change* 46 (2017): 60-71.
  64. <https://www.twgreatdaily.com/cat98/node1956422>
  65. Central Seram Forest management Unit 4 Forest Function Class and Land Cover Class Map 2018
  66. When The Wild Can No Longer Provide. ITTO PD425/06 Rev. 1 (I), Production and Utilization Technology for Sustainable Development of Eaglewood (Gaharu) in Indonesia. 2011. MINISTRY OF FORESTRY OF INDONESIA IN COOPERATION WITH INTERNATIONAL TROPICAL TIMBER ORGANIZATION. PP82."
  67. World Bank Group 2021, The Climate Country Profile: Indonesia,
  68. Valeri V., 2000, The Forest of Taboos: Morality, Hunting, and Identity Among the Huaulu of the Moluccas. University of Wisconsin Press, Madison.
  69. Approved VCS Methodology VM0010 Methodology for Improved Forest Management Version 1.4, October 24, 2024, Sectoral Scope 14.
  70. Von Rintelen, K.; Arida, E.; Häuser, C. A review of biodiversity-related issues and challenges in megadiverse Indonesia and other Southeast Asian countries. *Res. Ideas Outcomes* 2017, 3, e20860. [CrossRef]
  71. Yonky Indrajaya et.al. 2022. Tropical Forest Landscape Restoration in Indonesia: A Review. *Land* 2022, 11(3), 328.
  72. Yusuf B Samsudin, Thifali Adzani, Muhamad Aditio Ramadian, Daisuke Naito and Himlal Baral, 2021. The potential of agarwood as a climateresilient livelihood option in Indonesia. CIFOR Working Paper 271.
  73. <https://www.agriculture.gov.au/biosecurity-trade/export/controlled-goods/non-prescribed-goods/industry-notice/2023/2023-35>
  74. [https://forobs.jrc.ec.europa.eu/static/tmf/TMF\\_DataUsersGuide.pdf](https://forobs.jrc.ec.europa.eu/static/tmf/TMF_DataUsersGuide.pdf)
  75. C. Bourgoin, G. Ceccherini, M. Girardello, C. Vancutsem, V. Avitabile, P. S. A. Beck, R. Beuchle, L. Blanc, G. Duveiller, M. Migliavacca, G. Vieilledent, A. Cescatti & F. Achard., 2024, Human degradation of tropical moist forests is greater than previously estimated. *Nature*. Vol 631: 570-590.
  76. Kamalakumari Anitha, Louis V. Verchot, Shijo Joseph, Martin Herold, Solichin Manuri, Valerio Avitabile., 2015. A review of forest and tree plantation biomass equations in Indonesia. *Annals of Forest Science* (2015) 72:981-920.
  77. Gisel Reyes, Sandra Brown, Jonathan Chapman, and Ariel E. Lugo., 1992. Wood Densities of Tropical Tree Species. U.S. Department of Agriculture, Forest Service, Southern Forest Experiment Station, Retrieved from DOI <https://doi.org/10.2737%2Fso-gtr-88>.

## 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 West Seram Agarwood Ecosystem
APD	Avoided Planned Deforestation and Degradation
ARR	Aforestation, Reforestation and Regeneration
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
WSRAFP	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	Ministry 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 West 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
WSRAFP	West Seram Rastoration and Advanced ForestWise 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) Densimeter
- 2) LiDAR

