PLAN VIVO

PV Climate

Project Design Document

KUKUMUTY
Community-led miombo and mangrove enrichment and agroforestry in Sofala and Inhambane

Mozambique

Project PDD Version 5.5
PDD Template Version 5.5

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OVERVIEW

Project Title:	Kurarama Kuthemba Muty ("Kukumuty"): Community-led miombo and mangrove enrichment and agroforestry in Sofala and Inhambane, Mozambique
Location:	Sofala, Mozambique, centred around and starting from Chibabava district Inhambane, Mozambique, centred around and starting from the Ponta da Barra peninsula
Version:	2.0
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Validation Date:	13/11/2023 - 17/11/2023
Project Intervention(s):	Ecosystem Restoration, Agroforestry
Project Participants:	The project works with rural households in Chibabava District, Mozambique, where most families rely on a mix of subsistence farming, cash-crop production, and seasonal labour migration. In the Inhambane project region, the project collaborates with coastal fishing communities whose livelihoods depend on a diverse portfolio of activities, including fisheries, sea-fruit collection, crop agriculture, and seasonal labour. The project aims to expand organically over time by engaging additional interested communities in and around both Chibabava and Inhambane.
Project Area:	This project enriches Miombo woodlands in and around Chibabava, Mozambique. It also establishes agroforestry nurseries and plots for growing horticultural and fuelwood species. In the Inhambane project

	region, the project is restoring degraded mangroves along the edges of the Inhambane Bay, a large tidal-driven estuary opening into the Mozambique Channel. The project aims to upscale over time by including surrounding communities.
Project Period:	May 2022 – May 2055
Methodology:	The project follows the PM001 Agriculture and Forestry Carbon Benefit Assessment Methodology.
Expected Carbon Benefit:	Miombo: 74 390 tCO2e (initially) Mangrove: 83 187 tCO2e (initially)
Expected Ecosystem Benefit:	Boost for the floristic biodiversity (Shannon index) of the project miombo woodlands and mangroves within a broader agroecosystem mosaic.
Expected Livelihood Benefit:	An increase in access to a diverse mix of fruit, nut, medicinal, and other useful native tree species (e.g., Albizia, Papaya, Mango, Orange, Avocado, Moringa), combined with the sustainable collection of grasses, honey, and Miombo fruits, as well as the responsible harvesting of sea fruits, fish, crabs, and shrimp in the Inhambane project region.

1 General Information

1.1 Project Interventions

The Miombo tropical woodland ecosystem covers roughly 10% of the African continent. It is rich in biodiversity with 8500 floristic species, more than half of which are endemic. Miombo is considered a plagioclimax community formed and maintained by continuous human activity for at least 12,000 years. In central and northern Mozambique, this complex agro-ecosystem mosaic supports nearly two-thirds of rural livelihoods and energy requirements. Closer to the coast, central Mozambique is also known for having one of the largest concentrations of mangroves in Africa, in the deltas and estuaries of its large rivers. Changing climate patterns, combined with growing economic stress for rural households, has increased pressure on miombo woodland and mangrove resources, tree cover, biodiversity and ecosystem services.

This project aims to pursue climate mitigation and adaptation strategies in the Chibabava and Inhambane Districts of central Mozambique. It uses a landscape approach for enrichment of Miombo woodlands and restoration of degraded mangroves, to create climate-resilient agroecosystems and sustainable livelihood opportunities.

This ecosystem restoration intervention has five objectives:

1) Build on the agroecosystem expertise of rural communities to understand changing climatic patterns and economic pressures affecting the surrounding woodland landscape, and apply this knowledge on the project area.
2) Facilitate woodland enrichment in community-identified areas through a combined strategy of soil and fire management and planting of Miombo species sourced from local and project-established nurseries. The project aims to increase floral diversity in the project areas, currently dominated by Combretum, by facilitating the establishment of more endemic Miombo species and significantly raising the Shannon Diversity Index over time ($p<0.05$).
3) Generate livelihood diversification opportunities for agricultural associations by establishing agroforestry lots with a combination of commercially viable fruit, nut, medicinal, and other useful native trees (e.g. Albizia, Papaya, Mango, Orange, Avocado, Moringa). Inside the Miombo enrichment areas, the project aims to promote the sustainable collection of grasses, honey and Miombo fruits.
4) Restore degraded mangroves along the edges of the Inhambane Bay, a large tidal-driven estuary opening into the Mozambique Channel, in close collaboration with the fishery communities and the local Community Fisheries Councils (Conselhos Comunitarios de Pesca

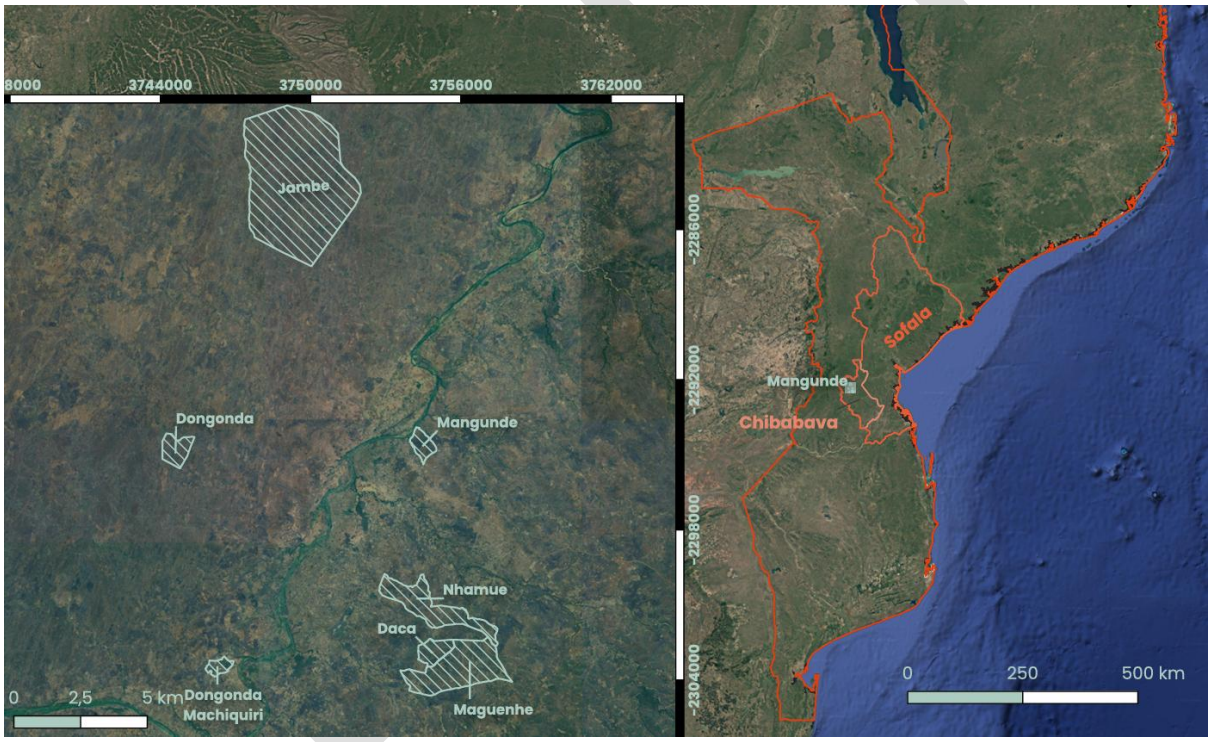
- CCP). The project aims to strengthen local livelihoods through improved access to sea products such as shellfish, fish, crab, and shrimp, while also enhancing coastal protection for agricultural activity.

5) Boost and certify the carbon removal in the project areas for long-term socio-environmental benefits and reinvestments by the participating communities.

1.2 Management Rights

1.2.1 Project Boundaries

The maps (shapefiles) with the boundaries of the project region and initial project areas are available in Annex 1 and here below. For a description of the initial livelihood and ecosystem conditions in the project areas, we refer to sections 3.3.1 and 3.4.1.



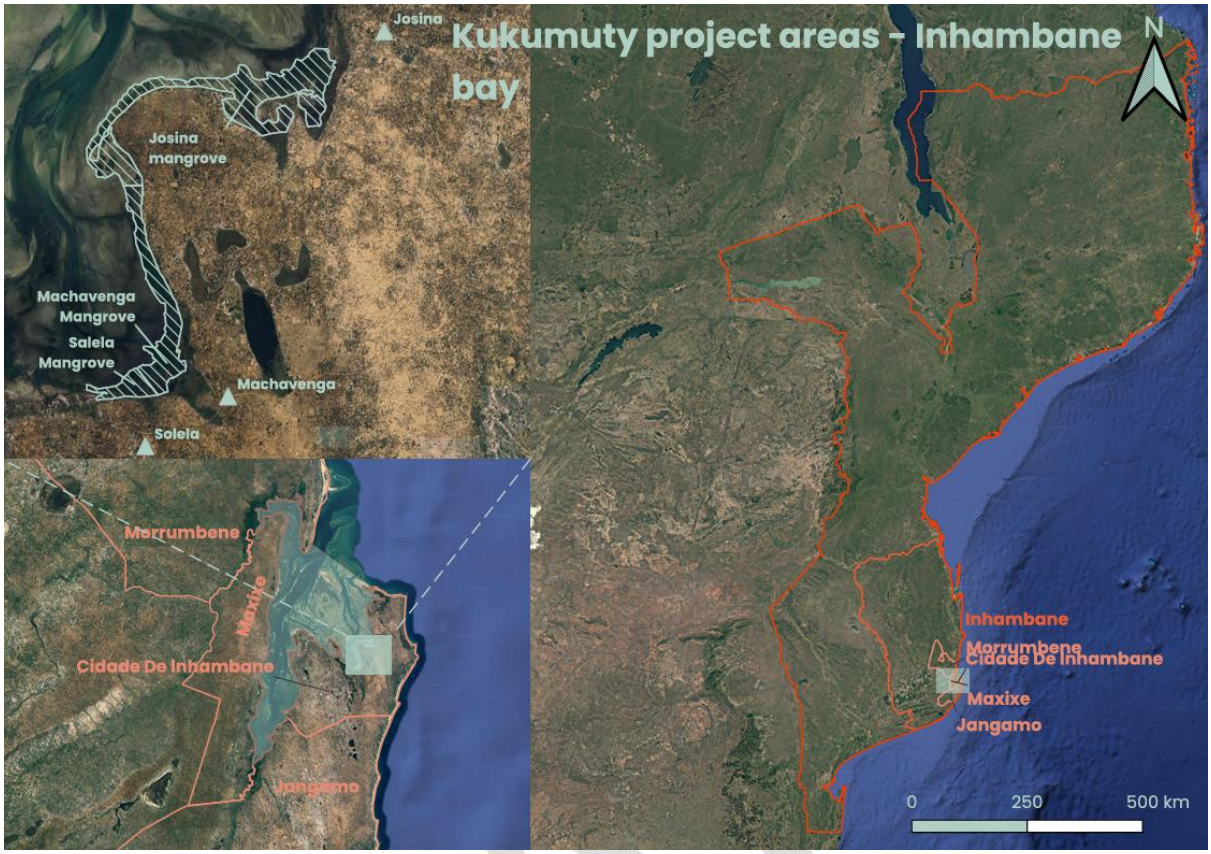


Figure 1.2.1. Project regions and initial project areas, and location of the project communities, for both Chibabava (upper part) and Inhambane (lower part).

1.2.2 Land and Carbon Rights

Table 1.2.2 describes the ownership, tenure and user rights of the project areas, and how these relate to the carbon rights of the project participants.

Table 1.2.2 Land and Carbon Rights

Project Area	Ownership and user rights status	Carbon rights	Evidence
Chibabava woodland project area	Based on the 1997 Land Law (DUAT – Direito de Uso e Aproveitamento dos Terras), the customary rights of rural communities,	The decree 23/2018 "Regulamento para Programas e Projectos Inerentes à Redução de	See DUAT + REDD+ Approval Letter + Document Nhaumue association + CCP establishment + Licenses of the áreas

	usufruct rights and land use activities (FAO, 2002) are formally determined and recognized. Members of rural community associations can hold equal shares in a single co-owned title over the use rights of all their customary lands. Access and use rights within these areas can be determined by custom. The DUAT thus formally recognises the community land rights. The project will draft a DUAT for all project areas. See Annex 15.	Emissões por Desmatamento e Degradação Florestal Conservação e Aumento de Reservas de Carbono (REDD+)" (dd. 3 May 2018) outlines the procedures governing forest conservation and carbon sequestration projects in Mozambique. It is possible to delegate the carbon benefit rights to the stakeholders concerned. The project must register as a carbon project in line with the decree 23/2018. See Annex 15.	de conservação comunitária.
Agroforestry plots	Private land, agricultural association user rights		
Inhambane mangrove project areas	User rights belong to the local Community Fisheries Councils (Conselhos Comunitarios de Pesca - CCP), managing the respective áreas de		

	conservação comunitária (art. 22 of Law 5/2017 dd. 11 May 2017).		

2 Stakeholder Engagement

2.1 Stakeholder Analysis

2.1.1 Stakeholder Identification

Table 2.1.1 identifies and describes the main stakeholder groups that can influence or be affected by the project. We also explain the relationship of each stakeholder group to the project.

Stakeholders were identified through a participatory and transparent approach by project staff and community representatives. The Azada Verde staff spoke with the Regulado of Chibabava and Mangunde, the líders comunitários of Machavenga, Salela and Josina as well as their traditional leaders and requested their permission to hold public meetings to provide information about the project and understand community interest.

The first round of public community meetings had attendance of between 50 and 60 members of each community (Chibabava project region) and between 10 and 20 members of each community in the Inhambane project region. Both meetings resulted in broad-based support expressed for the KKM project. Following this, the Azada Verde staff held a second round of open meetings. During this meeting, the community members and leaders identified key stakeholders and gave their opinions on the different groups to be included in the project design and development.

Subsequent meetings with the KKM Project team were also conducted in an open manner, with community members choosing to participate in group interviews as per their interest and knowledge. This allowed for a more convivial identification of stakeholders who took up the opportunity to answer questions and voice their opinions and feelings about the project.

Stakeholder analysis was carried out based on the community responses to the group interview sessions. In Chibabava, this process identified the Regulado, Chefes, Sagutas, dodas, retired elders, CGRN, farmers associations, women farmers, and young resident adults not engaged in farming. In Inhambane, this process identified the traditional leaders ("líders comunitários"), fishermen, fisherwomen, CCP members, coastal farmers and the community members not involved in fisheries activities. Although these sub-groups differ, they do not have distinct influence pathways, and

these groups will be actively represented in all engagement activities listed in the engagement section of Table 2.1.1. Please see Annex 18 for a glossary explaining these terms and acronyms.

Table 2.1.1 Stakeholder Analysis

Stakeholder Group	Stakeholder Type	Impact	Influence	Engagement
Participating communities in Chibabava District (Mangunde, Nhaumue, Maguenhe, Daca, Jambe & Dongonda)	Local stakeholder	Highly positively impacted by the project	High positive influence on the project	Involvement through project agreement, community meetings, trainings, benefit sharing, physical activities (e.g. labour), decision-making with Subcommittees and agroforestry.
Participating in communities in Inhambane District (Machavenga, Salela & Josina)	Local stakeholder	Highly positively impacted by the project	High positive influence on the project	Involvement through community meetings, trainings, benefit sharing, physical activities (e.g. labour), and decision-making.
Members of the agricultural association	Local stakeholder	Highly positively impacted by the project	High positive influence on the project	Involvement through agroforestry, association meetings, trainings, benefit sharing
Comité de Gestão dos Recursos Naturais (CGRN)	Local stakeholder	Highly positively impacted by the project	Moderate positive impact on the project	Involvement through project agreement, trainings,

				administrative and general support
Cooperativa Thomba Nha Ibua	Local stakeholder	Highly positively impacted by the project	Moderate positive impact on the project	Involvement through project agreement, trainings, administrative and general support
Community Fisheries Councils (Conselhos Comunitarios de Pesca) (CCP)	Local stakeholder	Highly positively impacted by the project	High positive influence on the project	Involvement through project agreement, trainings, administrative and general support
Régulo, sagutas, líders comunitários and community leaders	Secondary stakeholder	Limited impact by the project	Moderate positive impact on the project	Involvement through general support
Government institutions (at local, provincial and national level)	Secondary stakeholder	Limited impact by the project	Moderate positive impact on the project	Involvement through legal and regulatory processes

*In our stakeholder analysis we include the Cooperativa Thamba Nha Ibua as it is the cooperative that was created at the start of the project to formally register the CCPs.

2.1.2 Indigenous Peoples and Local Communities

Table 2.1.2 identifies local communities that have statutory or customary rights to land or resources in the project areas.

Table 2.1.2: Indigenous Peoples and Local Communities

Indigenous Peoples or local communities.	Rights to land or resources in the project area(s)	Governance structure	Involvement of women and marginalised groups	Engagement
Community of Mangunde	See DUAT, Annex 15	Committee = "Subcomité de Gestão dos Recursos Naturais" (Subcommittee of the CGRN; see §2.4)	Quorum of more than 50% female participation during Subcommittee meetings	Involvement through FPIC (§2.6.2), DUAT, project agreement, community meetings, trainings, benefit sharing, physical activities (e.g. labour), decision-making and agroforestry.
Community of Nhaumue	See DUAT, Annex 15	Committee = "Subcomité de Gestão dos Recursos Naturais" (Subcommittee of the CGRN; see §2.4)	Quorum of more than 50% female participation during Subcommittee meetings	Involvement through FPIC (§2.6.2), DUAT, project agreement, community meetings, trainings, benefit sharing, physical activities (e.g. labour), decision-making and agroforestry.
Community of Maguenhe	See DUAT, Annex 15	Committee = "Subcomité de Gestão dos	Quorum of more than 50% female participation	Involvement through FPIC (§2.6.2), DUAT,

		Recursos Naturais" (Subcommittee of the CGRN; see §2.4)	during Subcommittee meetings	project agreement, community meetings, trainings, benefit sharing, physical activities (e.g. labour), decision-making and agroforestry.
Community of Daca	See DUAT, Annex 15	Committee = "Subcomité de Gestão dos Recursos Naturais" (Subcommittee of the CGRN; see §2.4)	Quorum of more than 50% female participation during Subcommittee meetings	Involvement through FPIC (§2.6.2), DUAT, project agreement, community meetings, trainings, benefit sharing, physical activities (e.g. labour), decision-making and agroforestry.
Community of Jambe	See DUAT, Annex 15	Committee = "Subcomité de Gestão dos Recursos Naturais" (Subcommittee of the CGRN; see §2.4)	Quorum of more than 50% female participation during Subcommittee meetings	Involvement through FPIC (§2.6.2), DUAT, project agreement, community meetings, trainings, benefit sharing, physical

				activities (e.g. labour), decision-making and agroforestry.
Community of Dongonda	See DUAT, Annex 15	Committee = "Subcomité de Gestão dos Recursos Naturais" (Subcommittee of the CGRN; see §2.4)	Quorum of more than 50% female participation during Subcommittee meetings	Involvement through FPIC (§2.6.2), DUAT, project agreement, community meetings, trainings, benefit sharing, physical activities (e.g. labour), decision-making and agroforestry.
Community of Machavenga	Mangroves are Áreas de conservação comunitária (art . 22 of Law 5/2017 dd. 11 May 2017)	Community Fisheries Councils (Conselhos Comunitarios de Pesca) (CCP)	Quorum of more than 50% female participation during Community meetings	Involvement through FPIC (§2.6.2), project agreement, community meetings, trainings, benefit sharing, physical activities (e.g. labour), and decision-making.
Community of Salela	Mangroves are Áreas de conservação comunitária (art . 22 of Law	Community Fisheries Councils (Conselhos	Quorum of more than 50% female participation during	Involvement through FPIC (§2.6.2), project agreement, community

	5/2017 dd. 11 May 2017)	Comunitarios de Pesca) (CCP)	Community meetings	meetings, trainings, benefit sharing, physical activities (e.g. labour), and decision-making.
Community of Josina	Mangroves are Áreas de conservação comunitária (art . 22 of Law 5/2017 dd. 11 May 2017)	Community Fisheries Councils (Conselhos Comunitarios de Pesca) (CCP)	Quorum of more than 50% female participation during Community meetings	Involvement through FPIC (§2.6.2), project agreement, community meetings, trainings, benefit sharing, physical activities (e.g. labour), and decision-making.

2.1.3 Disputed Land or Resources

Dispute screening (land/resources conflicts, boundary disagreements, overlapping customary claims, etc.) was carried out. The results show that there are no relevant past or ongoing disputes over land or resources in the project areas.

2.2 Project Coordination and Management

The project coordination and management functions of the three main parties are summarised in Table 2.2: Azada Verde (AV), Reseed Indico (RI) and Climate Lab (CL).

We refer to Part F of the approved PIN for an information sheet on the three main parties involved. We refer to Annex 2 for legal documentation.

Project partner	Azada Verde	Reseed Indico Ltd	Climate Lab bv
Long-term objectives of organisation	To empower rural communities to develop sustainable and local food systems, since food sovereignty can be a tool to eradicate poverty, hunger and inequality in rural communities	Reseed is a not-for-profit organisation that promotes social, environmental and entrepreneurship development through education and sustainable actions around the Indian Ocean Region.	Climate Lab aims to partner with communities to initiate community-driven climate projects.

History and achievements	Azada Verde has executed several socioenvironmental projects in central Mozambique related with local food systems, agriculture and sustainability.	Reseed's purpose is to build enduring relationships and networks which work collaboratively to pursue practical ways for communities to flourish in their localities.	Climate Lab's projects are all intended for Plan Vivo certification and are implemented within uniquely valuable ecosystems. Projects are ongoing in Ethiopia, Bolivia, and Mozambique.
Summary of current activities	Azada Verde has been working since 2017 alongside rural communities in Sofala, Mozambique, in the development of sustainable and local food systems. Azada Verde works with and for the communities of Sofala and always respects the environment.	Reseed emerged in 2013 from a decades-long collaboration between Monash University researchers in Australia and community organisations, NGOs, government agencies and universities in South Africa and Mozambique. Reseed has experience in establishing and managing conservation and agroforestry	Climate Lab is working to strengthen three plan vivo projects: EthioTrees, BoliTrees and Kukumuty project.

		training projects, and socio-economic and environmental change research in Mozambique and South Africa.	
		Reseed has been involved in the development of sustainable agroecological projects around the province of Sofala, Mozambique, working with local partners including Mezimbite Forest Centre and Azada Verde. These projects have focused on improving agricultural systems through the	

		demonstration and implementation of agroforestry and soil conservation techniques. In the district of Buzi, Reseed worked with Mezimbite Forest Centre and ESMABAMA to establish a training social enterprise which incorporated elements of sustainable timber and coconut oil production alongside the establishment of agroforestry nurseries.	

Table 2.2 Responsibility for Project Coordination and Management Functions

Project Coordination and Management Function	Responsible Party/Parties (Chibabava project region)	Responsible Party/Parties (Inhambane project region)*

Stakeholder engagement during project development and implementation	AV/RI	AV
Ensuring conformance with the Plan Vivo Standard and compliance with applicable policies, laws and regulations	CL/RI	CL
Developing technical specifications, land management plans and project agreements with project participants	CL/RI/AV	CL
Ensuring that the PDD is updated with any changes to the project	CL	CL
Registration and recording of management plans, project agreements, monitoring results, and sales agreements	RI/CL/AV	CL/AV
Managing project finances and dispersal of income to project participants as described by the benefit sharing mechanism	AV	AV
Managing Plan Vivo Certificates in the Plan Vivo Registry	CL	CL
Preparing annual reports and coordinating validation and verification events	CL	CL
Securing certificate sales and other means of funding the project	CL	CL
Assisting Project Participants to secure any legal or regulatory permissions required to carry out the project	AV	AV
Providing technical assistance and capacity building required for project participants to implement project interventions	RI	CL/AV
Monitoring progress indicators, livelihood indicators and ecosystem indicators and providing ongoing support to project participants	AV/RI/CL	CL/AV
Measurement, reporting and verification of carbon benefits	CL	CL

*For the avoidance of doubt, project partner Reseed Indico (RI) is only active and participating in the project region of Chibabava (i.e. interventions Miombo enrichment and agroforestry), and not

active and not participating in the project region of Inhambane (interventions mangrove restoration).

2.3 Project Participants

Table 2.3 identifies the initial project participants and their location of residence in relation to the project areas and project region; their use of land or natural resources within the project region; and their typical use of labour for land or natural resource management activities. See Annex 1 for maps showing the location of project participants in relation to the project areas and project region. The project does not include Type II participants.

All project partners have signed an ethical charter not to discriminate based on gender, age, ethnicity, religion or social status when selecting project participants. They have committed to engage in community-driven landscape management to reduce potential for tensions or disputes within and between communities. The full list of initial project areas is provided in Annex 3.

Table 2.3: Project Participants (grouped by village, area, or region) (for the map of the community locations in relation to the project areas, see §1.2.1)

Project Participant	Participant Type*	Location of Residence	Typical Land Holding	Land and Natural Resource Use
Communities in Chibabava District (Mangunde, Nhaumue, Maguenhe, Daca, Jambe & Dongonda)	Type I	Communities residing near to the project area, and directly within the project region of Chibabava District	For a description of the typical land holding, we refer to §3.3.1.	For a description of the typical use of land and natural resources, we refer to §3.3.1.
Communities in Inhambane District (Machavenga, Salela and Josina)	Type I	Communities residing near to the project area, and directly within the project region Inhambane.	For a description of the typical land holding, we refer to §3.3.1.	For a description of the typical use of land and natural resources, we refer to §3.3.1.
Adult males residing further	Type II	Husbands residing further	For a description of	For a description of the typical use of

afield in cities (seasonal labour migrants)**		afield in cities in Mozambique or South Africa	the typical land holding, we refer to §3.3.1.	land and natural resources, we refer to §3.3.1.

* Type I = Project Participants that are resident within the Project Region; who manage and use land or natural resources within the Project Region for subsistence or small-scale production; and are not structurally dependent on year-round hired labour for their land or natural resource management activities; Type II = Project Participants that do not meet the Type 1 definition.

** Engagement mainly through information distribution rather than direct meeting.

2.4 Participatory Design

Existing community and governance structure

The Regulado of Mangunde is the traditional governance authority in the project area (project region Chibabava). This Regulado covers 11 communities, all within the District of Chibabava and including the initial project communities of Nhaumue, Mangunde, Maguenhe, Daca and Jambe. Note that the community of Dongonda works with the Regulado of Chibabava. The recognised institution for overseeing the utilization of community lands in this area is the "Comité de Gestão de Recursos Naturais" (CGRN) or "Natural Resources Management Committee". The CGRN includes representatives of all 11 communities but not with equal representation (there are 2 members for each community except for Mangunde that has 5 members). It is an incorporated body and is recognised at the provincial and national government levels. Consultation with communities and community leaders determined that the CGRN would be the best body to hold the titles for designated enrichment areas under the KKM project, but the communities hold the co-owned titles over the use rights of their customary lands under the DUAT.

In the Inhambane project region, the traditional governance authority is exercised by the líders comunitários. The communities of Machavenga, Salela and Josina (bairro 11 & 12) each have a different líder comunitário. The recognised institution for overseeing the utilization of community mangroves in this region is the Community Fishery Council (Conselho Comunitario de Pesca) (CCP). The CCP includes a President (main representative), a Vice President, a Secretary and Deputy Secretary, a Treasurer and Deputy Treasurer, and a Chair of the fiscal council. It is an incorporated body and is recognised at the provincial and national government levels. Consultation with communities and community leaders determined that the CCP would be the best body to manage areas under the KKM project in the Inhambane project region. The cooperative model emerged directly from the participatory design process carried out with the three communities of Machavenga, Salela, and Josina. During community meetings, workshops, and sensitisation

sessions, different governance and management options for the mangrove project were discussed with community members and the Community Fisheries Councils (CCP). These discussions focused on how to ensure fair representation, transparency, and equitable benefit-sharing across all three communities. Through this participatory process, the communities collectively agreed that establishing a single, legally recognised cooperative would be the most appropriate structure to coordinate mangrove management, project implementation, and benefit-sharing at a broader landscape level. This model was seen as a way to strengthen collective decision-making, facilitate legal recognition, and improve long-term sustainability of the project. The cooperative structure was therefore agreed upon by the three communities through their respective CCPs and validated during community assemblies, with decisions recorded in meeting minutes and supported by visual documentation.

Although titles are registered under the CGRN and CCP, project areas exist at the individual community level and are surveyed and determined by community leaders in conjunction with project staff. Knowledge of individual communities and families on the peripheries of project areas is essential to the selection of areas so that they do not impinge on community activities. This is a key action in mitigating the likelihood of potential conflict arising from the project.

Free, Prior and Informed Consent (FPIC)

Before any project areas are mapped, public forums, consultations and transect walks of proposed areas are undertaken with community members (see Annex 4). These actions are undertaken to ensure free, prior and informed consent (FPIC) is established at the community level before any physical activities take place. At the initial phase FPIC is undertaken through 4 key steps.

1. Initially a public meeting is held for all community members where project staff provide details about the overall project and Plan Vivo Approach, followed by meetings with smaller groups over several hours to hear concerns and provide details.

2. Transect walks through potential project areas are undertaken with community representatives and families and communities living amongst project areas are consulted and engaged. Questions about livelihood strategies, land management practices, intangible and tangible cultural landscape values, land management and use of timber and non-timber forest resources are raised throughout this process. Recording of GPS coordinates is undertaken by project staff at this point.

3. Project staff use GPS coordinates to draw up potential project areas and to identify potential challenges and pilot areas. These areas are then surveyed again with the community, including representatives of CGRN and CCP.

4. When project areas are confirmed, a ceremony is held, and community members participate in the design of a "Plan Vivo".

Establishment and role of Community Subcommittees in the Chibabava project region

While the CGRN is a centralized committee (across 11 communities), the project areas and activities will be managed at the community level. Community Subcommittees will take the lead in participatory planning and decision-making because the project activities in designated areas will generate income from the sale of carbon credits. The income thus generated will be used for community benefit and to sustain and further expand project activities in the woodland areas belonging to the communities. This approach has been shaped by local staff and community consultation to:

1. Increase gender equity in decision making – While there is currently limited female representation on the CGRN, initial pilot activities in Nhaumue and Mangunde have demonstrated levels of female participation above 60%. To reflect this level of participation, community subcommittees have a mandated female representation of at least 50%.

2. Build collaboration and participation between project stakeholders – Although Azada Verde, the Regulados of Mangunde and Chibabava, and other administrative bodies already have well established relations, the greatest influence on project success will stem from active involvement of community members and families living adjacent to project areas. The establishment of community subcommittees open to all members of participating communities will allow for families and individuals involved in field activities to inform and influence project direction and sustainability, as well as directly benefit from employment opportunities arising from project interventions.

3. Encourage community engagement and awareness – Nomination of individuals to the community subcommittees took place at open community meetings and decisions taken at regular meetings. Discussions and decisions regarding the use and allocation of project funds will be made at annual community meetings. Annual meetings will be held in public meeting spaces where all aspects of the project can be freely discussed, and individuals can be nominated to stand on Subcommittees. These actions are designed to increase engagement and ensure that community awareness is sustained throughout the life of the project.

**Note: In Inhambane project region, the establishment of a legalized cooperative (Cooperativa Thamba Nha Ibua) will represent the centralized committee across the three communities: Machavenga, Salela and Josina. Similarly to sub-committees, CCPs will take the lead in participatory planning and decision-making.*

2.5 Stakeholder Consultation

2.5.1 Design Phase Consultations

Project initiation

The preliminary design phase was initiated in April 2022 (Chibabava) and February 2024 (Inhambane). The Project Team held public community meetings in the Community of Mangunde and Nhaumue (Chibabava), and the Community of Machavenga, Salela and Josina (Inhambane). In the Chibabava project region, all stakeholders listed in Section 2.1.1, namely, members of the Nhaumue and Mangunde agricultural associations, CGRN representatives, the Régulo and sagutas, and Chibabava District officials were invited to and attended these meetings. In the Inhambane project region, all stakeholders listed in Section 2.1.1, namely, the traditional leaders ("líders comunitários"), fishermen, fisherwomen, CCP members, and other community members were invited to and attended these meetings.

The Project Team explained the scope and logic of the project to all attendees of the communities. After extensive discussion and response to questions, all stakeholders, the community attendees, and representatives agreed that they were willing to be involved in the project. Potential areas for environmental revitalisation were identified but the dimensions of project areas were to be finalised after further rounds of community consultations and agreement.

The project design was further developed through preliminary fieldwork by the Project Team in May 2022 (Chibabava), and over the course of 2024 and 2025 (Inhambane). This included community level interviews of social, economic, climatic, and ecological issues, pressures, and changes affecting agricultural production, market access, livelihood opportunities and natural resource availability in the locality, nearby towns, and district. Community-level interviews involved around 250 people residing in the settlements of Nhaumue and Mangunde, and around 45 people residing in Machavenga, Salela and Josina.

The local Comité Gestão do Recursos Naturais (CGRN: Committee for Management of Natural Resources) was involved in discussions regarding collective use and management of woodland areas and transect walks in potential sites for implementing the project. Meetings were held with officials of Chibabava District and Sofala Province Environment Department to clarify legal and regulatory processes for establishing the project in communal areas and obtaining approvals from relevant government agencies and traditional authorities. In the Inhambane region, an identical process was organised with the CCPs, and Inhambane government officials respectively.

Stakeholder feedback and input

After completing the preliminary field surveys, field staff continued working with local communities to inform and answer any doubts or questions regarding the project scope and inputs for refining project design. Based on discussions with CGRN, CCP and community representatives, the team reassessed the project areas which were initially identified and redefined the site areas for woody vegetation enrichment. After combining ground-truthing and biogeographical assessments with local community representative consultations, some originally identified project areas were considered less appropriate for ecosystem restoration and new areas were selected.

Specifically regarding women's feedback during the stakeholder consultation process, it can be noted that:

- Representation of women in consultation groups was over 50%.
- Labour representation of women in all activities has also been over 50%.
- When the initial consultations groups were divided into different themes, women were represented in each of the theme discussions.
- Follow-up stakeholder consultations were conducted in community areas by two female members of the Azada Verde team. Some consultations included group interviews with exclusively female members (focusing on agriculture and burning in Chibabava, and fisheries in Inhambane).

2.5.2 Stakeholder Engagement Plan

The KKM project takes an approach of assessing social and environmental impacts through participatory planning, collaborative action and shared reflection. The Project Team functions on the principle that high levels of community engagement lead to better decisions being made for the project and all of the communities involved.

During the project's initial stages all community leaders were invited and consulted on the project concept and aims. Through this process communities have had the opportunity to put forward areas which can be included in the project.

The process of area nomination involves a number of important steps including an open community consultation, transect walks across nominated areas, and a final survey of areas during which neighbouring families are engaged and informed about the project alongside community leaders.

In Chibabava, once the woodland enrichment areas are established, each community is facilitated to develop a "Subommittee" that will make decisions about the management of the designated areas on their community lands in conjunction with Azada Verde and the CGRN.

Subcommittees (SCs) have been elected by the whole community at open gatherings to which all community members are invited. Subcommittees will also include non-voting representatives of the CGRN and Azada Verde. To ensure transparency between key stakeholders, the decisions and actions of the subcommittee will be fully minuted and shared in public spaces and notice boards outside administrative offices, the Mangude Mission and church. All key stakeholders will be advised of the dates and places of meetings in the month prior to the meeting taking place.

In Inhambane, these responsibilities are handled by the CCPs that became established under impulse by the project. All CCPs organise themselves into one regional Cooperativa "Thomba Nha Ibua" that also became established under impulse by the project. The CCP councils are essential for managing local fisheries, representing fisherfolk, and coordinating with government bodies. The CCPs are structured with institutionalized roles, including a president, vice president, secretary, and advisors (bogáis). Each council is composed of six voting members and one technical secretary, with a strict mandate that at least 50% of the voting body must be women to ensure gender-inclusive leadership. These councils are responsible for the hands-on coordination of ecological restoration, nursery management, and community surveillance. To maintain transparency and accountability, members are elected in open assemblies for two-year terms, and they must convene at least three times annually to finalize budgets and report on project revenues, including those generated from carbon credits. While the role is a community service rather than formal employment, the project recognizes the dedication of council members by providing them with a "cesta básica" (basic food basket) three times a year, a benefit contingent upon consistent attendance at meetings. In the event of local disputes, the project leans on traditional leadership and community mediation to find resolutions. This structure balances professional technical oversight from Azada Verde with deep-rooted local representation, ensuring that the long-term protection of the mangroves is directly tied to the social and infrastructural development of the participating communities. In the Bay, fishing activities are led by specific sector chiefs, including a woman in charge of shellfish gathering, and other sector chiefs for gamboa, line fishing, gillnets, seine nets, and galhola.

Stakeholder engagement will consist of campaigns for general community awareness which will include the sharing of pamphlets and construction of small billboards in high traffic areas which are adjacent to community restoration areas under KKM. This information and publicity will help all visitors and community members to be aware of the project and project areas even if they are not a member of a participating community or a resident living adjacent to a restoration zone.

The SCs and CCPs, facilitated by Azada Verde, will meet at least three times per year including one general meeting. Between these meetings the members will be responsible for engaging key groups and segments of the population in activities relating to the project. Through this

engagement, the voice of community members will be heard in the project and community representatives will play a role in improving participation in decision making.

Finally, the project aims to involve, to the best of its ability, disabled people from the communities in project activities (e.g. working with seeds).

2.6 Free, Prior and Informed Consent (FPIC)

2.6.1 FPIC Legislation

Table 2.6.1 identifies national legislation and legal obligations under the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) , International Labour Organization Indigenous and Tribal Peoples Convention 169 (ILO 169) , and other FPIC legislation applicable to the project region.

Table 2.6.1: National Legislation and International Standards on FPIC

Legislation/Standard	Relevance to Project	Compliance Measures
Direito de Uso e Aproveitamento dos Terras (DUAT)	This 1997 Land Law formally recognises community land rights. It recognises the customary rights of rural communities, their usufruct rights and land use activities. Members of rural community associations can hold equal shares in a single co-owned title over the use rights of all their customary lands. Access and use rights within these areas are determined by custom.	In Chibabava, the project will follow the process outlined by the DUAT to obtain agreement from community members for using sections of their community land for Miombo woodland enrichment. The DUAT agreement will be formally registered with the relevant government departments. Not applicable for Inhambane (not applicable in intertidal zones).
UNDRIP	Article 8.2. One shall provide effective mechanisms for prevention of, and redress for: [...] (b) Any action which has the aim or effect of dispossessing them of their	The project recognizes that the participant communities have the right to the project areas, territories and resources which they have traditionally owned, occupied or otherwise used or acquired. The communities have

	lands, territories or resources; (c) Any form of forced population transfer which has the aim or effect of violating or undermining any of their rights	the right to own, use, develop and control the project lands, territories and carbon benefits in line with the project agreements
ILO 169	Article 6.1. In applying the provisions of this Convention, one shall: (a) consult the peoples concerned, through appropriate procedures and in particular through their representative institutions, whenever consideration is being given to legislative or administrative measures which may affect them directly; (b) establish means by which these peoples can freely participate, to at least the same extent as other sectors of the population, at all levels of decision-making in elective institutions and administrative and other bodies responsible for policies and programmes which concern them; (c) establish means for the full development of these peoples' own institutions and initiatives, and in	The project recognizes that the participant communities have the right to the project areas, territories and resources which they have traditionally owned, occupied or otherwise used or acquired. The communities have the right to own, use, develop and control the project lands, territories and carbon benefits in line with the project agreements. All consultations carried out are undertaken in good faith and in a form appropriate to the circumstances, with the objective of achieving agreement or consent to the project. Community control of decision-making and institutions is ensured through the Subcommittees and CCPs freely established through community processes.

	appropriate cases provide the resources necessary for this purpose.	

2.6.2 FPIC Process

In Plan Vivo Projects, the term FPIC is used to describe the principles for the negotiation of conditions under which a Project is designed, implemented, monitored, and evaluated:

- Free = consent is given voluntarily and without coercion, intimidation, or manipulation.
- Prior = consent is sought sufficiently in advance of any authorization or commencement of activities to allow time to understand, access, and analyse information on the proposed activity.
- Informed = information provided prior to seeking consent is accessible, objective, and complete.
- Consent = a collective decision ("Yes", "No", or "Yes with conditions") made by the rights-holders following their own timelines and decision-making processes with the option to reconsider if the proposed activities change or if new information relevant to the proposed activities emerges.

As explained in §2.5, all local stakeholders have been provided with full information on the project concept and consulted from the initiation of the project. Participation of all local stakeholders has been voluntary and based on fully informed understanding of the project scope and design.

In Chibabava, FPIC, and community consent, is safeguarded and formalized through the DUAT procedure. Community agreement regarding the areas to be allocated for the project is necessary prior to applying for the DUAT authorization.

In order to receive the DUAT authorization, the following steps are required:

1) A duly completed form from the Cadastre Services
2) Statutes
3) Map of the location of the areas to be used for the purpose intended (ecosystem enrichment) by the applicant
4) Project description
5) Full minutes of consultation with local communities, including consent and/or vetoes
6) Environmental License
7) Copy of the public notice.

Prior to the provisional authorization period, the state authorities conducted an inspection (dd. 10/03/2023) to verify the proposed development and project design for the designated areas and ensure that the FPIC principles, community rights and environmental health are secured. Following this verification, the state authorities issued the DUAT title and formal authorization for the proposed land use of the project.

In Inhambane, the DUAT procedure is not applicable, because the project areas are located in the intertidal zones (regularly covered by water). We refer to §2.6.3. Here, community representatives were selected through an open and participatory community assembly process, in accordance with Mozambican community governance structures. The process was as follows:

1. Selection of Community Representatives

A general community meeting was convened with broad participation (approximately 100 participants, as recorded in the official attendance register).

During this assembly:

- The Community Fishing Council (CCP) members were formally recognized and validated by the community.
- Where necessary, representatives were confirmed or selected through open consensus.
- Community-appointed leaders and respected members were identified to ensure representation of different groups (including fishers, women, and elders).
- The process was transparent and community-led. No representatives were imposed externally. The final list of representatives was agreed upon publicly and recorded in the meeting minutes.

2. Decision-Making Timeline

The decision-making process followed a staged approach:

- Initial sensitization meeting: Presentation of the project objectives, scope, and potential benefits.
- Open discussion period: Community members were invited to ask questions and express concerns.
- Time for internal reflection: Community members were given time to deliberate among themselves before formalizing agreements.

- Formalization meeting: The signing of the Memorandum of Understanding and Statutes was scheduled following confirmation of community consent.
- The timeline respected the community's pace and allowed space for collective deliberation before formal decisions were taken.

3. Information Shared Prior to FPIC Decisions

Before any decision was taken, the following information and materials were shared:

- Verbal explanation (in the local language) of:
- Project objectives (mangrove conservation and restoration)
- Roles and responsibilities of community members
- Expected benefits and long-term implications
- Governance structure and CCP involvement
- Draft Memorandum of Understanding
- Draft Statutes
- Explanation of the right to request clarification or withdraw
- No agreements were signed before the community demonstrated clear understanding and expressed voluntary consent.

The community meetings were conducted separately in each of the three communities (Machavenga, Salela and Josina). This approach was intentionally adopted to ensure that each community could understand the project within its own context, discuss it internally, and make decisions independently, without influence from other communities. In each community, several meetings were held, including project presentation sessions, open discussions and Q&A, and specific meetings focused on the FPIC process. This allowed us to adapt the language, examples and pace to each local reality. Although the project content is the same across all communities, the consultation and decision-making process has been independent and tailored to each community. The decision to accept the project was made through an open and participatory process during community assemblies.Community members selected their own representatives in a transparent manner, and decisions were discussed publicly in open meetings.The final agreement was reached through an open vote, ensuring that all community members had the opportunity to express their views. This process guaranteed that the decision was collective, transparent and legitimate.

During the meetings, we actively promoted the meaningful participation of women and other potentially vulnerable or marginalised groups. In most meetings, women's participation was even higher than that of men, reflecting the demographic reality of the communities. To facilitate their

involvement, meetings were scheduled at appropriate times, avoiding key working hours such as farming activities or fishing. Based on our surveys, women are the primary users of the mangrove ecosystem, as they are mainly responsible for gathering firewood and other natural resources for household use. For this reason, they are a key focus group in the project. We are specifically working together to improve their livelihoods while also raising awareness on sustainable practices, such as reducing mangrove cutting, allowing ecosystems to regenerate, and protecting wildlife. In addition, open discussion spaces were created where everyone could speak freely, fostering a safe and inclusive environment. This approach ensured that women were not only represented, but actively engaged in discussions and decision-making processes.

2.6.3 Initial FPIC

We refer to §2.5.1 and §2.6.2. In Chibabava, the first phase FPIC process that was followed for the initial project areas can be summarized as follows:

- The project team organised an initial meeting with the regulo;
- The sagutas organized the first community meetings;
- During the first meetings, there was a representation of at least 20 people;
- The meetings discussed on the history of the land, the types of land use in the region, the key natural resources and the dynamics of fire during the dry season;
- First community mapping was undertaken at this meeting;
- Subsequently, a smaller group of people was nominated by the community to perform transect walks;
- During the walks, resolution of initial concerns and mapping of the area was undertaken by AV staff alongside the nominated community members;
- The final maps were presented at the next community meeting.

In Inhambane, the first phase FPIC process that was followed for the initial project areas can be summarized as follows:

- The project team organised an initial meeting with the líders comunitários;
- The líders comunitários organized the first community meetings;
- During the first four meetings, there was a representation of at least 20 people;
- The meetings discussed on the history of the mangrove, the types of livelihoods in the region, the key natural resources and the dynamics of fisheries in the Bay;
- First community mapping was undertaken at the fifth meeting;

- During additional transect walks through the mangrove, mapping of the area was undertaken by AV staff alongside nominated community members;
- The final maps were presented at the sixth community meeting.

3 Project Design Baselines

3.1 Baseline Scenario

The most likely future land use and land management scenario of the project areas, in the absence of project interventions, is fully described in Annex 7a and 7b (based on AR-TOOL02 v1.0: "Combined tool to identify the baseline scenario and demonstrate additionality in A/R CDM project activities"). The most likely future land use and land management scenario of the project areas, in the absence of project interventions, is fully described in Annex 7a and 7b (based on AR-TOOL02 v1.0: "Combined tool to identify the baseline scenario and demonstrate additionality in A/R CDM project activities"). In short:

- Regarding the miombo restoration: Without the project taking place, in the pressure-as-usual scenario, the baseline ecology situation would remain metastable or even decreasing, as the existing trees are old enough to resist the fires. At the same time, woody biomass would not increase either, since the continued fires would kill off the young trees and continue the old trees to dry out and finally these will burn as well. Even when it rains a lot, there will be more grass as fuel load, and the late dry season fires will be stronger. We can thus expect the change in carbon stock in the project zones to be stable in the baseline scenario, under continued or even increasing pressures. In conclusion, the changes in carbon stocks in trees, shrubs and soil in the baseline pressure-as-usual scenario of the project zones may conservatively be accounted as zero.

- Regarding the mangrove restoration: There is an abundance of wood cutting signs and hypersaline to extremely hypersaline zones that have poor drainage. These testify to a generally degraded mangrove ecosystem within the project areas. Meanwhile the time series of satellite images show a relatively degraded and stable coastal landscape over the past decade. We can thus expect the change in carbon stock in the project zones to be stable in the baseline scenario, under continued or even increasing pressures. In conclusion, the changes in carbon stocks in trees, shrubs and soil in the baseline pressure-as-usual scenario of the project zones may conservatively be accounted as zero.

3.2 Carbon Baseline

Table 3.2 provides a summary of net-greenhouse gas evolution from all initial project areas under the baseline scenario for each year of the first crediting period; the table is presented in Annex 7. For details of the calculations, see Annex 7.

Table 3.2 Total net-greenhouse gas emissions under the baseline scenario

Year	Baseline (t CO2e) Chibabava*	Baseline (t CO_2e) Inhambane*
0	163.45	123.37
1-30	163.45	123.37

*Average of the initial project sites

3.3 Livelihood Baseline

3.3.1 Initial Livelihood Status

1) Chibabava project region: Communities of Mangunde and Nhaumue

The Mangunde Regulado comprises 11 communities, including Mangunde and Nhaumue. The total population of Mangunde is estimated at 1394, with 729 women (52%) and 665 men (48%). The number of households is 269 with an average household size of 5.18. The total population of Nhaumue is estimated at 1873, with 1016 women (54%) and 857 men (46%). The number of households in Nhaumue is 362 with an average household size of 5.17. Around 50% of the total population in both communities are estimated to be below the age of 16 (Mozambican Census 2017).

All households in Mangunde and Nhaumue are primarily engaged in subsistence agriculture, combined with some market crop production and seasonal labour migration. There are no industrial or other formal employment opportunities available for working age individuals within the communities or in Chibabava district. In many cases, adult males travel to cities such as Beira, Chimoio or Maputo, or to neighbouring countries such as South Africa and Zimbabwe, for seasonal or longer-term work and send remittances to support their households. Most of the farming work is carried out by women, retired older men, and youth (Community Surveys, May 2022).

Both Nhaumue and Mangunde settlements are located along the eastern flank of the Buzi River. Houses are well above the high flood level of the river, though flooding has occasionally inundated Mangunde Mission. Cultivation occurs in the low-lying areas closer to the riverbank and in upland areas. The average farming plot size per household in both communities is between 1 and 2.5 ha which is allotted between riverine and upland areas. Plots near the Buzi river are usually under 1 ha,

and plots in the upland areas may range between 1 and 2 ha, depending on the terrain, soil, and rainfall conditions. Households generally cultivate vegetable crops in the river irrigated plots (matoros) and maize, sorghum and beans in the rainfed upland plots (machambas). Cash crops such as sesame and pigeon pea are also cultivated as market crops in the upland plots. Most households also maintain small livestock such as chicken, sheep, pigs and goats. Cattle ownership is limited to very few households and is usually an indicator of relative wealth within their communities (Community Surveys, May 2022).

Income differentiation is minimal in Nhaumue and Mangunde and mainly influenced by the extent of remittances. A rough estimate of annual per capita income for these settlements is between US $185 and $245. In current exchange rate terms, this is between 11,470 and 15,190 MZN. To put this in comparative perspective, the 2021 estimate of per capita GDP for Mozambique was US$ 500. This estimate obscures substantial differences in income and economic opportunity between regions and provinces of the country. The highest GDP per capita is for Maputo province (where the country's capital is located) which is estimated at roughly $1139, while that of Sofala province is around $615. The population in the rural districts of Sofala Province are far poorer and their annual per capita income is 30 to 40% less than the per capita GDP average for Sofala Province.

The total area of the Mangunde community is 2752 ha and that of Nhaumue is 2237 ha. While all land and natural resources are owned by the Mozambican state, the 1997 Land Law (DUAT) formally bestows customary rights of usufruct and land use on rural communities. Access and use rights of land and natural resources in these communities are determined according to custom by traditional authorities. The community areas of Mangunde and Nhaumue extend from the Buzi River to the uplands which encompass Miombo woodlands. As per custom, traditional authorities allocate machamba plots, extraction of stone and timber for household or community building construction, clay for pottery, non-timber forest products for subsistence and artisanal production in the woodland areas. Machamba plots are not allowed to be located adjacent to watercourses due to customary belief that doing so will result in guardian water spirits abandoning the channels. Hunting of herbivores is permitted in the woodlands during the dry season and hunters are required to deliver the breast of the animal to their traditional leader (Community Surveys, May 2022).

Both Mangunde and Nhaumue fall under the traditional authority of the Mangunde Regulado. The Mangunde Regulado comprises 11 communities in total within the locality of Toronga in Chibabava District. The traditional leadership structure is made up of three levels, with the Régulo of Mangunde Regulado being the highest level for all 11 communities, the Chefes at the second level representing groups of villages under each community, and Sagutas at the third level representing village settlements. The sagutas may also perform the role of Dodas who serve as counsellors for traditional governance within each village. The sagutas and dodas have detailed knowledge of the

land boundaries between settlements, and are responsible for plot allocation, resolution of land conflicts and other social issues within their village.

The Régulo of Mangunde Regulado resides in the Mangunde community. In addition, there is one Chefe for the community and three sagutas representing the villages of Chingüoni, Nhamapondoro, and Tchigodi which make up the Mangunde community. The Nhaumue community has one Chefe and three sagutas representing the villages of Nhazvitundu, Mucuetcha, and Chinguone. They are centrally involved in all decisions regarding the project area, boundary determination, and conformity with customary rights and practices.

The CGRN (Natural Resources Management Committee) operates as a grassroots governance structure dedicated to the management of natural resources in the Mangunde Regulado. It works in partnership with the Mangunde traditional leadership structure and the district government agencies. The CGRN has a formal governing structure with members from all 11 communities of Mangunde Regulado and elected office-bearers of President, Vice-President, Secretary, Treasurer and ex-officio members.

The KuKuMuty Project will be managed by Community Subcommittees responsible for their designated project areas (SC). The membership of the SCs is explained in Section 2.5.2. The SCs will be set up for decision-making regarding the membership and gender balance in project design, area, rules for participation, and utilisation of future carbon revenues for social benefit of Mangunde and Nhaumue communities (and others as the project grows). The Project mandates 50% or greater membership of women in the SCs.

The Mangunde and Nhaumue communities each have an agricultural association comprising male and female farmers residing in their respective villages. These agricultural associations are also formally organised with their respective office-bearers. The associations enable farmers to collectively invest labour and coordinate cultivation in plots near the Buzi River. The associations also work with the assistance provided by Azada Verde for solar-based pumped irrigation to cultivate vegetable crops for household consumption and market sale. Nhaumue and Mangunde agricultural associations will be represented on their respective SCs. The Project's agroforestry activities and revenue generation will be overseen by a special working group created from participating households in Nhaumue and Mangunde communities and include both non-members and members of the agricultural associations. The working group will operate under and report to their respective SCs.

2) Inhambane project region: Communities of Machavenga, Salela and Josina

The Inhambane district located in the southern coastal region of Mozambique is divided into 23 neighbourhoods, including Salela, Machavenga, and Josina. Covering an area of 192 km², the district has a total population of 100,943, of which 53,373 (53%) are women (see community demographics in table 3.3.1). The population density is approximately 460 inhabitants per km², with an average household size of 3.9. The local population is very young, with over 58% under the age of 24 (Instituto Nacional de Estatística, 2025).

Table 3.3.1 Community Demographics

Community	Population Size	Female rate	Men rate
Machavenga	4,773	66,4% (3,180)	33,4% (1,593)
Salela	Waiting for data	Waiting for data	Waiting for data
Josina (barrio 11 & 112)	180	61% (110)	39% (70)

Inhambane District's population density (459.9 inhabitants per km²) is markedly higher than that of Inhambane Province (22.8 inhabitants per km²) (Tivane, 2024). This difference is likely due to the substantial influx of people from rural areas following the end of the civil war in 1992. Many migrated in search of better economic opportunities, employment, education, and access to basic services. As the provincial capital, Inhambane City was perceived as offering greater prospects (Tivane, 2024). In addition, the area has increasingly attracted tourism, further driving economic development within the district. Consequently, the district's built-up area almost doubled between 1992 and 2022, expanding from 6,582 hectares to 12,681 hectares (Tivane, 2024).

Households in Inhambane District primarily rely on farming, business, or fishing activities to support their families. In 2021, the district's GDP per capita was USD 968, nearly double the national GDP per capita of USD 482 (Indicadores em Flash Distrito de Inhambane, 2022). Despite this, the consumption poverty rate shows that 40% of the local population lives below the poverty line (Tivane, 2024). Moreover, the Human Development Index (HDI) of 0.467 reflects low human development in the area (Indicadores em Flash Distrito de Inhambane, 2022). This highlights the significant socio-economic disparities within the district, which are further evident in its dual urban structure: a more developed, cement-built city centre contrasted with peripheral areas dominated by reed houses. Zacarias Tivane (2024) further support this, claiming that neighbourhoods located further north in the touristic zones experience the highest levels of poverty and social inequality.

Households in the district are mainly located near the coast, with their machambas situated on the slopes close to the shoreline. This settlement pattern is driven by the more fertile soils, higher groundwater levels and logistical convenience (Interview Luciano, July 2025). Most households

engage in multiple income-generating activities simultaneously, often combining farming and fishing with occasional labour or small business activities, frequently linked to tourism. Typically, community members work in their fields in the morning and go fishing in the afternoon. Their production and catches are primarily used to feed their families, with any surplus sold at local markets (Community interviews, July 2025).

The district's main crop production consists of horticultural crops, followed by cassava. Peanuts and sweet potatoes are also widely cultivated. Many households own livestock, including cattle, pigs, goats, and poultry, with poultry and eggs being the primary products sold commercially (Indicadores em Flash Distrito de Inhambane, 2022). In terms of fishing, households primarily rely on fish followed by the capture of crabs, cephalopods, and shrimp. Men and women play distinct roles in fishing activities: men typically engage in boat fishing, line fishing, or Gamboa fishing, while women collect crabs, shells, oysters, and langoustines in the mangroves. Children also contribute by searching for worms in the mangrove soil, which they sell as bait to fishers, particularly those fishing further offshore.

The district's Gender Inequality Index (GII) of 0.607 highlights significant gender disparities in the area (Indicadores em Flash Distrito de Inhambane, 2022). Although Mozambique has made notable progress since 2016 through legal and institutional reforms, gender inequalities persist due to deeply rooted social and cultural norms, widespread gender-based violence, and the disproportionate poverty faced by female-headed households. These challenges are further exacerbated by climate shocks, ongoing conflicts, and the impacts of the COVID-19 pandemic, threatening to regress progress (ONU MULHERES, 2022).

The District of Inhambane, located in Inhambane Province, is organized into several administrative posts, which are further subdivided into localities. These localities consist of multiple urban neighbourhoods known as barrios, totalling 23 across the district. Community governance structures include "regulos", who serve as the traditional leaders of their communities. Each community, such as Machavenga, Josina, and Salela, has its own regulo, recognized by the local population and holding traditional authority. Under their leadership are the "chefes de barrio", who link directly with the government administration in day-to-day management, including registration, local organization, and coordination of activities. While the chefes de barrio act as the operational link with the formal government, the regulos embody traditional and cultural authority. Both collaborate closely in conflict resolution, organizing community meetings, and coordinating the Community Fishing Councils (CCPs).

Local communities depend heavily on the diverse ecosystem services provided by mangroves. These ecosystems support a rich variety of flora and fauna essential to coastal livelihoods. Mangrove wood is commonly used for house and boat construction as well as firewood (Community

Interviews, July 2025). Mangroves also serve as vital nurseries, breeding grounds, and feeding areas for fish, crabs, and shrimp (Come et al., 2023). In addition, shellfish, snails, and crabs harvested from mangrove ecosystems provide crucial sources of food and income. Finally, mangroves offer critical protection from flooding, erosion, and tidal waves (Come et al., 2023).

However, rising population pressure and unsustainable practices have led to significant mangrove loss and degradation, undermining the ecosystem services they provide (Community Interviews, 2025). Fishers report a decline in both the number and size of their catches. In response, nurseries were set up to restrict fishing in certain areas. The coast of Salela, for example, hosts a fish nursery that supplies the communities of Salela, Machavenga, and Josina (community Interviews, July 2025). Communities say these nurseries are vital for sustaining fish stocks. However, illegal fishing and mangrove loss have reduced fish activity in recent years (Community Interviews, July 2025). A temporary closure system was introduced to limit harvesting and fishing aiming to prevent local conflicts over overfished areas (Come et al., 2023).

Farmers, on the other hand, are concerned about the reduced coastal protection provided by mangroves. Climate change–driven sea-level rise and stronger wave action increasingly intrude into their fields, destroying crops (Community interviews, July 2025). Rising sea levels are gradually pushing communities further inland, reducing both access to food and sources of income. In Machavenga, for example, rising sea levels overtopped an island that once protected machambas from water movements, flooding the fields and causing significant degradation. Satellite imagery from 2003 to the present shows that approximately 25 hectares of machambas have gradually disappeared in the area.

To counter this trend, local communities have established Community Fishing Councils (CCPs) to develop, manage, and enforce regulations for the protection of coastal and marine resources. These CCPs consist of elected fishers from each community around Inhambane Bay who work on a voluntary basis (Community Interviews, July 2025). They operate under a clear organizational structure, with presidents for different regions, secretaries, vocal members, and treasurers. With official support from the Provincial Directorate of Fisheries and the Maritime Police Department, CCPs play a key role in enforcing environmental laws, including prohibitions on cutting mangrove trees. Community members can report illegal activities to the CCPs, who then forward these reports to the relevant local authorities (Come et al., 2023). In addition to monitoring the mangroves, CCPs act as crucial agents of awareness-raising, frequently organizing community meetings and sensitization campaigns (Community Interviews, July 2025). Their effectiveness, however, has been very limited due to insufficient members, resources, and formal authority. While CCPs assist in reporting and apprehending illegal users, the ultimate enforcement and judicial processes remain under the jurisdiction of government bodies (Community Interviews, 2025).

3.3.2 Expected Livelihood Change

Chibabava: Communities of Mangunde and Nhaumue

The populations of Mangunde and Nhaumue can be largely considered as economically marginalized and politically disadvantaged in relation to those working in urban centres of Sofala and Maputo provinces. Within these populations, women and youth-headed households are particularly vulnerable because of their reliance on subsistence cultivation and very limited income generation opportunities in the area. Under the baseline scenario, there is little likelihood of their socio-economic conditions improving in the short- or medium term. Their share of the annual per capita GDP is less than half of that of the national average of US $500 and is unlikely to improve under the present national economic policies for rural areas in central and northern Mozambique. In addition, the increased likelihood of extreme weather events and greater variability in seasonal rainfall due to climate change can further contribute to decline in agricultural production and overall livelihood security. All the stakeholders identified in Section 2.1.1 are likely to experience further income deterioration and distress under the prevailing baseline scenario.

Inhambane: Communities of Machavenga, Salela and Josina

The rapid population growth in Machavenga, Josina, and Salela, combined with the reliance on small-scale farming and fishing continue to strain coastal ecosystems, accelerating mangrove degradation and reducing both fish stocks and coastal protection (see Annex 7b). Despite the efforts of CCPs to safeguard these ecosystems, mangrove loss persists, as they lack the resources and capacity to fully fulfill their responsibilities and are constrained by limited legislative authority.

Environmental decline, compounded by climate change–driven sea-level rise, increasingly erodes agricultural lands, restricting access to food and income sources. Although tourism development provides some economic growth and employment opportunities, Inhambane City's GDP in 2023 was nearly double the national average of 482, these neighbourhoods continue to experience high levels of poverty and social inequality, with 40% of the population living below the poverty line (Tivane, 2024). Based on this baseline scenario, coastal communities are expected to experience increasingly pronounced economic disparities. Declining yields from both fishing and farming will heighten food insecurity and deepen poverty levels in the area, especially affecting female-headed households.

3.4 Ecosystem Baseline

3.4.1 Initial Ecological Conditions

Chibabava Project Region

Chibabava district experiences a tropical monsoon climate, ranging from dry semi-arid tropical in the inland areas to humid tropical near the coast. Average temperatures are above 24°C, with temperatures reaching up to 35°C during summer. The district is watered by the Búzi, Revue, Lucito and other seasonal rivers. The annual wet season occurs between November and April, and a dry season between May and October. Average annual rainfall ranges between 800 and 1000 mm, and average daytime temperatures vary between 30°C in the wet season and 18°C in the dry season.

The communities are situated on relatively gentle undulating landscapes, although there are steeper river terraces carved by floods along the banks of the Buzi River. The geology consists of a Precambrian granitoid and gneiss basement complex, sometimes expressing inselbergs and kopjes, flattened along erosion surfaces. Altitude along the floodplain of the Buzi River ranges between 80 and 90m above sea level. In some areas the flood plain narrows dramatically, but in most areas it ranges between 1.2 and 2km in width. Settlement areas are concentrated along the eastern flank of the Buzi River with almost all settlements occurring within 4km and well above the high flood level of 90m.

Soils include a mixture of acidic soils, consisting of ferrasols and acrisols, and ferruginous soils made up of lixisols and cambisols. These are highly acidic, low in cation exchange capacity, low total exchangeable bases and low in available phosphorus. The soils are formed by a catenary sequence of deeply weathered soils in higher elevations, a narrow zone of sandy colluvial soils along the foot slopes, and poorly drained alluvium along rivers. Generally, the soils in the area have low levels of organic matter due to abundant termite activities and frequent incidence of fire (Chidumayo, 1997). Soils in the project areas are mostly sandy loams (organic content between 0.5-3.1%), varying significantly from upslope to downslope areas. The lowest quantities of soil organic matter are found in the sandy lowlands, closer to creeks and gullies.

The district is characterised by the distinctive Miombo-related woodlands ecosystem prevalent across southern and south-eastern Africa. Miombo woodlands are dominant in the central African plateau (Cole 1986) and can be seen as a transitional system between the closed rainforests in central Africa and the open semi-arid savannas of southern Africa (Vinya 2010). This tropical dry forest formation is critical for biodiversity and for the livelihoods of millions. The woodlands have been modified by settled and swidden farming practiced over millennia to create a complex agroecosystem mosaic (Ribeiro et al. 2020a). In fact, Miombo woodlands can be regarded as socio-ecological systems maintained by humans over a long period of time (Ribeiro et al. 2020b).

Miombo woodlands hold a "significant portion of the world's tropical dry forests and house one of the last remnants of megafauna worldwide" (Mittermeier et al. 2003). They can be defined as "deciduous woodlands composed of broad-leaved trees of the legume subfamily Detarioidae, well-developed grass layer, high level of endemism and habitat of charismatic megafauna" (Ribeiro et

al., 2020). Vegetation is adapted to the occurrence of fire. Nearly 55% of the 8500 floristic species in the Miombo ecosystem are endemic and about 80 percent of the largest terrestrial mammals of Mozambique are found in Miombo woodlands (FAO, 2021). Because of its structural characteristics, the Miombo vegetation constitutes an excellent habitat for a variety of wild herbivores and large predators such as inhacozo (Kobus ellipsiprymus), bushbuck (Tragelaphus scriptus), eland (Taurotragus oryx), sable (Hippotragus niger), gondonga (A. litchensteini) and carnivores such as lions (P. leo), leopards (P. pardus) and necrophages (e.g. hyenas, vultures).

Miombo woodlands generally occur under a unimodal rainfall pattern characterised by distinct and prolonged dry seasons, coupled with leached and weathered soils. Three key factors shaping the Miombo socio-ecological system are (i) climate variability, (ii) nutrient availability of soils, and (iii) occurrence of fire (Ribeiro et al., 2020).

Ribeiro et al. (2020) classify the Southern African woodlands along seven vegetation categories: (1) Hymenocardia/Uapaca miombo, (2) Diplorhynchus miombo, (3) Combretum miombo, (4) Baikiaea, (5) Mopane (Colophospermum), (6) Acacia (Vachellia / Senegalia) and (7) Androstachys. Our field surveys (see Annex 7) indicated that the project areas fit within the class of Combretum woodland, although Diplorhynchus is also commonly present. For sake of convenience, we refer to the project woodland areas as "Miombo woodlands".

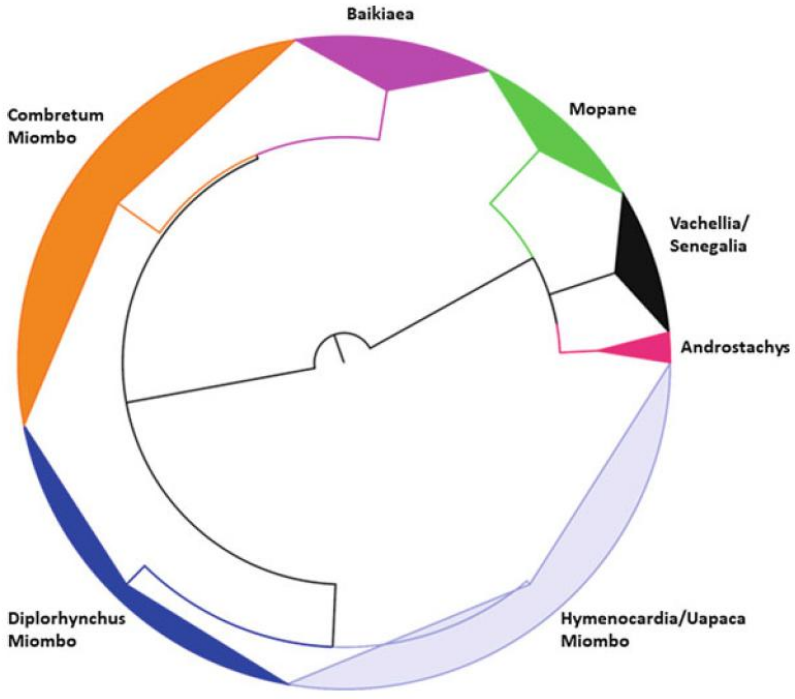


Figure 3.4.1. Classification of Southern African woodlands in seven vegetation categories (Ribeiro et al., 2020).

Inhambane Project Region

To date, many mangroves are in a state of degradation worldwide, with up to 0.4% of losses per year, mostly due to climate change (e.g. see de Lacerda et al., 2022) and anthropogenic impacts (e.g. see Goldberg et al., 2020). In Mozambique in particular, Campira et al. (2021) accounted that Mozambique had lost 7 114 ha mangrove areas between 2001 and 2020. Notably in the most recent years, they found an increasing prevalence of degradation (i.e. 23 318 ha only in the recent years). They relate the degradation trend with a combination of cyclones (linked with 53.38% of the degradation pattern) and direct and indirect anthropic impacts (causing 46.62% of the mangrove forest degradation).

The estuary of Inhambane Bay supports both mangrove forests and seagrass meadows, which are interconnected and face connected pressures. Based on a combination of six biodiversity surveys, thirty-one semi-structured interviews and participant observation at six mangrove areas within the Inhambane Bay, Come et al. (2023) identified mangrove destruction linked with a lack of community enforcement, coastal erosion and the increased occurrence of extreme events such as tropical storms. For instance, Macamo et al. (2016) reported that most of the mangrove forests in Inhambane were destroyed as long ago as the year 2000 (during the Eline cyclone). After the year 2000, Massingue (2019) measured a significant decrease in the area of coastal forest in the coastal zone of Inhambane Province (between the years 2000 and 2016) (Figure 3.4.2). For endemic species in particular, she identified timber or charcoal harvesting, the tourism industry, and agriculture and settlements as the key threats. For the full baseline field assessment, we refer to Annex 7b.

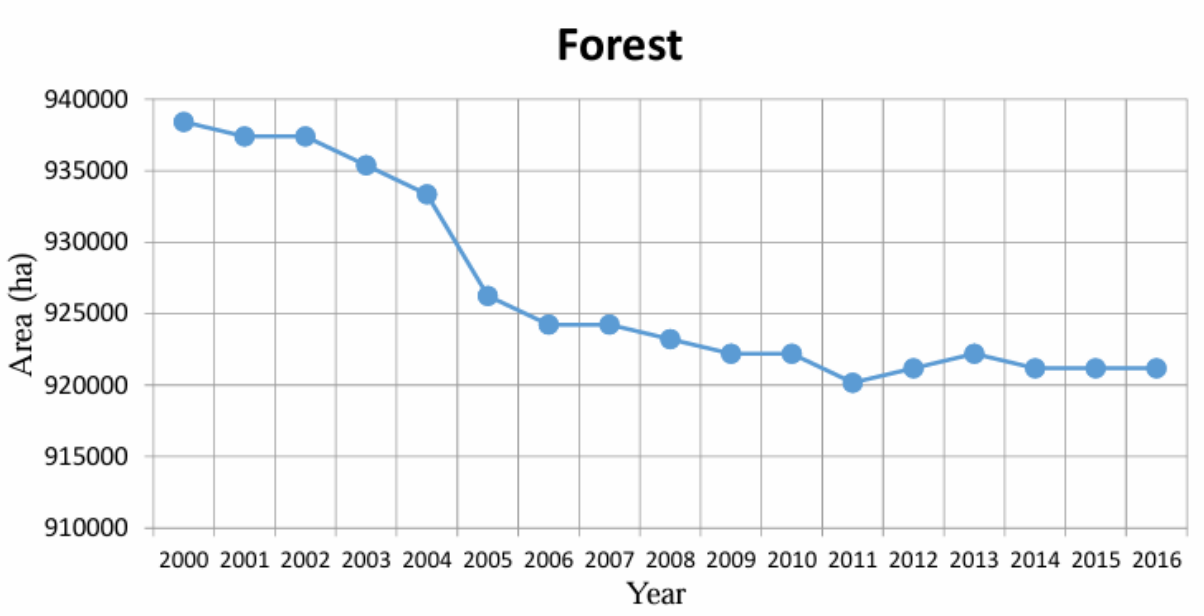


Figure 3.4.2. Significant decrease in the area of coastal forest in the coastal zone of Inhambane Province between the years 2000 and 2016 (Massingue, 2019).

3.4.2 Expected Ecosystem Change

Miombo woodlands are complex socio-ecological systems maintained by humans through cycles of clearing, cultivation, abandonment, and fire over millennia (Ribeiro et al. 2020b). Based on an analysis of remote sensing imagery and interviews on Miombo dynamics in Mozambique, Silva et al. (2009) show that shifting cultivation in the Miombo biome creates a complex agroecosystem mosaic in which change may occur simultaneously in many directions and at different rates. According to the authors, such dynamics are best explained by multiple causes and driving forces rather than by single-factor causation. This is in line with the review of Geist & Lambin (2002), indicating that land-use cover change in Southern Africa is driven by a variety of economic, cultural/socio-political, demographic, technological but also institutional/policy factors.

Across much of the rural development and biodiversity conservation literature, however, there is little acknowledgement of the Miombo woodlands as a complex agroecosystem mosaic. The dominant narrative is that charcoal production, timber harvesting, and slash and burn agriculture contribute to massive loss of Miombo ecosystems (Mather and Needle 2000; Brown 2001) and that reforestation projects must consequently protect Miombo from interference by local communities. Although Syampungani et al. (2016) relate Miombo cover loss with three main activities: (i) charcoal production, (ii) slash and burn agriculture and (iii) timber harvesting, they also state that Miombo woodland on sites abandoned after different traditional use and agricultural practices can recover to good health. Some authors argue that charcoal production and slash and burn agriculture may even be necessary disturbances that enhance the establishment and development of the regeneration pool of the Miombo plagioclimax (Luoga et al. 2002). Miombo woodland can recover easily on a timescale of about 20 to 25 years, under the condition that regeneration is not inhibited by late dry season fires (Chidumayo, 2019). Monfort et al. (2021) infer a high woodland regeneration capacity in terms of woody species diversity and soil properties but also find that disturbances and light conditions have a long-term effect on species composition and stand structure, underlining another condition of integrated landscape management.

Field observations of areas near the project sites show the occurrence of slash and burn agriculture, timber harvesting (Figure 3.4.2), and occasional instances of charcoal production. However, the project sites are neither located on abandoned formerly machambas nor used as grazing lands. They are on higher topography which have more eroded soils and are frequently affected by uncontrolled late dry season fires. The late dry season fires can contribute to increased erosion and impoverishment of soils and thus inhibit woodland enrichment. As outlined in the abovementioned literature findings, the field observations do not indicate massive losses of biomass due to slash and burn agriculture, timber harvesting, or charcoal production, but one can expect a metastable biomass baseline scenario. This most likely future land use and land management scenario of the

project areas, in the absence of project interventions, is fully described in Annex 7 (based on AR-TOOL02 v1.0: "Combined tool to identify the baseline scenario and demonstrate additionality in A/R CDM project activities").

Figure 3.4.2. Observations of (left) a cleared dryland machamba with Sorghum cultivation near the Mangunde project zone, (middle) charcoaling near the Nhaumue project zone and (right) timber harvesting near the Nhaumue project zone.

Finally, field observations of the project mangroves in Machavenga, Salela and Josina, show the occurrence of both high-intensity firewood harvesting and hypersalinity in these areas. Under these key constraints, one can expect a metastable biomass baseline scenario (no regeneration). This most likely future land use and land management scenario of the mangrove project areas, in the absence of project interventions, is fully described in Annex 7b (based on AR-TOOL02 v1.0: "Combined tool to identify the baseline scenario and demonstrate additionality in A/R CDM project activities").

Theory of Change

3.5 Project Logic

Table 3.5 provides a summary of the causal links between project activities and expected outcomes and key assumptions.

Regarding risks we refer to §Risk Management.

Table 3.5 Project Logic

Aim To use an integrated landscape management strategy for enrichment of Miombo woodlands and estuarine mangroves to create of climate resilient agroecosystems for sustainable livelihood opportunities in Chibabava District, Sofala Province, and sustainable fisheries in Inhambane, Mozambique.		
	Description	**Assumptions/Risks**
Outcomes		
Carbon Benefit	~ Community managed woodlands are enriched by increase in soil organic carbon and Miombo species biomass. Degraded estuarine mangroves are managed by communities and allowed to regenerate to increase biomass and soil organic carbon. The project expands to adjacent areas and involves neighbouring communities to scale-up the impact.	R1: Uncontrolled fires could continue to affect the project areas. A1: The project establishes mulching zones and fire breaks to protect enriching Miombo lands against uncontrolled annual fires. R2: Community could be uninterested to participate in the Miombo and Mangrove projects. A2: Strong role of stakeholder communities as project designers and involvement of neighbouring households in project activities will build a strong project support base.

Livelihood Benefit	Agroforestry nursery providing additional livelihood benefits to participating households of Mangunde and Nhaumue. Socio-ecological challenges are tackled by community decisions using re-investments. Protection of ecosystem services and non-timber forest products Mangrove restoration leads to coastal protection of the lowest-lying machambas and more sustainable fisheries (as mangroves deliver vital shelter and food for juvenile marine life).	R3: A focus on Miombo restoration alone could be insufficient to create significant community benefits. A3: Intensive agroforestry planting improves soil fertility and provides useful trees for participating households. R4: Project benefits could be insufficient to attract strong community interest. A4: Plan Vivo re-investments are used to improve the well-being of communities. R5: A focus on mangrove restoration alone could be insufficient to create significant community benefits. A5: Community needs are assessed from a broad perspective that includes fisheries, sea fruit collection, occurrence of sea grass, machambas, markets, firewood needs, village infrastructure and other.
Ecosystem Benefit	The floristic biodiversity of the ecosystem is supported through the enrichment, conservation, and improved management of community-managed woodland and mangrove. The project will also contribute	R6: The project team itself could be too small to perform all restoration activities alone.

	to regional habitat diversity for endemic fauna. The project expands to adjacent areas and involves neighbouring communities to scale-up the impact.	A6: The restoration areas are enriched, protected, and expanded by community members.
Outputs and activities		
Output 1	**Indigenous mulching techniques successfully applied as mosaic patches across the project areas.**	R7: The local soils may be too poor to allow strong Miombo enrichment. A7: Local soil management techniques are key to the successful enrichment of Miombo woodlands R8: The project team itself could be too small to perform all mulching activities alone. A8: Active and broad-based involvement of communities as project designers and project partners will build a strong project support base. R9: Drought and soil infertility may hamper vegetation growth. A9: Implementing soil enrichment and landscape water harvesting (mulching and building SWC structures) will speed up the growth of the biomass.
Activity 1.1	Assessing community knowledge on grasses and soil fertility, and making "soil fertility maps"	
Activity 1.2	Identify good locations in project area for mulching and develop mulching strategy with community participants	
Activity 1.3	Annual mulching activities in project subareas	
Activity 1.4	Construction of water-retaining swales or other soil and water conservation (SWC) structures in project areas	
Activity 1.5	Community-led soil strategy evaluation	
Activity 1.6	Community liaison regarding soil fertility improvement techniques	
Output 2	**Firebreaks installed and maintained around the project areas.**	R10: Banning all fire would not be smart since fire is an

Activity 2.1	Assessing community knowledge of fire regime in project areas, and making an "uncontrolled fire exposure" map	integral part of the ecological integrity and ecosystem function of miombo woodlands A10: The project is not 'anti-fire' but rather about managing the occurrence and frequency of uncontrolled fires in the project areas. According to Ribeiro et al. (2021), an (alternatingly cold and hot) fire return interval of ~3 (to 5 years) is beneficial for the Miombo ecosystem. Community-based management will establish mulching zones and fire breaks to protect and enrich project areas from uncontrolled annual fires. The project establishes fire experimental plots to gain detailed understanding of the effect of fire frequency and intensity on biomass. R11: The project team itself could be too small to perform all fire management activities alone. A11: Active and broad-based involvement of communities as project designers and project partners will build a strong project support base.
Activity 2.2	Develop fire(break) strategy for project sites and discuss it with the community	
Activity 2.3	Establish firebreaks (minimum 10m wide) at project sites, with community members, and at least 1 month before the start of the fire season	
Activity 2.4	Community-led fire strategy evaluation	
Activity 2.5	Community liaison regarding uncontrolled fire reduction through mulching and firebreak techniques	

Output 3	**Native Miombo species planted across the project areas.**	R12: A regeneration approach alone (without extra planting) could be insufficient to enrich certain bare subzones. A12: Enrichment planting of native Miombo seedlings can only take place when soil and fire management strategies are in place. R13: Non-native species could become invasive. A13: Seeds are harvested from local trees (in Chibabava district), based on community knowledge on best timing for seed harvesting R14: Meteorological data in Chibabava may still be scant. A14: Next to nutrient availability of soils, and occurrence of fire, Miombo trees are highly dependent on climate variability – so it is important to gather local climatic data
Activity 3.1	Biomass and soil plot measurements	
Activity 3.2	Community-led identification of the use of tree species and the timing for seed harvesting for making a "tree species distribution map"	
Activity 3.3	Develop strategy on planting different tree species and discuss it with the community	
Activity 3.4	Enrichment planting in project areas, during the first rainy months to maximize the plant survival rate and adaptation	
Activity 3.5	Continuous monitoring of temperature, rainfall, fire occurrence and seasonal plant behaviour	
Activity 3.6	Regular community liaison	
Output 4	**Agroforestry systems applied by the participants of the Project's Agroforestry Work Group.**	R15: It may be difficult to find high-quality seedlings to supply the project. A15: High-quality river-irrigated local nurseries are constructed since these are crucial to supply the necessary seedlings for Miombo enrichment and agroforestry cultivation R16: It may be technically difficult to implement the agroforestry component.
Activity 4.1	Training project team members in agroforestry nursery, strategies and processes	
Activity 4.2	Setting up nurseries and nursery irrigation system, and engage nursery labourers	
Activity 4.3	Planting and supporting replanting and long-term maintenance of the agroforestry system with the Project Agroforestry Work Group	
Activity 4.4	Community and association liaison	

Activity 4.5	Distribution of agroforestry crop benefits	A16: The project select agroforestry species that are best suited for the local socioecological circumstances and conditions R17: The agroforestry benefits may be insufficiently attractive. A17: Fruits and other products from agroforestry can be effectively sold at local markets
Output 5	**Estuarine mangroves restored leading to more productive local fisheries**	R18: Strategies and processes of project interventions may not be clear to most community members A18: Trainings will be practical and given in the field, all the while cooperation with Eduardo Mondlane University will remain close R19: Survival rate of mangrove seedlings may be reduced A19: Project logic follows hybrid restoration approach combining passive natural regeneration and active tree planting
Activity 5.1	Strengthening the structures of the Community Fisheries Councils (Conselhos Comunitarios de Pesca) and implicate them in active mangrove oversight	
Activity 5.2	Community sensibilization at community meetings, schools and churches, and through women ambassador groups	
Activity 5.3	Supporting alternative sources for local wood-based cooking needs	
Activity 5.4	Active mangrove restoration including enrichment planting, sea grass planting and microchannel cleaning	
Activity 5.5	Supporting efficiencies in the local fishery and sea fruit supply chain	

Technical Specification

The technical specification template for each project intervention is available in Annex 7. Two different technical specifications have been developed (Annex 7a and 7b):

- The Miombo Enrichment Specifications are based on the PM001 Agriculture and Forestry Carbon Benefit Assessment Methodology.
- The Mangrove Restoration Specifications are based on the PM001 Agriculture and Forestry Carbon Benefit Assessment Methodology.
- The Agroforestry Specifications will be added as a separate document later.

3.6 Project Activities

Table 3.6 provides a summary of the main project activities and inputs for the project interventions. Also see Table 3.5 and the separate technical specifications provided in Annex 7.

Table 3.6 Project Activity Summary

Project Intervention	Project Task	Project Activities	Inputs
Ecosystem Restoration	Implementing Miombo Soil Strategy	Assessing community knowledge on grasses and soil quality, and making a "soil fertility map"	Community interviews, participatory mapping
		Identify good locations in project area for mulching and develop mulching strategy and discuss it with community	Community interviews and community meetings
		Annually mulching in project subareas	Daily labour
		Construction of swales in project areas (or other SWC structures)	Daily labour and regular monitoring
		Community-led soil strategy evaluation	Community interviews and community meetings

		Community liaison	Regular community interviews
	Implementing Miombo Fire Strategy	Assessing community knowledge of fire regime in project areas, and make an "uncontrolled fire exposure map"	Community interviews, participatory mapping
		Develop fire(break) strategy for project sites and discuss it with the community	Community interviews and community meetings
		Establish firebreaks at project sites, with community members	Daily labour and regular monitoring
		Community-led fire strategy evaluation	Community interviews and community meetings
		Community liaison	Regular community interviews
	Implementing Miombo Enrichment Strategy	Biomass and soil plot measurements	Monitoring plots
		Community-led identification of the use of tree species and the timing for seed harvesting, and make "tree distribution map"	Community interviews, participatory mapping
		Develop strategy for planting tree species and discuss it with the community	Community interviews and community meetings
		Enrichment planting in project areas	Local nurseries, daily labour and monitoring

		Continuous monitoring of temperature, rainfall, fire occurrence and seasonal plant behaviour	Thermometer, pluviometry, regular community interviews
		Community liaison	Regular community interviews
Agroforestry	Implementing Agroforestry Strategy	Training project team members in agroforestry strategies and processes	Training sessions
		Setting up nurseries and nursery irrigation, and engage nursery labourers	Nursery investments, water infrastructure, nursery labour
		Planting with the Project's Agroforestry Work Group	Available communal or private lands close to nursery and river irrigation
		Community and association liaison	Regular community interviews and interviews with association members
Mangrove restoration	Implementing mangrove restoration strategy	Strengthening the structures of the Community Fisheries Councils (Conselhos Comunitarios de Pesca) and implicate them in active mangrove oversight	Community interviews and community meetings
		Community sensibilization at community meetings, schools and churches, and through women ambassador groups	Training sessions and meetings

		Supporting alternative sources for local wood-based cooking needs	Distribution of fuel-efficient cooking stoves
		Active mangrove restoration including enrichment planting, sea grass planting and microchannel cleaning	Nursery investments, nursery labour, daily labour
		Supporting efficiencies in the local fishery and sea fruit supply chain	Gap analysis of the local fisheries value chain

3.7 Additionality

Tables 3.7 provide a summary of the main barriers to project implementation and how they will be overcome for each project intervention. Full details of the additionality assessment, following an approved methodology, are provided in Annex 7a and Annex 7b.

Table 3.7a Additionality Assessment Summary

Project Intervention	**Main Barriers**	**Activities to Overcome Barriers**
Miombo restoration	Financial: 1. Limited funds 2. Other priorities 3. Limited private credit availabilities	Start-up capital secured by Government of Flanders (Belgium) funds to initiate the project; benefit sharing scheme supported by Plan Vivo; funding for soil and fire management, wages and enrichment planting

	Technical: Although biodiversity conservation projects are being pursued in other parts of Sofala Province, these are mainly targeted for wildlife parks. There is limited focus on enrichment of Miombo woodlands in rural community areas in conjunction with agroforestry activities Limited land availability for agroforestry plantings	Skilled local coordinators with understanding of local agroecosystems for enriching Miombo woodlands; inputs of environmental scientists and researchers linked to three universities; construction of plant nurseries for miombo enrichment and agroforestry plantings Collaboration with ESMABAMA for use of Mangunde Agricultural Training Centre and lands for agroforestry activities
	Institutional /Social: "Top-down approach" adopted by government officials, with limited room for local decision-making and grassroots initiatives	Bottom-up approach with first consultation rounds, continued workshops and benefit sharing for participating communities, and insertion of project within local community associations such as CGRN.
Mangrove restoration	Financial: 1. Limited funds 2. Other priorities 3. Limited private credit availabilities	Start-up capital secured by Government of Granada (Spain) funds to initiate the project; benefit sharing scheme supported by Plan Vivo; funding for management, wages and enrichment planting

Technical: Although biodiversity conservation projects are being pursued in other parts of Inhambane Province, these are not focussed on the threatened mangroves of the Inhambane bay.	Skilled local coordinators with understanding of local agroecosystems for enriching mangroves; inputs of environmental scientists and researchers linked to three universities; construction of plant nurseries for mangrove enrichment
Limited focus on mangrove restoration projects that include hybrid restoration approach combining passive natural regeneration and active tree planting	Collaboration with Eduardo Mondlane University for mangrove restoration strategy and monitoring
Institutional /Social: "Top-down approach" adopted by government officials, with limited room for local decision-making and grassroots initiatives CCP structures existing in theory, but very weak in practice	- Bottom-up approach with first consultation rounds, continued workshops and benefit sharing for participating communities, and insertion of project within local community associations such as CCPs.

Table 3.7b Regulatory surplus assessment

Project Intervention	**Relevant laws, statues or other regulatory frameworks that could arguably promote intervention**	**How the interventions fall outside the scope of laws or how laws or not effectively enforced**

Miombo Restoration (technical specification included in Annex 7a)	The 1997 Land Law (DUAT – Direito de Uso e Aproveitamento dos Terras)	Based on the 1997 Land Law (DUAT – Direito de Uso e Aproveitamento dos Terras), the customary rights of rural communities, usufruct rights and land use activities (FAO, 2002) are formally determined and recognized. Members of rural community associations can hold equal shares in a single co-owned title over the use rights of all their customary lands. Access and use rights within these areas can be determined by custom. The DUAT thus formally recognises the community land rights and allows for these to become protected and restored. In the project areas, however, neither community land rights were secured through DUATs, nor were these allowed to become protected and restored.
Mangrove restoration (technical specification included in Annex 7b)	Law establishing the possibility to enact áreas de conservação comunitária (art. 22 of Law 5/2017 dd. 11 May 2017)	User rights belong to the local Community Fisheries Councils (Conselhos Comunitarios de Pesca – CCP), managing the respective áreas de conservação comunitária (art. 22 of Law 5/2017 dd. 11 May 2017) In the project areas, however, neither CCPs, fishery user rights, nor áreas de conservação comunitária were secured,

		let alone that these could become protected and restored.

3.8 Carbon Benefits

Tables 3.8a and 3.8b provides a summary of the expected carbon benefits from each project intervention over the first crediting period. We provide these tables with full details of our procedures for estimating carbon benefits, following an approved methodology, in Annexes 7.

Table 3.8a Expected Carbon Benefits Summary

Project Intervention	**Baseline Emissions (t CO_2e/ha)**	**Project Emissions (t CO_2e/ha)**	**Leakage Emissions (t CO_2e/ha)**	**Carbon Benefit (t CO_2e/ha)**
Miombo Restoration (technical specification included in Annex 7a)	0	-288	0%	-288
Mangrove restoration (technical specification included in Annex 7b)	0	-643.7	0%	-643.7

Table 3.8b Plan Vivo Certificate Potential

Project Intervention	Carbon Benefit ($t CO_2e/ha$)	Project Area (ha)	Total Carbon Benefit ($t CO_2e$)	Risk Buffer ($t CO_2e/ha$)	Potential PVCs ($t CO_2e$)
Miombo Restoration (technical specification included in Annex 7a)	288	369	106 272	20%	74 390*
Mangrove restoration (technical specification included in Annex 7b)	643.7	179.49	115 538	20%	83 187*
TOTAL	-	548	221 810	20%	157 577

*After correction of Achievement Reserve

Risk Management

3.9 Environmental and Social Safeguards

3.9.1 Exclusion List

The project does not include any activities listed in the Plan Vivo Exclusion List (see Annex 8).

3.9.2 Environmental and Social Screening

Table 3.9.2 provides a summary of the potential risks and impacts identified in the environmental and social risk screenings. Please see Annex 9 for the complete Environmental and Social Screening, §3.9.3 for the environmental and social assessment, and §3.9.4 for the environmental and social management planning.

Table 3.9.2.a Environmental and Social Risks (Chibabava Project Region)

Risk Area	Likelihood (1-5)	Magnitude (1-5)	Significance (low, moderate, severe, high)
Vulnerable Groups	3	3	Moderate, potential risks mainly related with perpetuation of income-related inequality
Gender Equality	3	3	Moderate, potential risks mainly related with perpetuation of gender-related inequality
Human Rights	2	3	Moderate, potential risks mainly related with individuals not being present during Subcomité meetings
Community, Health, Safety & Security	3	3	Moderate, Mozambican Civil War ended in 1992, thereafter relative peace prevailed
Labour and Working Conditions	1	3	Low, as the project will at all times align with regional/national labour laws
Resource Efficiency, Pollution, Wastes, Chemicals and GHG emissions	1	3	Low, as no pollutants are used, and project GHG emissions are negligible
Access Restrictions and Livelihoods	3	3	Moderate, potential risks mainly related with displacement in

			the in cases of uncontrolled fire events
Cultural Heritage	1	2	Low, no registered cultural heritage within the project areas; community subcommittees to ensure culturally significant sites are properly identified and not affected by project interventions
Indigenous Peoples	3	3	Moderate, the majority of all inhabitants in the project region are Ndau
Biodiversity and Sustainable Use of Natural Resources	1	3	Low, project activities promote biodiversity enhancement; no non-native trees will be planted in woodlands
Land Tenure Conflicts	3	3	Moderate, potential risks mainly related with fire outbreaks that may occur adjacent to the project areas
Risk of Not Accounting for Climate Change	1	3	Low, potential risks mainly related with cyclones and increased frequency of extreme weather events
Other – e.g. Cumulative Impacts	2	3	Moderate, potential risks mainly related with the potential spread of uncontrolled fire outbreaks
Overall risk assigned to project:			**Moderate**

Table 3.9.2.b Environmental and Social Risks (Inhambane Project Region)

Risk Area	Likelihood (1-5)	Magnitude (1-5)	Significance (low, moderate, severe, high)
Vulnerable Groups	3	3	Moderate, potential risks mainly related with perpetuation of income-related inequality
Gender Equality	3	3	Moderate, potential risks mainly related with perpetuation of gender-related inequality
Human Rights	2	3	Moderate, potential risks mainly related with individuals not being present during CCP meetings
Community, Health, Safety & Security	3	3	Moderate, Mozambican Civil War ended in 1992, thereafter relative peace prevailed
Labour and Working Conditions	1	3	Low, as the project will at all times align with regional/national labour laws
Resource Efficiency, Pollution, Wastes, Chemicals and GHG emissions	1	3	Low, as no pollutants are used, and project GHG emissions are negligible
Access Restrictions and Livelihoods	3	3	Moderate, potential risk are mainly related to cutting and illegal fishing.
Cultural Heritage	1	2	Low, no registered cultural heritage within the project areas.

Indigenous Peoples	3	3	Moderate, all stakeholders participate to the project design and activities.
Biodiversity and Sustainable Use of Natural Resources	1	3	Low, project activities promote biodiversity enhancement; no non-native trees will be planted in woodlands
Land Tenure Conflicts	1	3	Low, the mangroves are classified as *Áreas de Conservação Comunitária* according to Article 22 of Law 5/2017 (11 May 2017).
Risk of Not Accounting for Climate Change	1	3	Low, potential risks mainly related with cyclones and increased frequency of extreme weather events
Other – e.g. Cumulative Impacts	2	3	Moderate, potential risks mainly related with the potential of illegal cutting and fishing.
Overall risk assigned to project:			**Moderate**

3.9.3 Environmental and Social Assessment

We include a full environmental and social assessment report in Annex 10. Risks rated 'moderate' or higher as part of the E&S screening review have been given more detailed consideration, and corresponding management plans added (see section 3.9.4).

Chibabava Project Region

On 3, 6 and 9 November 2023, communal meetings on risks were held by the AZ team in Mangunde and Nhamue. The main risk areas were discussed and mitigation measures were decided jointly. In Mangunde, 10 people joined the risk sessions on 9 November; in Nhamue, 18 people joined the risk sessions on 3 and 6 November.

Inhambane Project Region

A participatory Ecosystem Services Assessment (ESA) was facilitated by the Azada Verde and Climate Lab teams in the Inhambane project region to identify key risks associated with mangrove restoration and to capture community-led mitigation measures. The session took place on 15 July 2025 in Machavenga, with balanced representation from the three project communities: Machavenga, Salela, and Josina.

A total of 18 participants attended (nine women and nine men), who identified concerns including limited awareness of mangrove protection, weak enforcement and control, ongoing mangrove cutting, harmful fishing practices, and climate-related pressures. Despite these challenges, community members assessed the overall risk level as moderate and demonstrated a strong commitment to mangrove restoration.

Proposed mitigation measures focused on strengthening Community Conservation Committees (CCPs), increasing awareness through trained community ambassadors, promoting sustainable fishing and wood-use practices, and ensuring inclusive participation across all community groups.

3.9.4 Environmental and Social Management Plan

Tables 3.9.4a and table 3.9.4b describe the mitigation measures in place to address the main environmental and social risk identified in Sections 3.9.2 and 3.9.3.

Table 3.9.4a Environmental and Social Risk and Impact Mitigation Measures for Chibabava Project Region

Risk/Impact	Mitigation Measures	Project Activity	Livelihood Indicator
Potential risk related with spread of uncontrolled fire outbreaks	The neighbouring Miombo zones must be included in the participatory zonation maps and in the monitoring program. Community Subcommittees (SC) will organise regular meetings to discuss strategies and be prepared to act swiftly in cases of fire outbreaks; SCs ensure that community members are	**Activity 2.1 to Activity 2.5**	**L7**

	involved in fire monitoring around project areas. The Miombo restoration zones and nurseries will always be repaired, replenished and rehabilitated after any occurrence of uncontrolled fire, or any other extreme weather events such as high temperatures, low rainfall, or cyclones .		
Potential risk of disproportionate labour demands for mulching or planting activities falling on women.	This could increase female workloads during specific phases of cultivation during the wet and dry seasons. The project aims to mitigate these negative social risks by ensuring 50 % or more representation of women in the Subcommittees so that they can determine how to distribute the labour demands according to women's household needs and circumstances.	**Activity 1.1 to Activity 4.5**	**L2**
Potential risk of local elite capture	To include all community members, it is suggested to decentralise invitations (i.e. not only by the leader, but also by the project team) and to communicate earlier on upcoming project	**Activity 1.3, 1.4, 2.3**	**L2,L3**

	activities so the news can spread. The project should keep records of community members participating in project activities and use a smart rotation system to achieve broad inclusion of the community in the project.		
Potential risk of high opportunity costs	Freely distributing tree seedlings and/or seeds for direct seeding of important timber wood species to be planted in individual or communal woodlots. Grass cut-and-carry system (see further) Valorising non-timber forest products and particularly supporting honey production in the Miombo project areas. Established bee-hives in the project area would provide livelihood benefits and function as natural defenders of the area. Sensibilization and dissemination of project objectives and benefits to strengthen community ownership of the project.	**Activity 2.3 and 3.4** **Activity 4.1 to 4.5**	**L1, L6, L5**

Table 3.9.4b Environmental and Social Risk and Impact Mitigation Measures for Inhambane Project Region

Risk/Impact	Mitigation Measures	Project Activity	Livelihood Indicator
Under-representation of vulnerable groups and local elite capture.	Decentralized and transparent invitations to meetings. Monitoring of participation. Rotation mechanisms to ensure inclusion.	**Activity 5.2**	**L2**
Gender equality	Establishment a hard quorum of 50% female participation	**Activity 5.1, 5.2, 5.5**	**L2**
Political instability and insecurity	Strengthen community ownership by engaging members through regular meetings, targeted training, and hands-on project activities. Generating direct benefits through socio-environmental investments and income-earning opportunities that help sustain continuity during periods of instability.	**Activity 5.1, 5.2, 5.5**	**L3, L4, L5, L7, L8**
Climate change and extreme weather events	After an unexpected environmental shock, the affected project areas will receive extra project attention and enrichment planting.	**Activity 5.4**	**L7, C4**

Lack of community awareness about the project and sustainable practices	Awareness sessions at schools, churches, and markets. Support alternative sources for local wood-based cooking needs.	**Activity 5.1, 5.2, 5.3, 5.5**	**L1, L3**
Cutting / mangrove exploitation	Reinforcing CCP structures and ensuring their active involvement in mangrove monitoring and protection. Support alternative sources for local wood-based cooking needs.	**Activity 5.1, 5.5**	**L1**
Use of inappropriate or harmful fishing materials, including toxic plants	Reinforcing CCP structures and ensuring their active involvement in mangrove monitoring and protection. Educate at schools, churches, and markets.	**Activity 5.1, 5.2, 5.5**	**L3**
Fishing inside mangrove nurseries	Reinforcing CCP structures and ensuring their active involvement in mangrove monitoring and protection. Educate at schools, churches, and markets.	**Activity 5.1, 5.2, 5.5**	**L3**
Children cutting mangrove roots to collect worms for fishing bait	Reinforcing CCP structures and ensuring their active involvement in mangrove monitoring and protection.	**Activity 5.1, 5.2, 5.5**	**L3**

	Educate at schools, churches, and markets.		
Higher water levels and strong water movements	Implement mangrove restoration and planting to stabilize banks. Promote community-based water management to reduce erosion and flooding impacts.	**Activity 5.4**	**L7**

3.9.5 Native Species

All trees planted in the Miombo woodland and mangrove project areas are native; no non-native tree species are planted or introduced by the project (see: https://powo.science.kew.org/). Agroforestry areas will be located in the lowland areas closer to the river and will have a mix of useful trees and crops that are suited to the local agricultural economy and non-invasive in the surrounding environment.

Table 3.9.5: Non-Native Species Overview

Project Intervention	Non-Native Species Planted/ Introduced	Justification	Risk Assessment and Management
Agroforestry	Moringa oleifera	Moringa leifera is widely established right across Mozambique and is a useful plant to many communities who use the leaves as a source of food especially during wet months. It is not an invasive species, although it can be easily germinated in nursery conditions	Low risk species – little chance of self propagation. Will be used in agroforestry areas only, both in upland and lowland areas due to lack of invasive threat. Already naturalised in Mozambique.

		using cuttings or seeds. Bigger branches are also useful for construction purposes.	
Agroforestry	Mangifera indica	Mango is widely established and naturalised right across Mozambique. It is an important food source, especially around December and January. It will only be used in Agroforestry plots with some grafted and improved varieties to be trialled. It can be moderately invasive but is a useful plant already present in the area and provides economic and environmental benefit.	Slight risk of spreading but will be planted amongst indigenous and more proliferous species. Will be used in agroforestry areas only, both in upland and lowland areas. Already naturalised in Mozambique.

Note: During the first project year, when performing a first Miombo planting trial, the project planted a few Erythrophleum suaveolens and Khaya anthotheca seedlings derived from the Mezembite nursery. Erythrophleum suaveolens is native to Mozambique and Khaya anthotheca is naturalized, but these species are not very well adapted to the Miombo conditions of Sofala. The project will not plant these species again. Tamarindus indica is a popular tree that is native to Madagascar and naturalized to Mozambique. The project will consider planting Tamarindus in the future, but not before adjusting the PDD (including risk assessment).

3.10 Achievement of Carbon Benefits

The proportion of carbon benefits that will be held as an achievement reserve is 10%, and the project will generate rPVCs (regularly transforming into vPVCs upon verification).

3.11 Reversal of Carbon Benefits

Tables 3.11 describe the impact and likelihood of risks to the long-term maintenance of Carbon Benefits from the project. In the Score column, we multiplied Impact and Likelihood scores to give a total score between 0 and 9.

Table 3.11a Risk of Reversal Assessment (Chibabava Project Region)

Risk Factor	Mitigation Activities	Impact	Likelihood	Score
Internal Risks				
Project participants leave the project or fail to implement all project activities.	Project agreements agreed and signed by relevant stakeholders, DUAT in place	2: Climate benefits would not be issued for affected project area, but the project geographical spread across different project areas would limit the total impact	2: Tenure is secure and agreements and DUAT are in place	**4**
Project coordinator withdraws or fails to coordinate and manage the project effectively.	Financial plan developed with Community Subcommittees and CGRN to ensure long-term stability in project coordination	3: Potential impact would be important but there are three organisations involved and the communities could take over some responsibilities	1: The project coordinators are well-established organisations, Government of Flanders (Belgium) funds allow the project to start in the absence of carbon benefits	**3**
Capacity of project participants to implement project activities is not maintained.	Financial plan developed, technical specifications developed; project employees and Community Subcommittee participants are given ongoing technical	3: Potential impact would be important but the communities could take over some responsibilities	1: The project coordinators are well-established organisations, capable to provide support even in the absence of carbon benefits	**3**

	training to expand local capacity			
Cash flow is insufficient to sustain project activities.	Financial plan developed	3: There would be insufficient incentive to support project activities, although that situation would be temporary	1: The project coordinators are well-established organisations, Government of Flanders (Belgium) funds allow the project to start in the absence of carbon benefits	**3**
Project participants experience a reduction in food supply or income as a result of project activities.	Focus on community lands	2. Potential impact would be important but highly unlikely, revenue sharing can be used to purchase food support	1. This project acts on community lands	**2**
External Risks				
Land ownership, resource access or carbon rights are disputed.	Project agreements agreed and signed by relevant stakeholders, DUAT in place	2: Climate benefits would not be issued for affected project area, but the project geographical spread across different project areas would limit the total impact	2: Tenure is secure and agreements and DUAT are in place	**4**

Policy changes affect the project.	Project agreements agreed and signed by relevant stakeholders, DUAT in place, REDD+ license in place	2: Climate benefits would not be issued for affected project area, but the project geographical spread across different project areas and regions would limit the total impact	2: Tenure is secure and agreements and DUAT are in place	**4**
Political unrest affects the project.	To work closely with the different levels of government, i.e. at District, Province and National level	2: Political instability would impact the project although physical fighting is highly unlikely	2: Mozambican Civil War ended in 1992, and relative peace has since prevailed	**4**
Changing market and/or socioeconomic conditions, or other developments (e.g. infrastructure, or employment or educational opportunities) make alternative land uses more attractive than the project intervention.	Project agreements agreed and signed by relevant stakeholders. Diversification of income opportunities from agroforestry reduces attractiveness of alternative land uses in Miombo enrichment areas	2: Climate benefits would not be issued for affected project area, but the project geographical spread across different project areas would limit the total impact	1: Benefit sharing mechanism ensures attractive benefit delivery to the project participants	**2**

Permission to implement project activities and/or sell carbon credits is withdrawn.	Project agreements agreed and signed by relevant stakeholders, benefit sharing mechanism included, DUAT in place	3: Potential impact would be important, although the project communities have shown strong support for the project	1: The project is community-driven and communities receive the bulk of the benefits	**3**
External parties carry out activities that reverse climate benefits	The project agreement discusses procedures to handle disputes arising in relation to project areas. Community subcommittees have monitoring in project areas to prevent theft or damage of trees by outsiders	2: Climate benefits would not be issued for affected project area, but the project geographical spread across different project areas would limit the total impact	2: Tenure is secure and agreements and contracts are in place	**4**
Natural Risks				
Hydrological changes affect project area(s)	Avoid working in matoros	1: Decentralised project structure with project areas spread across a larger zone limit potential impact	1: Miombo areas upslope, in the higher parts of the landscape	**1**

Project area(s) are affected by fire.	Meetings to discuss fire practices and seasonal burning strategies are regularly organised; community members are involved in creating fire breaks	1: After an unexpected runaway fire, the affected project areas will receive extra project attention and enrichment planting.	3: Fires are common, although well studied by the project team, and fire breaks are in place	**1**
Project area(s) are affected by pest or disease outbreak.	Biodiversity will be monitored (see monitoring section) with special attention to potential pest outbreaks.	2: After an outbreak, the affected project areas will receive extra project attention and enrichment planting.	1: Seedling planting involves a biodiverse mix of different native species (see §3.9.5)	**2**
Extreme weather (drought, flood, wind, temperature extremes)	Potential cyclone damage in the project areas will be mitigated by planting a range of native species that are adapted to different levels of disturbance	2: After an unexpected environmental shock, the affected project areas will receive extra project attention and enrichment planting.	2: Cyclones may impact infrastructure but communities are experienced and adapted	**4**
Geological risk (earthquake, induced	Not relevant	Not relevant	Not relevant	**Not relevant**

landslides, volcanic eruption, desert progression)				
Sea level rise	Not relevant	Not relevant	Not relevant	**Not relevant**
Climate change (e.g. changes to length of the draught period, seasonal variability of rainfall pattern, or water availability)	Potential cyclone damage in the project areas will be mitigated by planting a range of native species that are adapted to different levels of disturbance	2: After an unexpected environmental shock, the affected project areas will receive extra project attention and enrichment planting.	2: Cyclones may impact infrastructure but communities are experienced and adapted	**4**

* Generally applicable for Activities 1.1 to 3.3

** If the score is greater than 4 for any risk factor (quod non), additional mitigation measures are required to reduce the risk to an acceptable level.

Table 3.11a Risk of Reversal Assessment (Inhambane Project Region)

Risk Factor	Mitigation Activities	Impact	Likelihood	Score
Internal Risks				
Project participants leave the project or fail to implement all project activities.	Project agreements agreed and signed by relevant stakeholders, CCP in place	2: Climate benefits would not be issued for affected project area, but the project geographical spread	2: Tenure is secure and agreements and CCPs are in place	**4**

		across different project areas would limit the total impact		
Project coordinator withdraws or fails to coordinate and manage the project effectively.	Financial plan developed and CCPs are established to ensure long-term stability in project coordination	3: Potential impact would be important but there are two organisations involved and the communities could take over some responsibilities	1: The project coordinators are well-established organisations	**3**
Capacity of project participants to implement project activities is not maintained.	Financial plan developed, technical specifications developed; project employees and CCP participants are given ongoing technical training to expand local capacity	3: Potential impact would be important but the communities could take over some responsibilities	1: The project coordinators are well-established organisations, capable to provide support even in the absence of carbon benefits	**3**
Cash flow is insufficient to sustain project activities.	Financial plan developed	3: There would be insufficient incentive to support project activities, although that situation would be temporary	1: The project coordinators are well-established organisations, Government of Granada (Spain) funds allow the project to start in the absence of carbon benefits	**3**

Project participants experience a reduction in food supply or income as a result of project activities.	Focus on community lands	2. Potential impact would be important but highly unlikely, revenue sharing can be used to purchase food support	1. This project acts on community lands	**2**
External Risks				
Land ownership, resource access or carbon rights are disputed.	Project agreements agreed and signed by relevant stakeholders	2: Climate benefits would not be issued for affected project area, but the project geographical spread across different project areas and regions would limit the total impact	2: Tenure is secure and agreements are in place	4
Policy changes affect the project.	Project agreements agreed and signed by relevant stakeholders	2: Climate benefits would not be issued for affected project area, but the project geographical spread across different project areas and regions would limit the total impact	2: Tenure is secure and agreements are in place	**4**
Political unrest affects the project.	To work closely with the different levels of government, i.e. at District, Province and National level	2: Political instability would impact the project although physical fighting is highly unlikely	2: Mozambican Civil War ended in 1992, and relative peace has since prevailed	**4**
Changing market and/or socioeconomic	Project agreements agreed and signed by relevant	2: Climate benefits would not be issued for affected project area, but	1: Benefit sharing mechanism ensures attractive benefit	**2**

conditions, or other developments (e.g. infrastructure, or employment or educational opportunities) make alternative land uses more attractive than the project intervention.	stakeholders. Diversification of income opportunities from fisheries reduces attractiveness of further fuelwood cutting for cooking	the project geographical spread across different project areas would limit the total impact	delivery to the project participants	
Permission to implement project activities and/or sell carbon credits is withdrawn.	Project agreements agreed and signed by relevant stakeholders, benefit sharing mechanism included	3: Potential impact would be important, although the project communities have shown strong support for the project	1: The project is community-driven and communities receive the bulk of the benefits	**3**
External parties carry out activities that reverse climate benefits	The project agreement discusses procedures to handle disputes arising in relation to project areas. CCPs perform monitoring in project areas to prevent	2: Climate benefits would not be issued for affected project area, but the project geographical spread across different project areas would limit the total impact	2: Tenure is secure and agreements and contracts are in place	**4**

	theft or damage of trees by outsiders			
Natural Risks				
Hydrological changes affect project area(s)	Hydrological strategy in place	2: Currently already hypersaline zones	2: Currently already hypersaline zones	**4**
Project area(s) are affected by fire.	CCPs hold regular meetings, including discussion on local fire practices	1: After an unexpected fire, the affected project areas will receive extra project attention and enrichment planting.	1: Fires are not common in the mangroves	**3**
Project area(s) are affected by pest or disease outbreak.	Biodiversity will be monitored (see monitoring section) with special attention to potential pest outbreaks.	2: After an outbreak, the affected project areas will receive extra project attention and enrichment planting.	1: Seedling planting involves a biodiverse mix of different native species (see §3.9.5)	**2**
Extreme weather (drought, flood, wind, temperature extremes)	Potential cyclone damage in the project areas will be mitigated by planting a range of native species that	2: After an unexpected environmental shock, the affected project areas will receive extra	2: Cyclones may impact infrastructure but communities are experienced and adapted, and the Ponta da Barra peninsula forms a natural barrier	**4**

	are adapted to different levels of disturbance	project attention and enrichment planting.	against the direct wave impact of cyclones	
Geological risk (earthquake, induced landslides, volcanic eruption, desert progression)	Not relevant	Not relevant	Not relevant	**Not relevant**
Sea level rise	Remain within the bay	2: Potentially important but very slow adaptive process	2: Protection by bay and mangrove system	**4**
Climate change (e.g. changes to length of the draught period, seasonal variability of rainfall pattern, or water availability)	Potential cyclone damage in the project areas will be mitigated by planting a range of native species that are adapted to different levels of disturbance	2: After an unexpected environmental shock, the affected project areas will receive extra project attention and enrichment planting.	2: Cyclones may impact infrastructure but communities are experienced and adapted, and the Ponta da Barra peninsula forms a natural barrier against the direct wave impact of cyclones	**4**

* If the score is greater than 4 for any risk factor (quod non), additional mitigation measures are required to reduce the risk to an acceptable level.

Table 3.11b Risk Scores

		Likelihood				
		Very unlikely (1)	Unlikely (2)	Possible (3)	Likely (4)	Almost certain (5)
Impact	Catastrophic (5)	Moderate	Substantial	High	High	High
	Devastating (4)	Low	Moderate	Substantial	Substantial	High
	Major (3)	Low	Moderate	Moderate	Moderate	Substantial
	Minor (2)	Low	Low	Moderate	Moderate	Moderate
	Insignificant (1)	Low	Low	Low	Low	Low

3.12 Leakage

We describe the risk of leakage (outside the project areas), the estimation and monitoring of leakage and leakage mitigation measures in Annex 7a and 7b (leakage sections), based on an approved methodology.

Table 3.12 Leakage Risk Mitigation

Project Intervention	Leakage Risk	Mitigation Measures*
Miombo Ecosystem Restoration	Displaced grazing	Implementing grass cut-and-carry system (see Livelihood Indicator L6) and monitoring grazing pressure (see Ecosystem Indicator E2)
	Displaced timber harvesting and charcoaling	Compensating households with extra trees, see Livelihood Indicator L1
Mangrove Restoration	Displaced firewood harvesting for cooking	Distribution of fuel-efficient cooking stoves

**Cross reference activities from Section 3.5 (e.g. Activity 1.1.1)*

3.13 Double Counting

There are no other greenhouse gas emission reduction and removal projects, programmes or initiatives that overlap with the project areas or that would generate transferable emission reduction or removal credits from carbon pools or emission sources already included in this project.

Carbon benefits achieved by the project will not be included in any other form of greenhouse gas emissions trading.

In every annual report, the project will check emerging regulations that relate to trading carbon credits and REDD+ in Mozambique and state how compliance will be organized (if applicable). As stipulated in the Decree of 3 May 2018 (ARTICLE 27: National Register of Emission Reduction Transactions), the Project is already approved and to be enrolled in the National Register of Emission Reduction Transactions as soon as that register is operational. It includes an accountholder system for managing positions and seats for transfers and transactions of emission reduction certificates. Samuel Sibanda will be responsible for regulatory compliance and will keep up with potentially emerging regulations while regularly maintaining communication with the respective government ministry when necessary.

Table 3.13 GHG Emission Reduction and Removal Projects and Programmes in the Project Region

Project, Programme or Initiative	Scope	Carbon Credit Generation	Risk Mitigation
No other GHG emission reduction/removal project programmes or initiatives overlap with the project regions	-	-	-

Agreements

3.14 Land Management Plans

Chibabava Project Region

As a basis for land management, Plan Vivo Maps were drawn on sandy ground by the community members and then copied on paper by the project field staff in the presence of the community (at the same gathering). It was done in a participatory and collaborative manner where members of the community were able to fact check and correct what was sketched by fellow community members and the paper drawings by the project team. Roughly 15 to 20 community members including the sagutas participated in the exercise for each village.

The Subcommittees were not formed when the mapping took place. However, many of the members involved in the community mapping process are now active members of the Subcommittees. As the project moves forward, Subcommittees will be responsible for redrawing and updating these maps through a participatory process (at least every 10 years) to carry out project activities and regenerative strategies. These mapping and strategy documents will be recorded and maintained by the project team.

During the establishment of 'plan vivo maps', team members were present and provided logistical support (paper, pens) but they did not steer the 'plan vivo' development. The community groups had full freedom to add any element they preferred on the 'plan vivos'. The community members developed a map of the present situation, and a map of the desired situation. Maps were developed in the language Ndau. After mapping, the local coordinator assessed the cartographic quality of the

plan vivos (correct area delimitation, legend) and possibly invited the participating members to make cartographic corrections. The coordinator also conducted a final discussion to ensure that the maps are fully understood and agreed to by the project participants, while providing a first estimation of carbon benefits. The plan vivos are stored in the office of Azada Verde in Mangunde, and scans are stored on the shared drive.

For every site, plan vivo maps were designed during these meetings. Thus, these plan vivos are handwritten spatial land management plans, voluntarily produced and owned by the community or community sub-group, which form the basis of a project agreement. This voluntary and participatory mapping/planning process addressed the following local socio-ecological needs and priorities:

- Local livelihood needs and opportunities to improve or diversify livelihoods and incomes
- Reduce extraction of trees from the surrounding miombo woodland areas
- Land availability and land tenure
- Food security
- Practical and resource implications for participation of women
- Application of agroforestry
- Opportunities for soil and fire management and planting native species

We provide example land management plans in Annex 11.

Inhambane Project Region

As a basis for land management, Plan Vivo Maps were drawn on large papers by the community members. It was done in a participatory and collaborative manner where members of the community were able to fact check and correct what was sketched by fellow community members. Around 10 community members including the líders comunitários participated in the exercise for each village.

As the project moves forward, CCPs will be responsible for redrawing and updating these maps through a participatory process (at least every 10 years) to carry out project activities and regenerative strategies. These mapping and strategy documents will be recorded and maintained by the project team.

During the establishment of 'plan vivo maps', team members were present and provided logistical support (paper, pens) but they did not steer the 'plan vivo' development. The community groups had full freedom to add any element they preferred on the 'plan vivos'. Discussions were held in the language Bitonga, with regular translation to Portuguese. After mapping, the local coordinator

assessed the cartographic quality of the plan vivos (correct area delimitation, legend) and possibly invited the participating members to make cartographic corrections (e.g. one initial map was cross-mirrored). The coordinator also conducted a final discussion to ensure that the maps are fully understood and agreed to by the project participants, while providing a first community needs assessment. The plan vivos are stored in the office of Azada Verde in Inhambane, and scans are stored on the shared drive.

For every site, plan vivo maps were designed during these meetings. Thus, these plan vivos are handwritten spatial land management plans, voluntarily produced and owned by the community or community sub-group, which form the basis of a project agreement. This voluntary and participatory mapping/planning process addressed the following local socio-ecological needs and priorities:

- Local livelihood needs and opportunities to improve or diversify livelihoods and incomes
- Community infrastructure such as schools, roads and health centres
- Reduce extraction of trees from the surrounding mangrove
- Land availability at the low-lying machambas
- Food security
- Practical and resource implications for participation of women
- Different types of fisheries
- Opportunities for fish nurseries and planting native species

We provide example land management plans in Annex 11.

3.15 Crediting Period

For the Chibabava Project Region, the initial crediting period is from 1 May 2022 to 1 May 2052, which may be extended when necessary and/or for project areas that are added to the project after 2022.

For the Inhambane Project Region, the initial crediting period is from 1 May 2024 to 1 May 2054, which may be extended when necessary and/or for project areas that are added to the project after 2024.

3.16 Benefit Sharing Mechanism

Benefits shared from the sales of Plan Vivo Certificates are spent following a community consultation (coordinated by the Community Subcommittees in Chibabava, and by the CCPs in Inhambane. Payments are indirectly linked to environmental management performance, as the income from the sales of the certificates from any designated project area depends on the performance (see project agreement for monitoring responsibilities, targets and corrective actions) and is allocated for investment in the associated community area. It is agreed that shared benefits will be used for investments in social or environmental activities that benefit the local community, preferably in line with future plans for the designated project areas which are developed by the communities themselves.

The Subcommittees and CCPs have discussed and developed a system whereby each community gets an equal amount of income from the sale of PVCs, plus an amount proportional to the size of land that they manage. This way, communities with less land still get a significant amount of income from the project, while communities who manage a larger area of land are also rewarded. We refer to the project agreement that presents the formula to allocate the funds to the communities.

Payments will only be withheld if there is clear evidence for fraud, or a clear violation of the project agreement (see project agreement for details).

Once a Subcommittee in Chibabava or a CCP in Inhambane agrees on a certain social or environmental investment, it will provide a budget estimate and call for tenders if a contractor is required. The winning tender will be given the contract and direct payments will be made in two to three instalments to the contractor on satisfactory delivery of each phase outlined in the contract. Direct transfer of funds in installments is preferred for minimizing risk of funding leakage, reducing transaction costs, and maximizing transparency of deliverable outcomes. Investments will be subject to standard contracting practice, allowing fair competition for contractors from the locality or surrounding region. All contracts are overseen by the project coordinators, who guarantee that at least 60% of the income from the sales of the certificates (after payment of any charges, taxes or similar fees levied by the host country) will directly benefit project participants and other local stakeholders. The disbursements are transparently reported in the annual reports. For activities that do not require a contractor, e.g. firebreak maintenance or planting, the Subcommittee/CCP will employ local community members directly to conduct the work, giving preference to people living adjacent to the intervention areas.

3.17 Grievance Mechanism

Any complaints and suggestions that are raised during community (and subcommittee or CCP) meetings or walks around the project areas are recorded by the project coordinator in a "complaints and suggestions logbook". Note that in Chibabava, these walks are conducted twice a year by members of the Subcommittee with representatives of the CGRN and the project team. In Inhambane, these walks are conducted twice a year by members of the CCP and the project team. In addition, walks are conducted when enrichment activities are being undertaken in the project areas.

The logbook is regularly updated and scans are stored on the shared drive. Where possible, remediating actions – following complaints and suggestions – are taken. The project coordinators are responsible to organise extra consultation rounds, if required, and to implement remediation actions. We refer to the project agreement for actions in case of dispute.

In Chibabava, the régulo of Mangunde will be responsible for mediating resolution of any grievances that cannot otherwise be resolved, as per community norms. In Inhambane, the Province will be responsible for mediating resolution of any grievances that cannot otherwise be resolved.

3.18 Project Agreements

If a community wants to enter into a project agreement, several initial community meetings are organised (see §2.4), to discuss the basic project logic and get initial feedback. Thereafter, the process of establishing plan vivos can start. Only then, a project agreement can be signed.

Project agreements do not remove, diminish or threaten project participant's rights to land and/or resources. The agreements are valid for 30 years, which is in line with the crediting period and carbon benefit estimation. A representative of Azada Verde will visit the communities on a regular basis during this period, to ensure that rights and obligations are met.

Annex 12 provides examples of project agreements (one for Miombo enrichment, one for mangrove restoration).

4 Monitoring and Reporting

Indicators

4.1 Progress Indicators

We completed Table 4.1 with the relevant project progress indicators.

Table 4.1 Progress Indicators

Output/Activity		Indicator	Means of Verification
Output 1	**Indigenous mulching techniques successfully applied in mosaic patches across the project areas**	P1: # hectares of mulching applied per year	Reporting of mulching activities; photographic evidence and map of areas covered in Annual Report
Activity 1.1	Assessing community knowledge on grasses and soil quality, and make "soil fertility map"	P2: % of participating communities having soil fertility maps	Participatory fertility maps
Activity 1.2	Identify good locations in project area for mulching and develop mulching strategy and discuss it with community	P3: % of participating communities having mulching strategy	Mulching strategy document
Activity 1.3	Annual mulching activities in project subareas	P4: # mosaic blocs of mulching applied per year	Reporting of mulching activities; photographic evidence and map of areas covered in Annual Report
Activity 1.4	Construction of swales in project area (or other SWC structures)	P5: # SWC constructed and/or maintained	Photographic evidence in Annual Report
Activity 1.5	Community-led soil strategy evaluation	P6: # mulching-related evaluation sessions per year	Evaluation note
Activity 1.6	Community liaison	P7: # soil-related meetings per community per year	Monthly community reports
Output 2	**Firebreaks installed and maintained around the project area**	P8: Meters of firebreaks installed and maintained	Reporting of firebreak activities; photographic evidence and map of areas covered in Annual Report

Activity 2.1	Assessing community knowledge of fire regime in project areas, and make "uncontrolled fire exposure map"	P9: % of participating communities having uncontrolled fire exposure maps	Participatory fire maps
Activity 2.2	Develop fire strategy for project sites and discuss it with the community	P10: % of participating communities having fire strategy	Fire strategy document
Activity 2.3	Establish firebreaks at project sites and prune low-hanging tree branches to reduce fire spread into the canopy with community members when necessary	P8: Meters of firebreaks installed and maintained	Reporting of firebreak activities; photographic evidence and map of areas covered in Annual Report
Activity 2.4	Community-led fire strategy evaluation	P11: # fire-related evaluation sessions per year	Evaluation note
Activity 2.5	Community liaison	P12: # fire-related meetings per community per year	Monthly community reports
Output 3	**Native Miombo species planted across the project area**	P13: Number of Miombo seedlings planted	Reporting of planting activities; photographic evidence and map of areas covered in Annual Report
Activity 3.1	Biomass and soil plot measurements	P14: Number of survey plots per project area	Reported in Annex 7 of the PDD
Activity 3.2	Community-led identification of the use of tree species and the timing for seed harvesting, and make "tree distribution map"	P15: % of participating communities having tree maps	Participatory tree distribution maps

Activity 3.3	Develop strategy on planting species and discuss it with the community	P16: % of participating communities having planting strategy	Planting strategy document
Activity 3.4	Enrichment planting in project areas (i.e. specific patches that require extra planting)	P13: Number of Miombo seedlings planted	Reporting of planting activities; photographic evidence and map of areas covered in Annual Report
Activity 3.5	Continuous monitoring of temperature, rainfall, fire occurrence and seasonal plant behaviour	P17: Number of measurements per year	Daily results reported in Annual Report
Activity 3.6	Regular community liaison	P18: # plant-related meetings per community per year	Monthly community reports
Output 4	**Agroforestry system applied by the Project's Agroforestry Work Groups**	P19: # hectare agroforestry applied by participating agricultural associations	Reporting of agroforestry activities; photographic evidence and map of area and species planted in Annual Report
Activity 4.1	Training project team members in agroforestry nursery, strategies and processes	P20: # team members trained at Mezembite Training Center	Report of training
Activity 4.2	Setting up nurseries and nursery irrigation system, and engage nursery labourers	P21: # seedlings produced per nursery	Nursery counting, reported in Annual Report
Activity 4.3	Agroforestry planting with association members	P22: # seedlings planted per nursery	Planting activities reported in Annual Report
Activity 4.4	Community and association liaison	P23: # agroforestry-related meetings per	Monthly community reports

		community and/or association per year	
Activity 4.5	Distribution of agroforestry crop benefits	P24: # participants and/or annual income generated from different agroforestry crops	Report of per capita benefits
Output 5	**Estuarine mangroves restored leading to more productive local fisheries**	P25: # hectare mangrove areas under restoration	Project area maps and shapefiles
Activity 5.1	Strengthening the structures of the Community Fisheries Councils (Conselhos Comunitarios de Pesca) and implicate them in active mangrove oversight	P26: # members active in CCP and/or working with CCP	Monthly community reports
Activity 5.2	Community sensibilization at community meetings, schools and churches, and through women ambassador groups	P27: # sensibilization actions per year (with community groups, at schools, at churches or with women ambassadors)	Monthly community reports
Activity 5.3	Supporting alternative sources for local wood-based cooking needs	P28: # fuel-efficient cooking trainings held or stoves distributed	Report of trainings
Activity 5.4	Active mangrove restoration including enrichment planting, sea grass planting and microchannel cleaning	P29: Number of seedlings, propagules or grass planted or sown	Reporting of field activities; photographic evidence and map of areas covered
Activity 5.5	Supporting efficiencies in the local fishery and sea fruit supply chain	P30: Trainings organised on the local fisheries value chain	Report of trainings

4.2 Carbon Indicators

Table 4.2 provides a summary of the carbon indicators that are monitored for each project intervention.

Table 4.2 Carbon Indicators

Project Intervention	Carbon Indicator	Means of Verification
Miombo Ecosystem Restoration	C1: Number of Miombo seedlings planted across the ecosystem restoration areas	Registration of tree seedlings leaving the nurseries for enrichment planting across the restoration areas and photographs of planting activities by the project team.
	C2: Survival rate of seedlings planted in the Miombo project areas	Monitoring of survival rate of seedlings planted at the end of each rainy season.
	C3: Miombo tree density	Systematic vegetation and soil survey in nested plots (see tech spec). Survey to be repeated every 5 years.
Mangrove restoration	C4: Number of mangrove seedlings / propagules planted across the ecosystem restoration areas	Registration of tree seedlings leaving the nurseries for enrichment planting across the restoration areas and photographs of planting activities by the project team.
	C5: Survival rate of seedlings planted in the mangrove project areas	Monitoring of survival rate of seedlings planted

4.3 Livelihood Indicators

According to UNDP's Integrated SDG Insights for Mozambique, the country's most prominent SDG priorities correspond to the areas with the strongest potential for accelerated progress. These priorities include:

- SDG 8: Decent Work and Economic Growth, reflected in the focus on sustained per-capita growth.
- SDG 11: Sustainable Cities and Communities, emphasized through the need for resilient and well-planned human settlements.
- SDG 16: Peace, Justice, and Strong Institutions, highlighted by the priority to strengthen effective, accountable, and transparent institutions.

Table 4.3. Livelihood Indicators

Livelihood Indicator	Relation to SDGs	Relation to Host Country's SDG Targets	Means of Verification
L1: # of trees allocated for timber harvesting and charcoal making from agroforestry cultivation	Allocating trees from agroforestry systems for timber and charcoal reduces pressure on natural forests, supporting sustainable forest management (SDG 15), while ensuring renewable biomass production that lowers emissions and enhances climate mitigation (SDG 13). It also strengthens local livelihood opportunities through sustainable value chains (SDG 8).	It strengthens local livelihood opportunities through sustainable value chains (SDG 8).	Registration of agroforestry trees allocated for harvesting and charcoal making.

L2: % female participation during the Subcommittee, CCP meetings per project area	Increasing women's participation in Subcommittee and CCP meetings strengthens gender equality and women's decision-making power (SDG 5).	Higher female engagement also contributes to SDG 16 by fostering more inclusive, participatory, and representative decision-making processes at the local level.	Reporting, meeting minutes, attendance list and photographic evidence in Annual Report.
L3: Formal training in agroforestry, mangrove restoration, and/or landscape water harvesting techniques	Providing formal training in agroforestry and water harvesting strengthens SDG 4 by improving access to practical, skills-oriented learning opportunities for adults and youth. It also supports SDG 13 and SDG 15 by building local capacity for climate-resilient land management, sustainable natural resource use, and ecosystem restoration.	Formal training provision support SDG 8 by building technical skills that enhance productivity and expand sustainable livelihood opportunities.	Reporting and photographic evidence of trainings in Annual Report.
L4: Metical spent on socioenvironmental reinvestments	Because the types of reinvestments can vary, from education and health to water access, food aid, or food for work, the specific SDG	Socioenvironmental investments contribute to SDG 8 through improved livelihood opportunities and inclusive local	Financial reporting included in Annual Report.

	contributions depend on the activity financed. However, the overarching link is to SDG 11 (Sustainable Cities and Communities), as these investments strengthen community resilience, improve local services, and support more sustainable and inclusive community development.	economic development, and to SDG 11 by financing community-level improvements that strengthen resilience, services, and sustainable settlement development.	
L5: Annual cash income generated from agroforestry and/or honey activities	Increase in annual cash income from agroforestry or honey activities support SDG8 by strengthening or creating new livelihood opportunity and contributing to inclusive economic growth.	Increase in annual cash income from agroforestry or honey activities support SDG8 by strengthening or creating new livelihood opportunity and contributing to inclusive economic growth.	Financial statements of the Agroforestry Work Group and Honey Farmer Association.
L6: Amount of grass allocated for cut-and-carry	The amount of grass allocated for cut-and-carry relates primarily SDG 15, as it supports sustainable livestock feeding systems that reduce grazing pressure on natural vegetation.	It indirectly supports SDG 8 by improving livestock productivity and strengthening rural livelihoods through more reliable fodder supply.	Reporting and photographic evidence in Annual Report.
L7: Metical spent on activities (firebreaks,	These activities support SDG 15 by	It directly supports SDG 8 as community	Financial reporting in Annual Report.

mulching, swales, planting, microchannel development,..)	financing activities that protect and restore ecosystems, and SDG 8 as community members are paid to carry out these land-management activities, generating local employment and income.	members are paid to carry out these land-management activities, generating local employment and income.	
L8a: Average weekly fish catch (kg) per household surveyed. L8b: Average weekly crab catch (kg) per household surveyed. L8c: Average weekly sea snail (kg) per household surveyed.	It supports SDG 14 by monitoring sustainable use of marine resources and to SDG 8 by reflecting the productivity and income generation of fishing-based livelihoods.	It supports SDG 8 by reflecting the productivity and income generation of fishing-based livelihoods.	Reporting and photographic evidence in Annual Report.

4.4 Ecosystem Indicators

Table 4.4 describes the indicators that are used to monitor ecological conditions and possible risks of negative environmental impacts in the project region.

Table 4.4 Ecosystem Indicators

Ecosystem Indicator	Relation to SDGs	Relation to Host Country's SDG Targets	Means of Verification
E1: Miombo tree-species Richness in the project areas	Improving Miombo species richness contributes directly to SDG 15 by enhancing biodiversity and	NA	Based on the vegetation survey (every 5 years), the total number of species in the tree

	ecosystem integrity, while indirectly supporting SDG 13 through more resilient and carbon-rich landscapes.		community (richness S), as well as the proportion of species i relative to the total number of species (p_i) can be calculated. We use the Shannon's diversity index as a robust indicator for biodiversity status in the project areas. The evolution of the Shannon index will be reported every 5 years.
E2: Number of observations of uncontrolled fires, timber harvesting and charcoal making in the miombo enrichment project areas	Tracking observations of uncontrolled fires and unsustainable timber or charcoal extraction relates directly to SDG 15 by monitoring pressures on forests and biodiversity, and indirectly to SDG 13) because reducing these activities lowers emissions and strengthens landscape resilience.	NA	Registration of observations (written reports and on maps) by project staff and/or mentioned during the four-monthly Community Subcommittee public meetings.
E3: Mangrove-species Richness in the project areas	Mangrove-species richness contributes to SDG 13, 14, and 15 by enhancing climate resilience, protecting	NA	Based on the vegetation survey (every 5 years), the total number of species in the tree

	coastal ecosystems, and supporting biodiversity.		community (richness S), as well as the proportion of species i relative to the total number of species (pi) can be calculated. We use the Shannon's diversity index as a robust indicator for biodiversity status in the project areas. The evolution of the Shannon index will be reported every 5 years.
E4: Occurrence per ha of mangrove trees with cutting signs	Occurrence of mangrove trees with cutting signs relates to SDG 13, 14, and 15 as it helps track ecosystem degradation, supports climate adaptation efforts, and informs actions to protect coastal and terrestrial biodiversity.	NA	Registration of observations (written reports) by project staff during the systematic vegetation survey (every 5 years)

Monitoring

4.5 Monitoring Plan

Overall, as rPVC are issued based on the expected carbon benefits, annual progress reports will present activity-based indicators to determine whether the project activities are being carried out

as needed to achieve the expected benefits. rPVCs will transform into vPVCs after every verification audit.

In parallel, every 5 years (at minimum), a full-scale carbon monitoring round will be organised to recalibrate the carbon benefit calculations.

We refer to the monitoring plan in Annex 13 for more details on specific monitoring and verification activities.

1. Monitoring Approaches

The project employs a dual-track monitoring approach to ensure both immediate operational progress and long-term impact:

- Progress Indicators: Monitored annually using a traffic light system (green, orange, red) to track activity-based targets like the area of enrichment, the installation of soil and water conservation (SWC) structures, and the establishment of firebreaks.
- Carbon Indicators: Tracking focuses on the number of seedlings planted and their survival rate. This is supplemented by high-precision field measurements of Aboveground and Belowground Biomass (AGB/BGB) and Soil Organic Carbon (SOC) to recalibrate carbon models.
- Livelihood Indicators: Data is collected through focus group sessions and community meetings to assess household needs, income, and access to resources like honey, fruit, and medicinal plants.
- Ecosystem Indicators: Monitoring focuses on tree-species richness and understory diversity using the Shannon Diversity Index. It also includes recording observations of uncontrolled fires or illegal harvesting.

2. Sampling Strategy and Selection

- Fixed Plots: Monitoring is conducted on fixed sample plots with locations recorded via GPS.
- Transect Sampling: Plots are sampled along transects.
- Soil Sampling: Within each plot, a composite soil sample is created by mixing five samples taken from the corners and center subsquare.

- Expansion Areas: For future project areas, the number of required samples will be determined using the Winrock calculator.

3. Frequency of Monitoring

- Annual: Progress indicators (activities), tree planting survival rates, and risk mitigation activities (e.g., fire incidence) are reported every year to underpin carbon estimations and justify certificate issuance.

- Every 5 Years: Full-scale carbon monitoring (biomass and SOC surveys) and comprehensive ecosystem biodiversity assessments (Shannon Index) are conducted to recalibrate the project's long-term models and undergo verification audits.

4. Roles and Responsibilities

- Project Coordinators: Responsible for high-level coordination, developing technical specifications, managing finances, and performing the measurement, reporting, and verification (MRV) of carbon benefits.

- Community Subcommittees / CCPs: These local bodies oversee the use of project funds and daily operations. They are also responsible for documenting community observations and participating in monitoring meetings.

- Project Participants/Communities: Local households and associations provide the labor for enrichment activities and participate in participatory mapping and monitoring sessions.

5. Resource and Capacity Requirements

- Technical Capacity: The project hired experts in botanical identification

- Equipment and Infrastructure: Essential resources include GPS devices for plot location, augers for soil sampling, frigoboxes for sample transport, and local nurseries to supply high-quality seedlings.

4.6 Progress Monitoring

The milestones or targets of the progress monitoring indicators are listed below (Table 4.6.1). The targets are subdivided in three categories: full, partial and missed target.

There are the following consequences for certificate issuance and corrective actions that will be implemented if the performance targets are not met (mitigation actions):

1. If the values for all indicators meet or exceed their performance target, the full issuance is received;
2. If one or more of the indicator values are below its performance target for one monitoring period, the full issuance is received but corrective actions must be implemented by the next year;
3. If one or more of the indicator values are partially achieved for two consecutive monitoring periods, the full issuance is received but corrective actions must be implemented.
4. If one or more of the indicator values are missed for two consecutive monitoring periods, or partially achieved for three consecutive monitoring periods, certificate issuance of the project area concerned is withheld until corrective actions have been implemented and the performance target(s) have been reached.

In addition, in Table 4.6.2 we summarize the performance tracking of the project piloting activities. These are pilot activities/targets that are not contributing to overall PVC issuance at this stage. These project activities are in addition to those generating Plan Vivo Certificates.

Table 4.6.1	Activity Indicator P1 to P3024 (measure annually)	Performance Targets		
		Full Target Achievement	Partial Target Achievement	Missed Target
Miombo enrichment activities	Project area undergoing mulching activities	≥10 ha/yr	-	<10 ha/yr
	Area of each project area surrounded by firebreak or otherwise protected against annual fire	>80%	50-80%	<50%
	Number of SWC in project area (swales or other) installed and/or maintained	6 / yr	4-6 / yr	<4 / yr

	% of participating communities having soil fertility maps, a defined mulching strategy, uncontrolled fire exposure maps, a defined fire strategy, tree maps and a defined planting strategy	100%	-	<100%
Miombo Tree Planting	Number of Miombo seedlings planted	>1500 seedlings/yr	1000-1500 / yr	<1000 seedlings / yr
	Survival Rate	>60%	30-60%	<30%
Miombo Community Subcommittee meetings	Number of meetings per project area	3 per year	1-2 per year	0 per year
	Female participation	>50%	30-50%	<30%
Miombo Risk mitigation Activities	Index of uncontrolled fires, woodcutting and charcoal making in the project zones, per project zone per year	<4 per year	4-10 per year	>10 per year
Mangrove Restoration Activities	# hectare mangrove areas under restoration	>150 ha	100-150 ha	<100 ha
	# members active in CCP and/or working with CCP	>6 per CCP	-	<6 per CCP
	# sensibilization actions per year (with community groups, at schools, at churches or with women ambassadors)	3 per year	1-2 per year	0 per year

	# fuel-efficient cooking trainings held or stoves distributed	2 or more per year	1 per year	0 per year
	Number of seedlings, propagules or grass planted or sown	>1500 seedlings/yr	1000-1500 / yr	<1000 seedlings / yr
	Number of trainings organised on the local fisheries value chain	1 or more per year	-	0 per year

Table 4.6.2 Monitoring for piloting activities

Piloting Activity	Activity Tracker	Ambition	Piloting purpose
Activity 3.1	P14 (Number of survey plots per project area)	>80 plots	Understanding biomass and soil dynamics in the PA
Activity 3.5	P17 (Number of measurements per year)	Weekly measurements (where possible: daily)	Better understanding effect of temperature and rainfall on fire occurrence and seasonal plant behaviour
Activity 4.3 / Output 4	P19 (# hectare agroforestry applied by participating agricultural associations)	>0.5ha during piloting phase	Experimenting with agroforestry activities and understanding the farmers' interest
Activity 4.2, 4.3	P21 (# seedlings nurtured) P22 (# seedlings planted)	>750 /yr	Experimenting with agroforestry activities and understanding the farmers' interest
Activity 4.1, 4.4	P20, P23 (Organised training sessions or	>1 per year	Experimenting with agroforestry activities and

	sensitizing events on agroforestry techniques)		understanding the farmers' interest
Activity 4.5	P24 (participants and/or annual income generated from different agroforestry crops)	1 association during piloting phase	Experimenting with agroforestry activities and understanding the farmers' interest

4.7 Carbon Monitoring

The carbon monitoring scheme follows a double time track:

- Activity based performance indicators are reported annually to underpin the carbon estimation as described in §4.6.
- Carbon Indicators: The project aims for >1500 seedlings planted per year with an average Survival Rate >50%.

We follow AR-TOOL14 vs 4.2, section 6.2, on the direct estimation of change by re-measurement of sample plots; see also §4.8.2. The intended verification schedule is 5-yearly, or more frequent. The carbon indicators will be monitored throughout the entire crediting period.

4.8 Livelihood and Ecosystem Monitoring

Livelihood Monitoring

The focus group sessions at the community meetings provided baseline data related to household needs, activities and income at a collective level. These were collectively determined and checked by open discussion within groups. These data will be used as a baseline for assessing livelihood improvements during subsequent phases of the project.

For each of the livelihood indicators listed in Section 4.3, we identified targets for each period of 5-years (or less) throughout the crediting period:

- L1: 3-5% of agroforestry tree species allocated for timber harvest and charcoal production over 5 years;

- L2: 50% female participation during all Community Subcommittee meetings for each project area;
- L3: 1 organised training session for Agroforestry Work Groups each year;
- L4: Amount spent on socioenvironmental reinvestments from the sales of the PV certificates (60% of net income, after payment of any charges, taxes or similar fees levied by Mozambique)
- L5: Significant increase ($p<0.05$) of annual cash income, ceteris paribus, of all participating households in the Agroforestry Work Groups (according to statistical test and weighted for inflation).
- L6: Amount of grass allocated for cut-and-carry: significant increase ($p<0.05$) after baseline year.
- L7: Metical spent on activities (firebreaks, mulching, swales): significant increase ($p<0.05$) after baseline year.
- L8: Significant increase ($p<0.05$) of annual catch, ceteris paribus, for surveyed households

Ecosystem Monitoring

For each of the ecosystem indicators listed in Section 4.4, we identify targets for each period of 5-years throughout the crediting period.

We follow AR-TOOL14 vs 4.2, section 6.2, on the direct estimation of change by re-measurement of sample plots during every five-years monitoring round.

Ecosystem indicators (section 4.3)	5-year target
E1: Miombo-species tree Richness in the project areas	Significant increase ($p<0.05$ as compared to the baseline) of tree-species richness, based on the Shannon diversity index. Since this is a paired testing over time in fixed plots, a paired samples Wilcoxon test is to be used since the Shannon indices are paired over time, while not normally distributed.
E2: Number of observations of uncontrolled fires, timber	Significantly reduced ($p<0.05$) number of observations (ceteris paribus)

harvesting and charcoal making in the project zones	
E3: Miombo understory Richness in the project area	Significant increase ($p<0.05$ as compared to the baseline) of understory richness, based on the Shannon diversity index. Since this is a paired testing over time in fixed plots, a paired samples Wilcoxon test is to be used since the Shannon indices are paired over time, while not normally distributed.
E4: Mangrove-species Richness in the project areas	Significant increase ($p<0.05$ as compared to the baseline) of tree-species richness, based on the Shannon diversity index. Since this is a paired testing over time in fixed plots, a paired samples Wilcoxon test is to be used since the Shannon indices are paired over time, while not normally distributed.
E5: Occurrence per ha of mangrove trees with cutting signs	Significantly reduced ($p<0.05$) occurrence per ha (ceteris paribus)

Ecosystem Monitoring

Relevant ecosystem and livelihood monitoring results are discussed at the annual Subcommittee /CCP meetings. This allows for direct feedback from the community members and to adjust the project design if any issues arise.

In parallel, the project will disseminate monitoring results via leaflets at district offices and public events across the Districts and Province government departments. It will also collaborate with ESMABAMA to inspire interest among other communities in Chibabava District and within the Buzi River watershed.

In addition, monitoring results will be shared alongside the 5-year verification reporting, transparently published on the website of Plan Vivo. Summaries of the 5-year verification reports

will also be lodged with the relevant government departments at the district, province and national levels.

Reporting

4.9 Annual Report

The project's annual cycle runs from May to May. Project activities started on 1 May 2022 in Chibabava and on 1 May 2024 in Inhambane. We aim to submit draft Annual Reports by April of each calendar year.

Monitoring rounds are organised in 2022, 2026, 2031, 2036,2041, 2046 to the end of the project.

4.10 Record Keeping

All project data are stored on a shared project drive with limited access (Dropbox). The project data (technical data, financial data, monitoring data) are updated on the drive at least once per month.

In Annex 14, an overview of the general database architecture is included. Note that this is a dynamic environment, subject to changes over time. The following first-level folders are listed:

1. Example Plan Vivo projects
2. Azada Verde information
3. Climate Lab information
4. KKM Project meeting notes
5. Collaboration documents
6. Relevant Articles
7. Relevant reports and information (REDD+ etc)
8. Summaries and External communications
9. Maps and potential enrichment areas
10. Project Idea Note and PDD
11. Grants and Funding
12. Internal reports and research
13. Logo and design ideas
14. Government of Flanders (Belgium) and Granada (Spain) funds document (successful)
15. Miombo woodlandsScientific articles

16. Agroforestry and Nursery planning
17. Photos
18. Budgets and Finances (reporting)
19. Human Resources
20. Local environmental research
21. Social research and community interviews

5 Governance and Administration

5.1 Governance Structure

Project Governance in the Chibabava Project Region is structured through the Community Subcommittees comprising individuals or household representatives from the Mangunde and Nhaumue communities where the project areas are located. The Community Subcommittees will also include ex-officio members from the CGRN and from Azada Verde as representative of the Project Coordinators (See Annex 2). The Community Subcommittees will represent the key stakeholders of the project, including the Regulado, CGRN, participating communities and individuals and families of those communities, and Azada Verde (acting as the lead partner of the overall KKM Project). Each participating community will form its own subcommittee to oversee and govern project activities on designated community lands. Each committee will have up to 15 members including one representative from Azada Verde, two representatives from the CGRN. Women will comprise at least 50% of the community subcommittee membership.

Project Governance in the Inhambane Project Region is structured through the CCPs comprising individuals or household representatives from the Machavenga, Salela and Josina communities where the project areas are located. The CCPs will not directly include members from the Project Coordinators, but representatives of the Project Coordinators will be invited to the relevant CCP meetings. Each participating community will form its own CCP to oversee and govern project activities on designated community mangroves. Women will comprise at least 50% of the CCP membership.

The Community Subcommittee (SC) and CCP are responsible for working with the Project team to ensure legitimate decision-making, equitable participation in implementation and benefit sharing in the project activities. In Chibabava, each SC will oversee the miombo enrichment activities in the project areas and the agroforestry activities in the areas allocated by the Chefes of both

communities (Mangunde and Nhaumue) and new committees for new community project areas will do the same (with the input of the Mangunde Régulado). It will set up a special agroforestry working group for each community and include additional members from the community through an open and transparent consultation process. In Inhambane, each CCP will oversee the mangrove enrichment activities in the project areas (Machavenga, Salela and Josina) and new CCPs for new community project areas will do the same (with the input of the líders comunitários). Each SC and CCP will hold at least three meetings annually (once every four months) to discuss matters related to the project. It will liaise with the Project Team to determine seasonal labour needs (e.g. for creating firebreaks, mulching, building swales, tree planting etc). The seasonal labour needs for agroforestry activities will be determined between the Project Team, SCs and their respective working groups. It was agreed that two members of the agroforestry systems working group will participate in the Subcommittees. One member has to be from the agricultural association and other from outside of the agricultural association.

SCs will address grievances and dispute resolution according to the rules set out in the Statutes for Community Subcommittees. See Annex 17a & b.

5.2 Equal Opportunities

The project partners signed an ethical charter not to discriminate based on gender, age, ethnicity, religion or social status when selecting project participants or employing staff members. Applicable labour laws are always adhered to – these also forbid all forms of discrimination.

Community Subcommittees and CCPs will ensure that stakeholder participation is embedded in the design phase consultations at the very beginning of the project. The SCs/CCPs will create opportunities for project participants to build capacity and gain experience in enrichment and/or agroforestry practices. Each SC and each CCP will ensure proper representation of different groups and 50% or more representation and participation of women in all meetings and decision-making processes.

In Chibabava, our field interviews and social research indicate that although women are the main contributors of labour in agriculture and natural resources, they have marginal representation in the CGRN. The Community Subcommittees have been set up with the aim of offsetting this imbalance without disrupting or undermining the established systems of functioning of the CGRN. The SC structure ensures that gender equity is not only present in meeting attendance and labour contribution but also in decision-making:

- The KKM field project team will hold consultation and participatory decision-making sessions with Subcommittees for designing equitable access for training workshops.
- Availability of household members at different periods of the cultivation seasons will determine when they can participate in Miombo enrichment activities.
- Capacity building for miombo enrichment will be targeted for households living adjacent to the project areas and enrichment activity zones
- Subcommittees will ensure that there is representative and equitable access to labour in miombo enrichment activities spread over the year.

Further, stakeholder identification, baseline research and pilot activities for the project indicate that most participants engaging in labour for the enrichment area activities are women (approximately 60%). In contrast, all the traditional community leaders of the Mangunde Regulado and the CGRN are men. Due to this gender imbalance in labour and power, the Subcommittees overseeing the project areas in Nhaumue and Mangunde will have 50% or more women members, and all work for enrichment activities will be on a paid basis. This approach has been taken to ensure that additional work does not fall on women and there is balanced decision-making which does not disadvantage women. Similarly, the CCPs overseeing the mangrove project areas in Machavenga, Salela and Josina, will have a hard quorum of 50% or more women members.

Young girls and boys of school going age will not be involved in any direct project activity. However, they may be invited to take part in awareness campaigns for project activities, practical classes and learning activities. They may also receive horticultural training and skill development as part of their school program at the project nursery.

5.3 Legal and Regulatory Compliance

Table 5.3 identifies national and international policies, laws and regulations that may affect the project. The project will operate in full compliance with these. We refer to Annex 15 for the letter of approval, DUAT and full text of Decree 23/2018 that stipulates the legal procedures.

Table 5.3: Legal and Regulatory Compliance

Policy, Law or Regulation	Date	Relevance	Compliance Measures
2013-2025 National	25/ 12/ 2010	The National Climate Change Strategy aims to reduce vulnerability to climate change and improve the living	-

Strategy for Climate Change (ENMC)		conditions of the Mozambican people. It proposes climate change adaptation and disaster risk reduction measures and also focuses on mitigation by targeting low carbon development. The ENMC is structured around three core themes: (i) adaptation and climate risk management; (ii) mitigation and low carbon development (iii) cross cutting issues. These include institutional and legal reform for climate change, research on climate change, and training and technology transfer. Covering the period 2013-2025, the implementation of the ENMC is planned in three phases. The first phases focus on improving the response of local communities to climate change, reducing poverty, planning adaptation measures, as well as identifying opportunities for the development of low-carbon economy in local communities. The Strategy also proposes the establishment of a Centre of Knowledge on Climate Change (CGC) within the Ministry of Science and Technology. The primary objective of the centre should be to collect, manage and disseminate scientific knowledge on climate change, providing crucial information for the development of policies and plans.	
National Environ-mental Policy	03/ 08/ 1995	The National Environmental Policy was adopted by the Council of Ministers as a part of the implementation of the Five-Year Government Plan (1995-1999). The Policy provides guidance for the establishment of national environment plans and legislations, aiming at conciliating development with environment protection. Under this broad scope, the 1995 National Policy proposes a set of activities in the short and long term in the field of the environment. The Policy suggests the adoption of an Environment Law and regulations, followed by the creation of a Ministry for Coordination of Environmental Action, and an Environmental Monitoring Centre. The Policy acts on the following issues: marine and	-

		coastal area protection; engagement of the private sector in environmental management; development of databases and research activities; investments in environmental education projects; the engagement of civil society with environmental protection; waste management; and international cooperation.	
Decree No. 6/2016 creating the National Fund for Sustainable Develop-ment (FNDS)	24/ 03/ 2016	The decree creates the National Fund for Sustainable Development (FNDS) which aims to promote and finance programmes and projects that ensure sustainable, harmonious and inclusive development. Main objectives include: (i) mobilising financial resources in actions leading to sustainable development, (ii) promote and support strategies, programs and projects that contribute to rural development, (iii)promote scientific research programs and actions in the field of sustainable development, (iv) fund programs for environmental adaptation and mitigation of climate change, sustainable management of forests, conservation of biodiversity, land administration and land use planning, (v) finance programs for transferring technologies that contribute to sustainable development in rural areas, (vi) carry out investment projects and financial applications that promote sustainable development, (vii) create and participate in the capital of companies or institutions whose object competes for integrated and sustainable development, (viii) finance institutional development activities.	FNDS as a key partner
Mozambique NDC operationaliz ation plan for 2020-2025	11/ 12/ 2018	This plan was approved by the Council of Ministers at its 38th Session, held on 11 December 2018. It has identified Mozambique's updated NDC, however no further documentation is available.	-

Green Economy Action Plan	25/ 12/ 2013	This plan notably seeks to favour low-carbon growth in the country, and to increase resilience to adverse effects of climate change in a number of sectors, including agriculture, transport and infrastructure.	-
Governmental five-year program	25/ 12/ 2020	This document notably aims to increase the resilience of the country's infrastructure and population to adverse effects of climate change.	-
National development strategy 2015-2035	01/ 07/ 2014	This document notably identifies climate change as a purveyor of disasters and thus a major risk for the long term resilience of a range of sectors including agriculture, infrastructure and energy supply. It also aims to develop alternative sources of energy.	-
Decree No. 23/2018	03/ 05/ 2018	This Decree approves the Regulation for the Implementation of Projects to Reduce Emissions from Deforestation and Forest Degradation, Conservation and Increase of Carbon Reserves (REDD+ Regulation). It aims to regulate, define principles and standards for the implementation of the above mentioned Programmes and Projects, defining the institutional framework and competencies. This Regulation applies to REDD+ Programmes and Projects to be implemented in any area of the national territory. The legitimacy and ownership of the State in the creation, generation, emission, validation, verification and withdrawal of emission reductions and corresponding titles must be respected. The compatibility of REDD+ activities with the conservation of natural environments, biological diversity and scientific research that support the sustainable use of forest resources, must also be respected. The purpose of this Regulation is to: (i) Define rules for REDD+ Programmes and Projects in the national territory; (ii) promote the conservation and restoration of degraded natural ecosystems and enhance their ecosystem and environmental services;	Annex 15

		(iii) Define rules for generation, transfer, transaction and withdrawal of emission reduction titles; (iv) Ensure the monitoring and transparency of information on REDD+ emissions and removals at the national, provincial and district levels; (v) Promote the adoption of good practices in sustainable forest management.	
Law 5/2017	11/05/2017	The law defines a Community Conservation Area as an area delimited, allocated to the local community for the protection, conservation, and sustainable use of biological diversity resources. The objectives of the Community Conservation Area are: a) To protect and conserve natural resources, including biodiversity and the landscape; b) To ensure the sustainable use of natural resources by the local community for its benefit; c) To promote local development through the sustainable use of resources and the sharing of benefits resulting from their management. The management of the Community Conservation Area is carried out by the local community, in coordination with the relevant government authorities and other stakeholders.	Licenses of the áreas de conservação comunitária

The authorities with jurisdiction over land and marine management, as well as fisheries, environmental and territorial governance, have been informed about the project interventions and the expected carbon benefits. To date, no significant objections have been raised regarding the project.

During the current year, the Inhambane project has been presented and discussed with the following institutions and entities through technical visits, coordination meetings, joint activities, and awareness-raising processes:

- Inhambane Provincial Delegation
- INOM (National Institute of the Ocean and Sea)
- Inhambane Provincial Directorate of Environment
- SDEJT / Education
- Fisheries and Agriculture Services
- Marine Megafauna Association
- Local Maritime Administration
- IUCN
- DINAPE (National Directorate of Fisheries)
- Kingfisher School
- Project support and logistics team

These interactions have served to inform authorities and partners about the project's objectives, mangrove restoration and conservation activities, the community-based management model, and the expected environmental and climate benefits, including carbon benefits.

As part of this process, the District Director for Environment is currently preparing an official letter of support, which is expected to be issued this week. This letter will confirm that the competent authorities are aware of the project, have been informed about its interventions and expected benefits, and that no relevant objections have been raised. This letter will be attached as supporting documentation.

5.4 Financial Plan

See Annex 16. For Inhambane, during the first project years, project operating and management costs are financed through internal funds from the project partners and the government of Granada grant. Later, these costs can be financed as part of the 40%.

For Chibabava, the start-up funds were financed through internal funds from the project partners and the GSTIC grant.

5.5 Financial Management

Once a Community Subcommittee or CCP agrees on a certain social or environmental investment it will provide a budget estimate and call for tenders. The winning tender will be given the contract

and direct payments will be made in two to three instalments to the contractor on satisfactory delivery of each phase outlined in the contract. Direct transfer of funds in installments is preferred for minimizing risk of funding leakage, reducing transaction costs, and maximizing transparency of deliverable outcomes. Investments will be subject to standard contracting practice, allowing fair competition for contractors from the locality or surrounding region. All contracts are overseen by the project coordinators, who guarantee that at least 60% of the income from the sales of the certificates (after payment of any charges, taxes or similar fees levied by the host country) will directly benefit project participants and other local stakeholders. The disbursements are transparently reported in the annual reports.

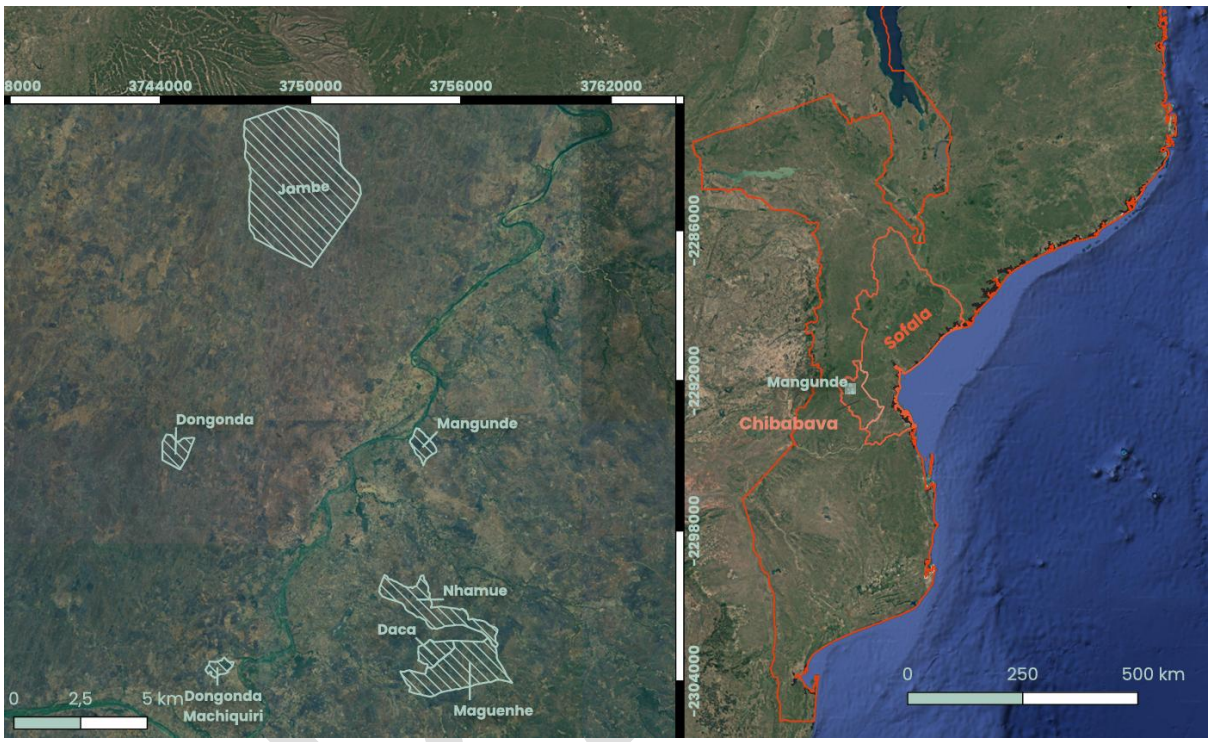
The responsible accountant is Vandelanotte Accountants, an approved legal entity by the ITAA – (Institute for Tax Advisors and Accountants), with ITAA number 50792735.

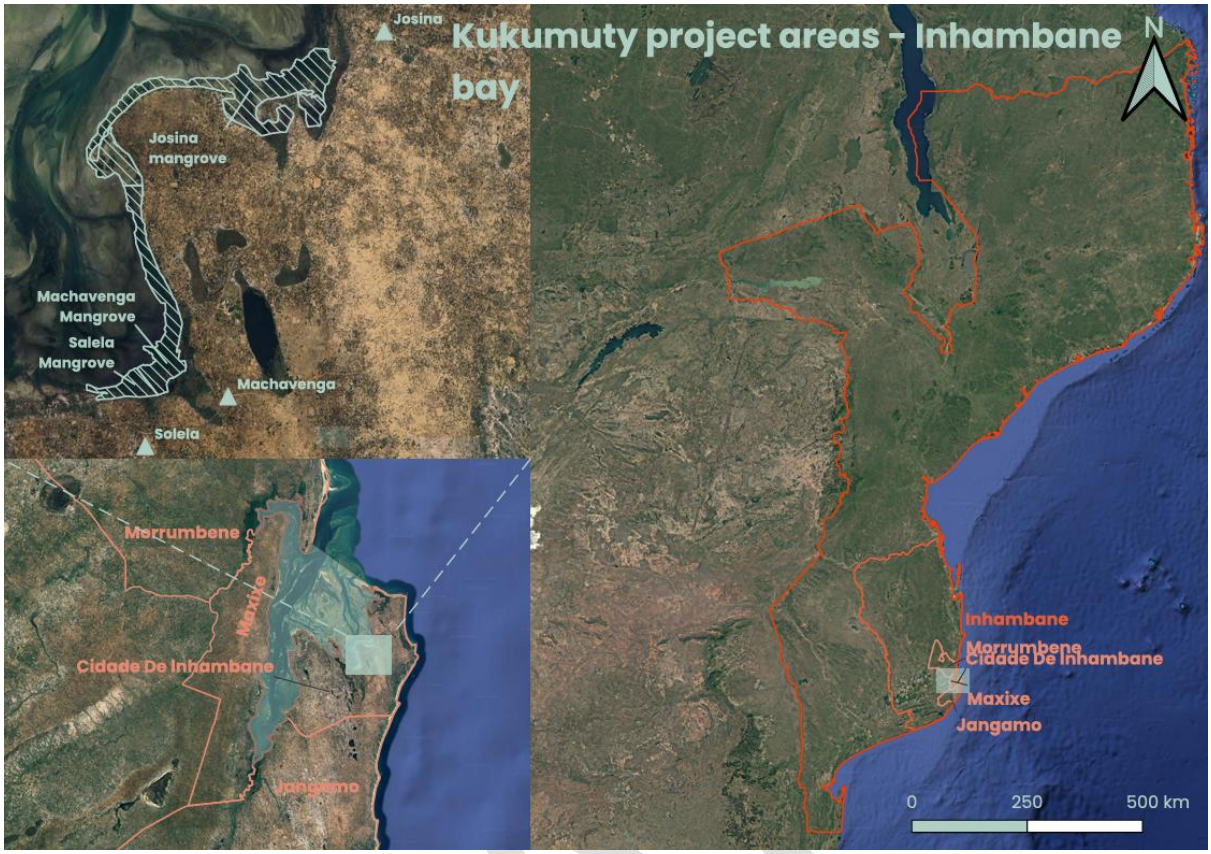
Vandelanotte performs an annual audit and submits the annual accounts to the Belgian national bank.

Annexes

Annex 1 – Project Boundaries

All KML files available as separate files.




Kukumuty project areas - Inhambane bay
N
Josina
Josina mangrove
Machavenga Mangrove
Salela Mangrove
Machavenga
Solela
Merrumbene
Maxixe
Cidade De Inhambane
Jangamo
Inhambane
Merrumbene
Cidade De Inhambane
Maxixe
Jangamo
0
250
500 km

Annex 2 –Registration Certificate and Partner Agreements

The following documents have been made available to the Plan Vivo Foundation, and are available upon request:

- Registration certificates Azada Verde, Reseed Indico, Climate Lab
- Signed agreement between partner organisations

Annex 3 – Initial Project Areas

Chibabava Project Region: see Table below.

Initial Project Area	Nhaumue	Mangunde
Name of project participant	Subcommittee of Nhaumue	Subcommittee of Mangunde
Location	Community of Nhaumue, see Annex 1	Community of Mangunde, see Annex 1
Project Intervention	Ecosystem Restoration	Ecosystem Restoration
Extent of project area	300 ha	69 ha
Project Agreement Reference	1	2
Start date	1 May 2022	1 May 2022
Project Requirements 2.3.1 and 2.3.2 met?	Yes	Yes

Inhambane Project Region: see Table below.

Initial Project Area	Machavenga	Salela	Josina
Name of project participant	CCP	CCP	CCP
Location	Community of Machavenga, see Annex 1	Community of Salela, see Annex 1	Community of Josina, see Annex 1
Project Intervention	Mangrove Restoration	Mangrove Restoration	Mangrove Restoration
Extent of project area	51 ha	14 ha	114 ha
Project Agreement Reference	I1	I2	I3
Start date	1 May 2024	1 May 2024	1 May 2024

Project Requirements 2.3.1 and 2.3.2 met?	Yes	Yes	Yes

Annex 4 –Participatory Design

See examples below

Initial participatory sessions in May 2022, with a community group of Mangunde village (left) and an agricultural association of Massane village (right).

Involvement of both the traditional chiefs (regulo and sagutas) as well as the administrative leadership (leader of Localidade Toronga, administrator of the District Chibabava and members of two Provincial institutes of Sofala) in a traditional ceremony to bless the project.

Example of a first workshop while practicing plan vivo mapping in the sand.

From top to bottom (Inhambane Project Region): (i) examples of individual interviews using proportionate piling to understand household income streams from labour activities versus sales of different fish species; (ii) community meeting at Machavenga discussing project set-up; and (iii) participative mapping workshops.

Annex 5 – Initial FPIC

Chibabava Project Region

See below:

1. Acta da reuniao Comunitaria Nhaumue [minutes of Nhaumue community meeting]
2. Relatorio da reuniao Comunitaria de Nhaumue [report on Nhaumue community meeting]
3. Acta da reuniao Comunitaria Mangunde [minutes of Mangunde community meeting]
4. Relatorio da reuniao Comunitaria de Mangunde [report on Mangunde community meeting]

Summary of the meeting of the community Nhaumue

On the 14th day of July a 2.20pm a meeting was held with 11 members of the community amongs whom were the leaders of the three neigbouring communities. Also present were three representatives of Azada Verde

The meeting had the following agenda :

- Development of map

The meeting moderator welcomed everyone and outlined the program of the meeting. The topic of the development of the map was commenced and there were a range of comments about boundaries and there were various conflicts between the communities of Nhaumue and Manguenhe on this issue.

During this meeting it was possible to overcome issues around points, J, K, L, M on the map. Community representatives concluded that they would sit down to resolve any further conflicts around boundaries.

Once these points were resolved there was nothing further to discuss . The meeting was closed at 5.10pm

Notes were taken by Josefina A Manuel, the meeting was chaired by Joao A Massunde. Minutes were signed by community representative Paulo Joao Simango, Mateus Manuel and Mateus Jose.

Summary of the meeting of the community of Mangunde

On the Thirteenth day of the month of July 2022 at the time of 2.16pm a meeting we held with the community of Mangunde with 41 people in attendance, 20 women and 21 men.

Among this group were the leaders of the community including the President of the Committee for the management of Natural resources (comite de gestao de recursos naturais – CGRN) and other local community members

The agenda for the meeting was:

- Description of the historical profile of the communities
- Social organization of the community
- Use of natural resources
- Geography and spatial characteristics
- Map outline
- Identification of conflicts
- Mechanisms for the resolution of conflicts

Summary

A brief history of Mangunde was provided by the leader of the community and president of CGRN

The structure of the community – the head of the community is the 'regulo', followed by 'chefe', followed by 'saguta', followed by 'madoda'

All natural resources belong to the community and are overseen by the 'regulo' on their behalf.

All of the community lands are considered occupied lands apart from sacred places

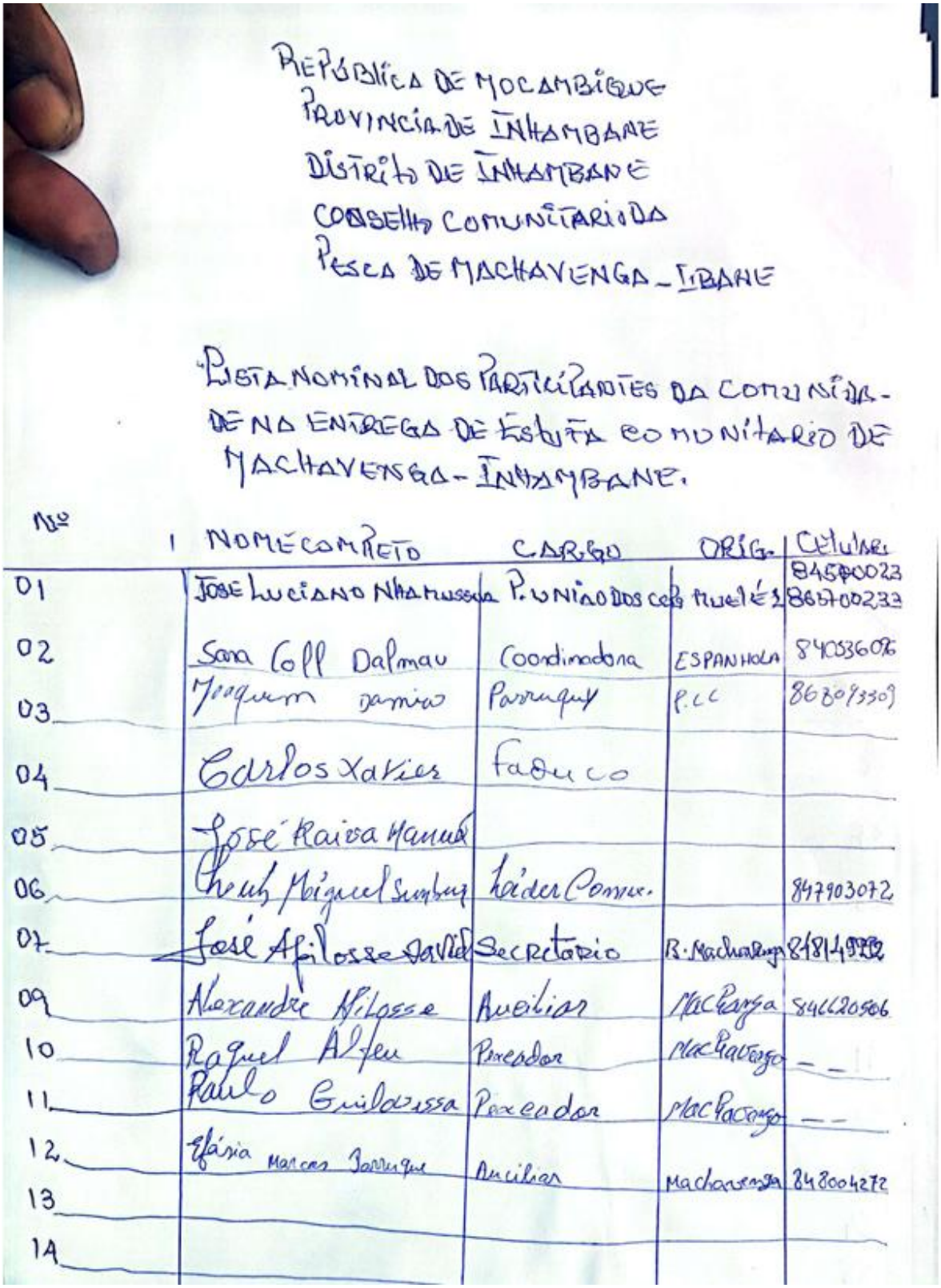
Leaders worked together to develop the map so everyone present would know the boundaries of the residences, pasture area, fields and areas of the project

Threats to the community were considered to be crocodiles in the river, hippopotamuses and fires both in the fields and forests. To reduce these risks the president of the CGRN has down awareness raising about how to avoid threats and manager fires.

Minutes by Josefina A Manuel, Chair of the meeting was Joao Massunde

Inhambane Project Region

See below:



REPÚBLICA DE MOCAMBIQUE
PROVINCIA DE INHAMBANE
DISTRITO DE INHAMBANE
CONSELHO COMUNITARIO DA
PESCA DE MACHAVENGA - IBANE

LISTA NOMINAL DOS PARTICIPANTES DA COMUNIDA-
DE NA ENTREGA DE ESTUTA COMUNITARIO DE
MACHAVENGA - INHAMBANE.

Nº	NOME COMPLETO	CARGO	ORIG.	Celular
01	JOSE LUCIANO NHAMUSSUA	P. UNIAO DOS CO	NUELÉ	845900233 867700233
02	Sara Coll Dalmau	Coordinadora	ESPANHOLA	84036096
03	Joaquim Jamisse	Parruque	P.C.C	86809350
04	Carlos Xavier	Fabrico		
05	José Raiva Manuel			
06	Chefe Miguel Sumbuy	Líder Comun.		847903072
07	José Afilosse David	Secretário	B. Machavenga	848149
09	Alexandre Afilosse	Auxiliar	Machavenga	846620506
10	Raquel Alfeu	Peixeira	Machavenga	--
11	Paulo Guilaxissa	Peixeira	Machavenga	--
12	Efásia Marcos Barruque	Auxiliar	Machavenga	843004272
13				
14				

Annex 6 – Carbon Calculations Spreadsheet

Carbon calculation spreadsheets (Excel) are available upon request

PLAN VIVO

Annex 7a – Technical Specifications Miombo enrichment

Project Intervention:	Miombo enrichment (ecosystem restoration)
Version:	1.0
Date Approved:	08/03/2024
Methodology:	PM001 Agriculture and Forestry Carbon Benefit Assessment Methodology
Modules/Tools:	Module PU001, PU002, PU004, PU005
Certificate Type(s):	rPVC and vPVC

Applicability conditions

We refer to §3.3.1 for a description of the project areas and to the sections below for a description of the baseline scenario.

Near the project areas, field observations showed the occurrence of runaway fires, grazing, timber harvesting, slash-and-burn and charcoal production. Inside the project areas, field observations showed the occurrence of burning, and to a limited extent some grazing, timber harvesting and charcoaling. The project areas should not be located on machambas (croplands) and not be used as grazing lands. They are located at higher topography on highly eroded soils, which are not part of existing landscape management projects. These upland areas are particularly affected by frequent uncontrolled late dry season fires inhibiting ecosystem enrichment.

Consequently, the applicability conditions for the project zones and potential expansion zones are:

1) Project zones cannot be located on machambas/croplands, nor on designated grazing lands.
2) Observations of cyclones, grazing, fire occurrence, tree cutting and charcoaling in the project zones must be reported by project staff and community members, and must be discussed and recorded during the regular meetings with the communities.
3) Project zones must be located within the Sofala province.

Additionality

Below we describe the most likely land use scenario in the absence of project interventions and the additionality of the project interventions using AR-TOOL02 v1.0: "Combined tool to identify the baseline scenario and demonstrate additionality in A/R CDM project activities".

We follow the following steps:

STEP 0. Preliminary screening based on the starting date of the project activity

The starting date of the activity was 1 May 2022. By then, the incentive from the planned plan vivo project was seriously considered in the decision to proceed with the project activity: that month, the baseline measurement campaign was organized.

STEP 1. Identification of alternative land use scenarios to the proposed project activity

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

Based on the socioecological survey (see §3.3.1), we identify the following land use scenarios to be credible:

- Continuation of the pre-project" pressure-as-usual" (combination of burning, grazing, timber harvesting and charcoaling), pushed by increased drought conditions;
- Hypothetical forestation of the land within the project boundary performed without being registered as a plan vivo credit generating project activity.

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

Both alternative land use scenarios are in compliance with mandatory legislation and regulations taking into account their enforcement in the Sofala and Mozambique. Continuation of the status quo is in agreement with laws and regulations, while forestation is obviously also a land cover type that is allowed by applicable regulations.

STEP 2. Barrier analysis

Sub-step 2a. Identification of barriers that would prevent the implementation of at least one alternative land use scenarios

No financial, technical, institutional nor social barriers would plausibly hamper the continuation of the pressure-as-usual scenario. Continuation of the status-quo requires no investments, technical knowledge nor legal efforts: the project areas are regularly affected by runaway fires, grazing and (to a limited extent) timber harvesting and charcoaling (see further). As will be shown further from Landsat imaginary, pressure-as-usual resulted in limited net forest loss in Nhaumue and net stability in Mangunde, over the past two decades. However, hypothetical forestation without extra (plan vivo) funding is not a plausible scenario, given the significant amount of funding required and the lack of nurseries in the area. The District confirmed this in writing: besides both project nurseries, there are currently no other nurseries in the entire district (except for two private

cashew monoculture plantation nurseries). There are thus no nurseries for Miombo forest species and fruit species to support forestation without the project intervention.

Sub-step 2b. Elimination of land use scenarios that are prevented by the identified barriers

We eliminate the scenario of forestation without extra plan vivo funding, since it is not a plausible future land cover scenario, given the significant amount of funding required for mulching, planting, rainwater harvesting and firebreaks, and the lack of nurseries in the area. It remains a hypothetical scenario (there are no known Miombo projects or nurseries in Mangunde). We also refer to the financial plan (Annex 16).

Sub-step 2c. Determination of baseline scenario (if allowed by the barrier analysis)

Forestation without being registered as a plan vivo project is not included in the list of land use scenarios that are not prevented by any barrier. Consequently, only one land use scenario remains (pressure-as-usual scenario), so according to the tool, this scenario is the baseline scenario. We continue with Step 4: Common practice test.

STEP 4. Common practice analysis

There are no similar previous or ongoing forestation activities in or near the project zones, not even remotely similar to this proposed plan vivo project. Consequently, the plan vivo project activity is not the baseline scenario and, hence, it is additional.

Finally, below we present a summary of the basic barriers the project activities are to overcome.

Table A7.1: Main Barriers for the project activities to overcome.

Ecosystem Restoration	Main Barriers	Activities to Overcome Barriers
Financial	• Limited funds • Other priorities (e.g. subsistence agriculture in this region with per capita GDP of between US $185 and $245) • Limited private credit availabilities	Start-up capital secured by GSTIC; benefit sharing scheme supported by Plan Vivo; funding for soil and fire management, wages and enrichment planting
Technical	Although natural resources conservation is quite well established in Sofala, there is ample opportunity to	Skilled local coordinator; academic input of environmental scientists; link with three universities;

	enrich Miombo woodlands and to launch agroforestry activities	installation of (agroforestry) nurseries
Institutional /Social	"Top-down approach", although room is given for local initiatives	Bottom-up approach with first consultation rounds, continued workshops and benefit sharing for participating communities

Project activities

For a summary of project activities and input needed to implement the project intervention, including species selection, establishment, and long-term management, we refer to Table A7.2 below. For a summary of the trees to be planted inside the Miombo project areas, we refer to Table A7.3.

Table A7.2: Project framework

Aim		
To use an integrated landscape management strategy for enrichment of Miombo woodlands and creation of climate resilient agroecosystems for sustainable livelihood opportunities in Chibabava District, Sofala Province, Mozambique.		
	Description	**Assumptions/Risks**
Outcomes		
Carbon Benefit	~ 369 ha community managed woodlands are enriched by increase in soil organic carbon and Miombo species biomass The project expands to adjacent areas and involves neighbouring communities to scale-up the impact.	R1: Uncontrolled fires could continue to affect the project areas. A1: The project establishes mulching zones and fire breaks to protect enriching Miombo lands against uncontrolled annual fires. R2: Community could be uninterested to participate in the project. A2: Strong role of stakeholder communities as project designers and involvement of neighbouring households in project activities will build a strong project support base.

Livelihood Benefit	Agroforestry nursery providing additional livelihood benefits to participating households of Mangunde and Nhaumue. Socio-ecological challenges are tackled by community decisions using re-investments. Protection of ecosystem services and non-timber forest products	R3: A focus on Miombo restoration alone could be insufficient to create significant community benefits. A3: Intensive agroforestry planting improves soil fertility and provides useful trees for participating households. R4: Project benefits could be insufficient to attract strong community interest. A4: Plan Vivo re-investments are used to improve the well-being of communities.
Ecosystem Benefit	The floristic biodiversity of the Miombo ecosystem is supported through the enrichment, conservation, and improved management of 369 ha community-managed woodland. The project will also contribute to regional habitat diversity for endemic fauna. The project expands to adjacent areas and involves neighbouring communities to scale-up the impact.	R5: The project team itself could be too small to perform all restoration activities alone. A5: The Miombo restoration areas are enriched, protected, and expanded by community members.
Outputs and activities		
Output 1	**Indigenous mulching techniques successfully applied as mosaic patches across the project areas**	R6: The local soils may be too poor to allow strong Miombo enrichment. A6: Local soil management techniques are key to the successful enrichment of Miombo woodlands R7: The project team itself could be too small to perform all mulching activities alone. A7: Active and broad-based involvement of communities as project designers and project
Activity 1.1	Assessing community knowledge on grasses and soil fertility, and making "soil fertility maps"	
Activity 1.2	Identify good locations in project area for mulching and develop mulching strategy with community participants	

Activity 1.3	Annual mulching activities in project subareas	partners will build a strong project support base. R8: Drought and soil infertility may hamper vegetation growth. A8: Implementing soil enrichment and landscape water harvesting (mulching and building SWC structures) will speed up the growth of the biomass.
Activity 1.4	Construction of water-retaining swales or other soil and water conservation (SWC) structures in project areas	
Activity 1.5	Community-led soil strategy evaluation	
Activity 1.6	Community liaison regarding soil fertility improvement techniques	
Output 2	**Firebreaks installed and maintained around the project areas**	R9: Banning all fire would not be smart since fire is an integral part of the ecological integrity and ecosystem function of miombo woodlands A9: The project is not 'anti-fire' but rather about reducing the occurrence and frequency of uncontrolled fires in the project areas. According to Ribeiro et al. (2021), an (alternatingly cold and hot) fire return interval of ~3 (to 5 years) is beneficial for the Miombo ecosystem. Community-based management will establish mulching zones and fire breaks to protect and enrich project areas from uncontrolled annual fires. R10: The project team itself could be too small to perform all fire management activities alone. A10: Active and broad-based involvement of communities as project designers and project partners will build a strong project support base.
Activity 2.1	Assessing community knowledge of fire regime in project areas, and making an "uncontrolled fire exposure" map	
Activity 2.2	Develop fire(break) strategy for project sites and discuss it with the community	
Activity 2.3	Establish firebreaks at project sites, with community members	
Activity 2.4	Community-led fire strategy evaluation	
Activity 2.5	Community liaison regarding uncontrolled fire reduction through mulching and firebreak techniques	

Output 3	**Native Miombo species planted across the project areas**	R11: A regeneration approach alone (without extra planting) could be insufficient to enrich certain bare subzones. A11: Enrichment planting of native Miombo seedlings can only take place when soil and fire management strategies are in place. R12: Non-native species could become invasive. A12: Seeds are harvested from local trees (in Chibabava district), based on community knowledge on best timing for seed harvestingR13: Meteorological data in Chibabava may still be scant. A13: Next to nutrient availability of soils, and occurrence of fire, Miombo trees are highly dependent on climate variability – so it is important to gather local climatic data
Activity 3.1	Biomass and soil plot measurements	
Activity 3.2	Community-led identification of the use of tree species and the timing for seed harvesting for making a "tree species distribution map"	
Activity 3.3	Develop strategy on planting different tree species and discuss it with the community	
Activity 3.4	Enrichment planting in project areas	
Activity 3.5	Continuous monitoring of temperature, rainfall, fire occurrence and seasonal plant behaviour	
Activity 3.6	Regular community liaison	
Output 4	**Agroforestry systems applied by the participants of the Project's Agroforestry Work Group**	R14: It may be difficult to find high-quality seedlings to supply the project. A14: High-quality river-irrigated local nurseries are constructed since these are crucial to supply the necessary seedlings for Miombo enrichment and agroforestry cultivation R15: It may be technically difficult to implement the agroforestry component. A15: The project selects agroforestry species that are best suited for the local socioecological circumstances and conditions R16: The agroforestry benefits may be insufficiently attractive.
Activity 4.1	Training project team members in agroforestry nursery, strategies and processes	
Activity 4.2	Setting up nurseries and nursery irrigation system, and engage nursery labourers	
Activity 4.3	Planting and supporting replanting and long-term maintenance of the agroforestry system with the Project Agroforestry Work Group	
Activity 4.4	Community and association liaison	
Activity 4.5	Distribution of agroforestry crop benefits	

		A16: Fruits and other products from agroforestry can be effectively sold at local markets

Table A7.3: Miombo species targeted for planting inside the project areas

Species targeted for planting	Other common name	Native to Mozambique (POWO, Kew Gardens, 2023)*	Tolerance to local conditions: preferential zones for planting
Millettia stuhlmannii	Lonchocarpus mossambicensis	Yes	Sandy areas and stony/rocky
Afzelia quanzensis	Intsia quanzensis (Welw.)	Yes	Low lying areas
Tamarindus indica	Tamarind	Native to Madagascar, naturalized in Mozambique	Near termite mounds
Millettia mossambicensis	-	Yes	Medium topography
Xeroderris stuhlmannii	Aganope stuhlmannii	Yes	
Cassia abbreviata	Cassia abbreviata Oliv.	Yes	
Albizia anthelmintica	Worm-bark false-thorn	Yes	
Philenoptera violacea	Rain tree	Yes	
Kigelia africana	Bignonia africana Lam.	Yes	
Acacia robusta subsp. usambarensis	Vachellia robusta subsp. usambarensis	Yes	

*https://powo.science.kew.org/

Carbon benefits

Crediting Period

The project start date was 1 May 2022 (i.e. the date of the first employee hired). The period of time over which the climate benefits will be quantified will be 30 years. This is an estimation of the period during which a stable state of ecosystem carbon can be reached under a certain type of management. Indeed, there will be a slowdown in carbon storage after maturity will be reached. We refer to the study of Chidumayo (2019) who showed that Miombo woodland can recover fairly easily on a timescale of about 2 to 3 decades, under the condition that regeneration is not inhibited by late dry season fires. This is corroborated by the study by Williams et al. (2007) in their study of regrowing Miombo woodlands after 20–30 years. A project period of 30 years is thus applicable because this is the timeframe during which a stable enriched Miombo ecosystem can be reached under integrated landscape management.

Carbon Pools and Emission Sources

Below, we list the carbon pools and emission sources included in the estimation of carbon benefits with the justification for any excluded carbon pools or emission sources. We refer to Annex A7E for the full Application of A/R TOOL04.

Table A7.4: Carbon pools and emissions sources that are included or excluded in the quantification

Pools or emission sources	Type of pool or emission source	Included?
Carbon pools	Soil organic carbon	Yes: soil organic carbon is an important pool for carbon sequestration in Miombo woodlands (calculated from AR-TOOL16 Tool for estimation of change in soil organic carbon stocks due to the implementation of A/R CDM project activities, Version 1.1)
	Above-ground biomass	Yes: above-ground biomass (trees, shrubs) is a major pool for carbon sequestration, to be considered and quantified
	Below-ground biomass	Yes: this is a potentially significant pool to be considered for tree planting
	Non-tree biomass	No: Non-tree biomass and grasses are not included as carbon pools in the above-ground biomass estimations
	Dead wood and litter	No: conservatively excluded
	Wood products	No: conservatively excluded

Emission sources	Grassland cutting and burning Project gasoline use	No: the effect is negligible

Baseline Emissions/Removals

Satellite images show how the landscape has changed in the project areas. We could compare Landsat 7 images (2000-2022) using the datasets of Hansen et al. (2013), in combination with images of the years 2013, and 2018 using Google Earth history and Planet Explorer time series of satellite images between 2016 and 2022.

We estimated tree cover change in the project area for the period 2000-2022, using the datasets of Hansen et al. (2013). The layers are built with Landsat 7 images, with a resolution of 30 x 30m. The first layer represents forest cover in 2000, which is defined as "canopy closure for all vegetation taller than 5m". Every pixel has a value between 0 and 100, representing the percentage of forest cover. The Hansen et al. (2013) dataset derives forest cover changes from both the annual decline or incline in the percentage of tree cover, and the NDVI during the minimum growing season.

The dataset of Hansen et al. (2013) was loaded in Google Earth Engine to determine the annual percentage change of tree cover over time. Subsequently, the forest cover loss and forest cover gains were calculated year by year.

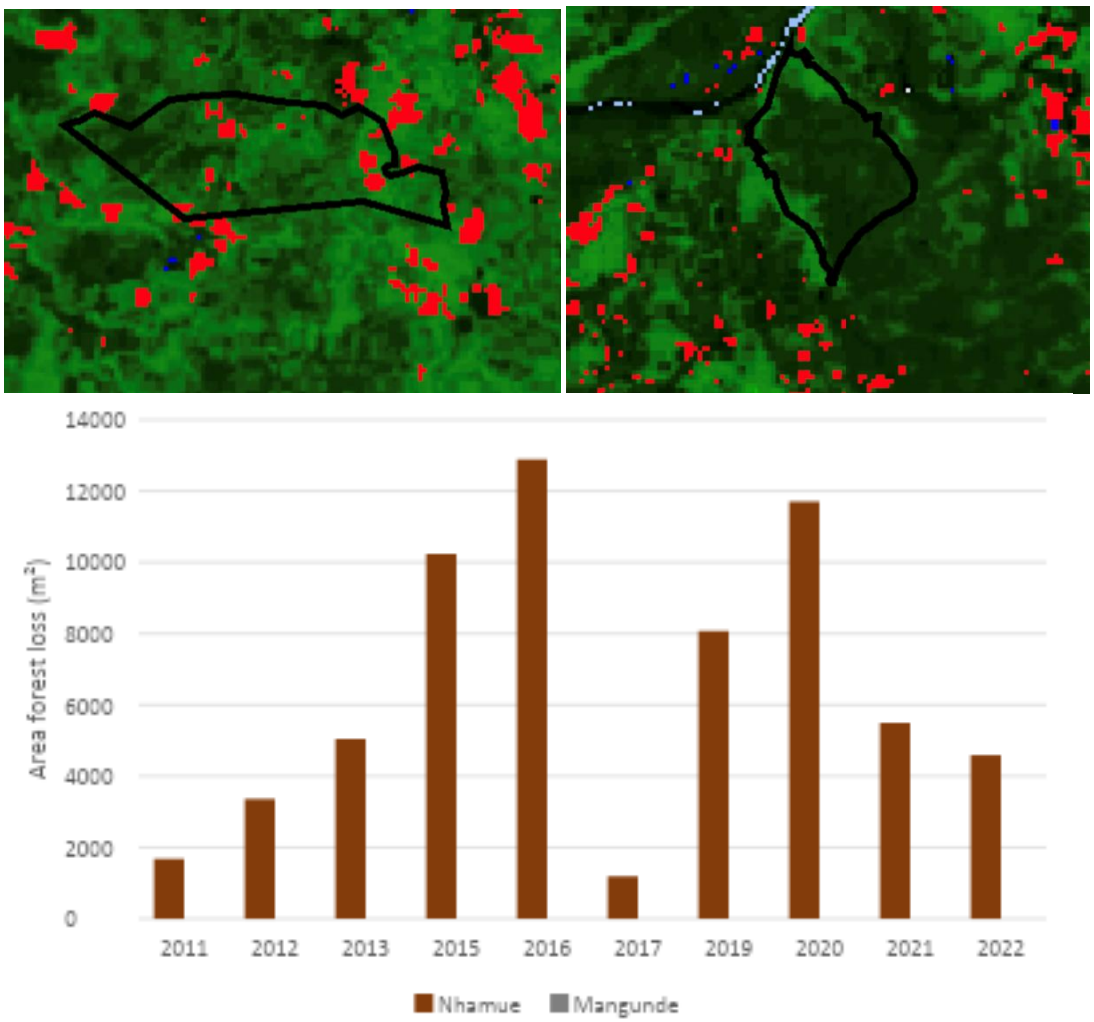


Figure A7.0: Forest cover change in the project areas for the period 2000-2022 (with forest losses indicated in red, and forest gains in blue, while greenish colors indicating stability): (above, left) Nhamue project area (demarcated with a black polygon); (above, right) Mangunde project area (demarcated with a black polygon); (below) Histogram of net forest cover loss in the project areas during the period 2000-2022. In Nhamue (brown bars), the net forest cover loss is equivalent to ~5% of the initial total forest cover. In Mangunde (grey bars), forest cover remains stable as there are no indications of net forest loss, nor net forest gains.

A visual assessment of remote sensing imagery from Google Earth satellite images provides more contextual background on baseline landscape conditions between 2013 and 2018. A comparison of the Mangunde project area over time indicates a metastable landscape over 5 years. The indicative forest boundary in 2013 following the river channel is almost unchanged in 2018. Inside the area, there are some signs of oscillations between degradation and recovery in the landscape, although forest cover remains stable as there are no indications of net forest loss, nor net forest gains. The

metastable landscape conditions are also confirmed by a time series of Planet Explorer satellite images between 2016 and 2022 (annex A7A). This time-series includes subsequent April and September images, respectively representing the seasonal variability between typical rainy and dry season images.

Figure A7.1: Google Earth images of Mangunde project area (in yellow). Left: satellite image of June 2013; right: satellite image of June 2018. On both images the forest boundary of 2013 is plotted indicatively in white.

Also for the Nhaumue project area, a comparison was made between Google Earth Images of 2013 and 2018. The visual comparison indicates that clear bareland patches increased over the five year period within the landscape. This is in line with the limited net forest cover loss calculated from the Landsat 7 images (above). The Planet Explorer time series of satellite images between 2016 and 2022 (Annex A7A) also confirms that the project area has seen some degradation dynamics.

Figure A7.2: Google Earth images of Nhaumue project area (in yellow). Left: satellite image of June 2013; right: satellite image of June 2018. On both images clear bareland patches are indicatively plotted in red.

The results of the quantitative estimate of change (using Landsat 7) and the contextual background provided by images from GoogleEarth and Planet support the metastability of the baseline pressure-as-usual scenario. For both project areas, there is no evidence for a significant

amelioration or regeneration of Miombo vegetation over the past decade. It is clear that the Miombo landscape remained metastable over the years (or is even under increasing pressure in Nhaumue). We can reasonably conclude that the areas are not naturally regenerating over the course of the last decade. Ecosystem enrichment will most probably not happen without the project intervention. This is corroborated by the generally low values of typical Miombo parameters that were measured during the baselining (see §Monitoring for the methodology), as compared with more healthy Miombo habitat conditions reported by Ribeiro et al. (2010). In general, the project areas currently have a very low basal area, no typical Miombo indicator species, a low tree density, a low Shannon biodiversity index and a small share of "regenerating" intermediate trees (Table A7.4) (all averages for the project areas):

- Basal Area = 8.7 m^2/ha
- Presence of Miombo indicator species (Brachystegia spp., Julbernardia globiflora) < 1%
- Number of intermediate trees (10 < dbh <30) as percentage of total = 21%
- Shannon diversity index = 2.78
- Current canopy cover in project areas = 36%

Note that the project areas are currently dominated by Combretum instead of Brachystegia spp., Julbernardia globiflora.

Table A7.4: Miombo parameters measured during the baselining (see §Monitoring for the methodology), as compared with more healthy Miombo habitat conditions reported by Ribeiro et al. (2010)

MIOMBO ECOLOGY PARAMETERS	BASELINE		Ribeiro et al. (2020)
METRICS	*Mangunde*	*Nhaumue*	*"Healty Miombo"*
Basal Area (m^2/ha)	7.8	9.5	>20
Miombo Indicator species	0	0	>110
Tree density (dbh =>5dbh)	630	662	>1000
Diversity of the layer structure: Number of Intermediate trees (10>=dbh<30) - greater than 20% of total	16%	25%	>50%
Shannon diversity	2.75	2.81	>3.5

Figure A7.3: Photographs of project zones (Nhaumue-Daca on the left and Mangunde on the right), showing a domination by grasses (fuel load), lots of fire marks and a small density of standing trees.

Without the project taking place, in the pressure-as-usual scenario, the baseline ecology situation would remain metastable or even decreasing, as the existing trees are old enough to resist the fires. At the same time, woody biomass would not increase either, since the continued fires would kill off the young trees and continue the old trees to dry out and finally these will burn as well. Even when it rains a lot, there will be more grass as fuel load, and the late dry season fires will be stronger.

We can thus expect the change in carbon stock in the project zones to be stable in the baseline scenario, under continued or even increasing pressures. Images and photographs testify to the metastable, degraded status in 2022. Overall, we can reasonably assume that there is no change in carbon stock in the baseline pressure-as-usual scenario over time, as compared to the initial carbon stock: $\Delta C_{baseline} = 0$.

We here follow the Methodology PM001 (Agriculture and Forestry Carbon Benefit Assessment Methodology): The change in carbon stocks expected under the baseline scenario for each project area is calculated with Module PU001 (P6). Module PU001 requires "no change in woody biomass carbon stocks if the conditions in AR-TOOL14 v4.2 section 5 are met" (§5.1.2).

AR-TOOL14 vs 4.2 states in section 5: "Changes in carbon stocks in trees and shrubs in the baseline may be accounted as zero for those lands for which the project participants can demonstrate, through documentary evidence or through participatory rural appraisal (PRA), that one or more of the following indicators apply (underlined if applicable in the project area):

1) Observed reduction in topsoil depth (e.g. as shown by root exposure, presence of pedestals, exposed sub-soil horizons)
2) Presence of gully, sheet or rill erosion; or landslides, or other forms of mass movement erosion;
3) Presence of plant species locally known to be indicators of infertile land;

4) Land comprises of bare sand dunes, or other bare lands;
5) Land contains contaminated soils, mine spoils, or highly alkaline or saline soils;
6) Land is subjected to periodic cycles (e.g. slash-and-burn, or clearing regrowing cycles [or regular uncontrolled fires]) so that the biomass oscillates between a minimum and a maximum value in the baseline;

Module PU001 also requires "removals in soil organic carbon under the baseline scenario are zero for afforestation, reforestation and agroforestry activities that meet the applicability criteria in AR-ACM0003 v2.0 and/or if it can be demonstrated that soil organic carbon stocks are expected to decline under the baseline scenario" (§5.5.1). The applicability criteria in AR-ACM0003 v2.0 indeed apply:

1) The land subject to the project activity does not fall in wetland category;
2) Soil disturbance attributable to the project activity does not cover more than 10 per cent of area in each of the following types of land, when these lands are included within the project boundary (quod non): Land containing organic soils; Land which, in the baseline, is subjected to land-use and management practices and receives inputs listed in appendices 1 and 2 to this methodology.

In conclusion, the changes in carbon stocks in trees, shrubs and soil in the baseline pressure-as-usual scenario of the project zones may conservatively be accounted as zero.

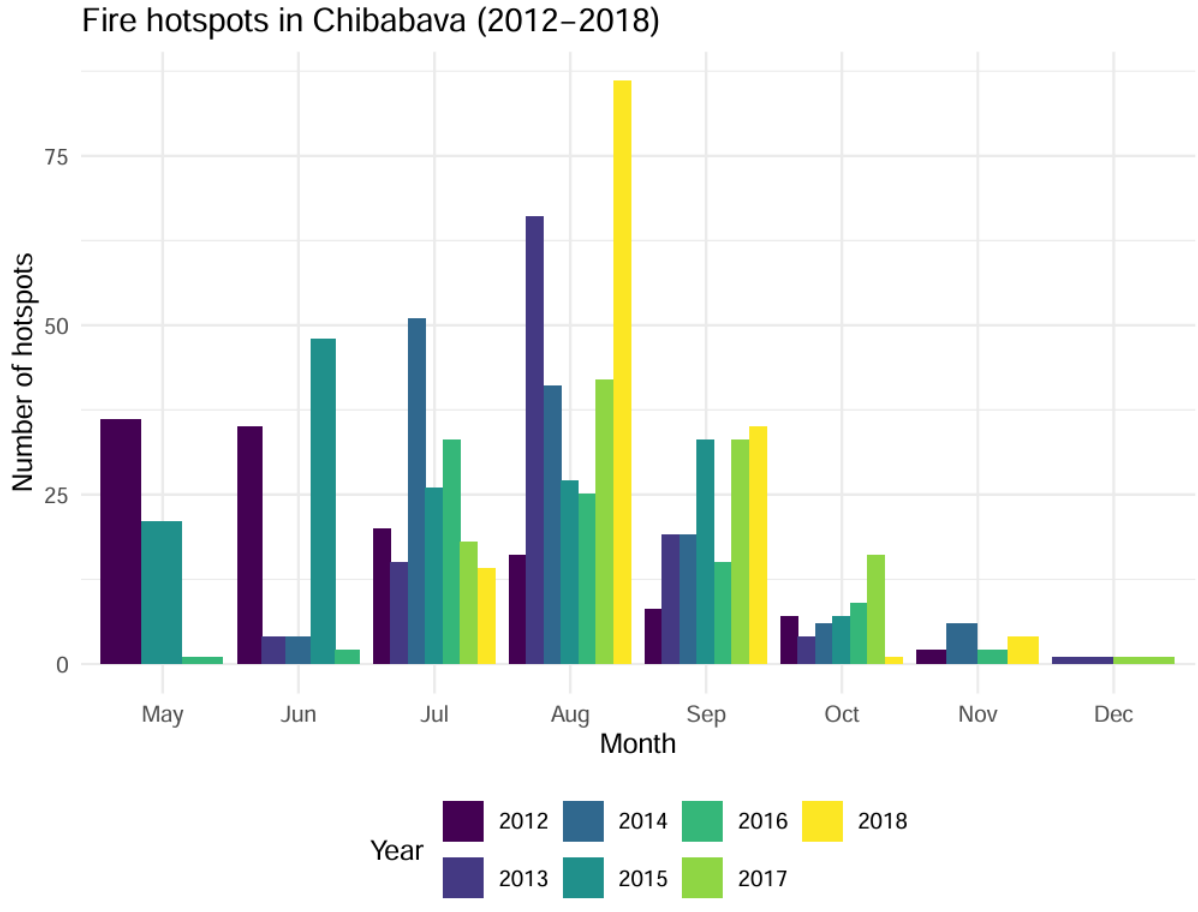
The above underlined criterion "periodic cycles of uncontrolled fires" has been corroborated by our VIIRS time analysis 2012-2022 (histograms below). The VIIRS (Visible Infrared Imaging Radiometer Suite) Fire layer shows active fire detections and thermal anomalies, such as volcanoes, and gas flares. The fire layer is useful for studying the spatial and temporal distribution of fire, to locate persistent hot spots such as volcanoes and gas flares, to locate the source of air pollution from smoke that may have adverse human health impacts.

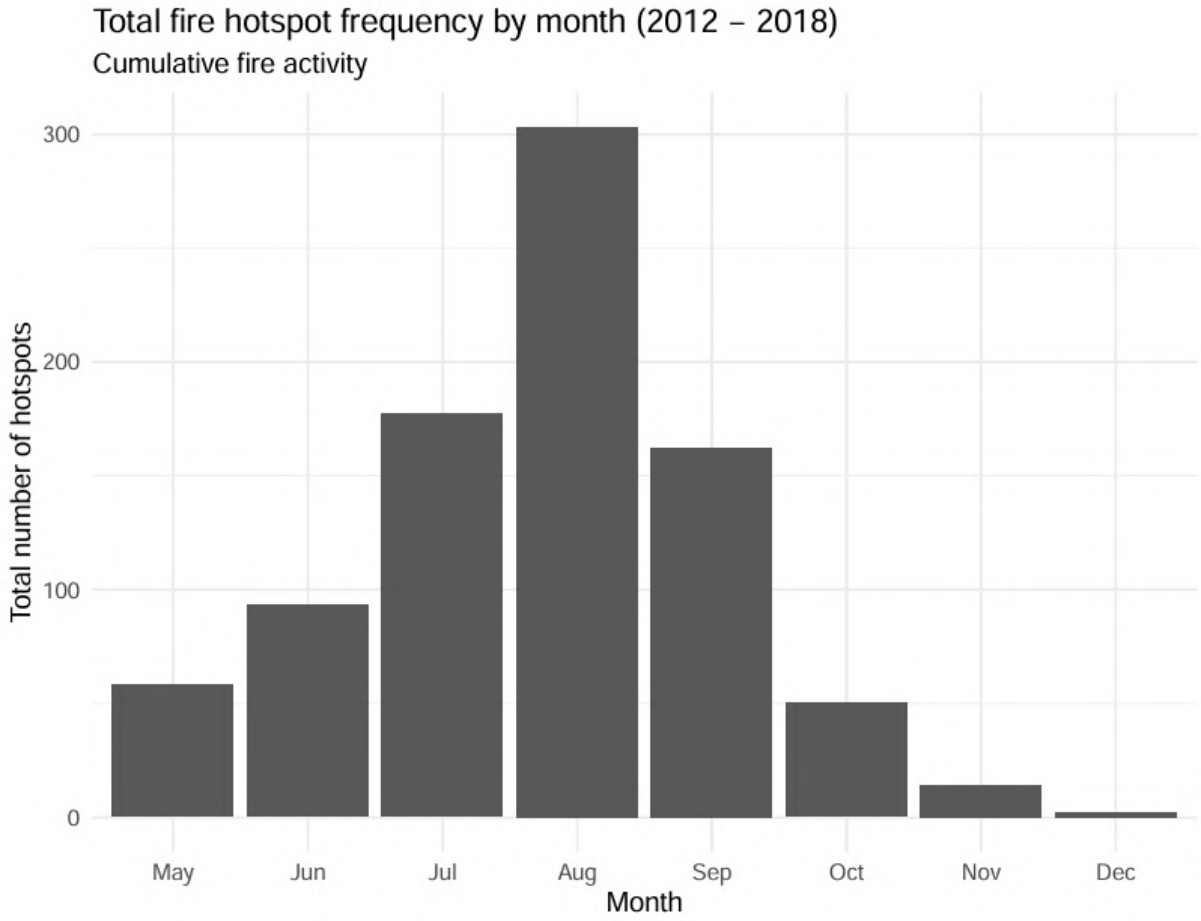
VIIRS is the successor to MODIS for Earth science data product generation. The 375m I-band data complements the MODIS fire detections; they both show good agreement in hotspot detection but the improved spatial resolution of the 375m data provides a greater response over fires of relatively small areas and provides improved mapping of large fire perimeters. The 375m data also has improved nighttime performance. Consequently, these data are well suited for use in support of fire management (e.g., near real-time alert systems), as well as other science applications requiring improved fire mapping fidelity.

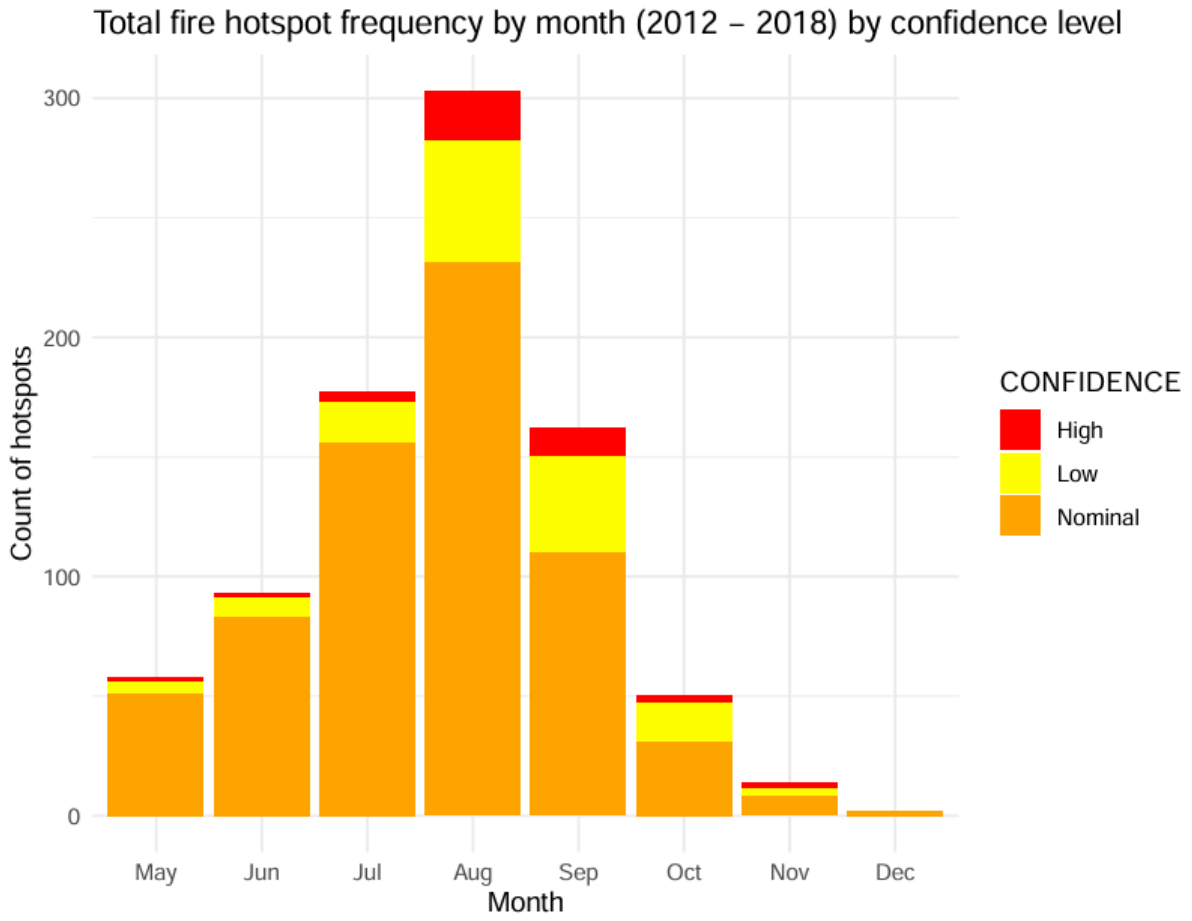
The VIIRS Fire and Thermal Anomalies product is available from the joint NASA/NOAA Suomi-National Polar orbiting Partnership (S-NPP), NOAA-20 (JPSS-1) and NOAA-21 (JPSS-2) satellites. The sensor resolution is 375 m, imagery resolution is 250 m, and the temporal resolution is twice daily.

The thermal anomalies are represented as red points (approximate center of a 375m pixel). The nominal (equator-crossing) observation times for VIIRS S-NPP are 1:30pm and 1:30am. The orbit of NOAA-21 is about 50 minutes ahead of NOAA-20 with S-NPP orbiting between them. Consequently, all three sensors conduct observations within approximately 1 hour of one another. Thanks to its polar orbit, mid-latitudes will experience 3-4 looks a day.

The confidence value is based on a collection of intermediate algorithm quantities used in the detection process. It is intended to help users gauge the quality of individual hotspot/fire pixels. Confidence values are set to low (l), nominal (n), and high (h). Low (l) confidence daytime fire pixels are typically associated with areas of Sun glint and lower relative temperature anomaly (<15 K) in the mid-infrared channel I4. Nominal (n) confidence pixels are those free of potential Sun glint contamination during the day and marked by strong (>15 K) temperature anomaly in either day or nighttime data. High (h) confidence fire pixels are associated with day or nighttime saturated pixels. Please note: Low confidence nighttime pixels occur only over the geographic area extending from 11° E to 110° W and 7° N to 55° S. This area describes the region of influence of the South Atlantic Magnetic Anomaly which can cause spurious brightness temperatures in the mid-infrared channel I4 leading to potential false positive alarms. These have been removed from the NRT data distributed by FIRMS.




Total fire hotspot frequency by month (2012 – 2018)
Cumulative fire activity
Total number of hotspots
300
200
100
0
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month



Expected Project Emissions/Removals

Expected changes in carbon are calculated PU001 through AR-TOOL14: Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities, Version 4.2.

At project start, expected project removals in woody biomass must be estimated through the modelling of tree growth development following the procedures in AR-TOOL14 v4.2 Section 8.2. That method is used for ex-ante estimation (initial projection) of carbon stock in tree biomass. One must select a fitting model to predict the development of the tree stand over time, and a fitting model to predict the growth of trees. In our case, we use the age-dependent growth model of Williams et al. (2007) and the allometric model of Ryan et al. (2011), both calibrated in Miombo woodlands of Sofala, Mozambique.

Age-dependent growth model of Williams et al. (2007)

Through planting and regeneration, basal area is expected to be boosted by ~12 m^2/ha (comparing the baseline densities in Mangunde and Nhaumue with the healthy Miombo habitat conditions reported by Ribeiro et al., 2010). This is corroborated by the strong Miombo age-BA relationship

derived from the study of Williams et al. (2007) (see Figure A7.4), indicating that it would indeed take about 28 years to attain such a boost in basal area. Thus, we use the strong age-BA relationship calibrated by Williams et al. (2007) ($P < 0.001$ and $R^2 = 0.68$) to simulate the development of the basal area increase over time.

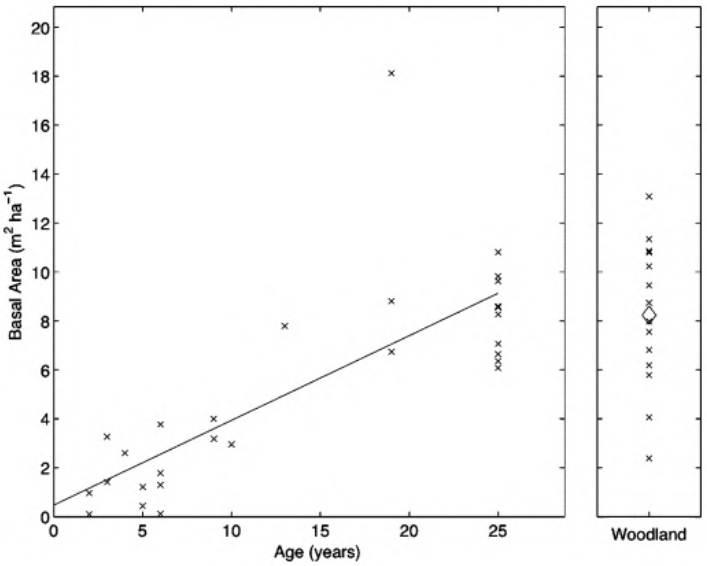


Figure A7.4: Miombo age-BA relationship calibrated by Williams et al. (2007): y = 0.47x - 0.41; (whereby $P < 0.001$ and $R^2 = 0.68$).

Allometric model of Ryan et al. (2011)

As shown by Ryan et al. (2011), basal area BA (m^2/ha) can be used as an excellent predictor of Miombo total woody carbon stock:

$Bt = 3.972\ BA$

($R^2 = 0.76$, RMSE = 7.82 tC/ha, n = 58, Bt is total (above- and belowground) tree carbon stock).

Ryan et al. (2011) employed a destructive harvest of 29 trees combined with an inventory of 12,733 trees, specifically in Miombo woodlands in Sofala Province, Mozambique, to calibrate this relationship (Figure A7.5).

Based on both models, the intervention model was calculated and presented in Annex 6. A summary of the Expected Project Emissions/Removals and Net Carbon Benefits is provided below.

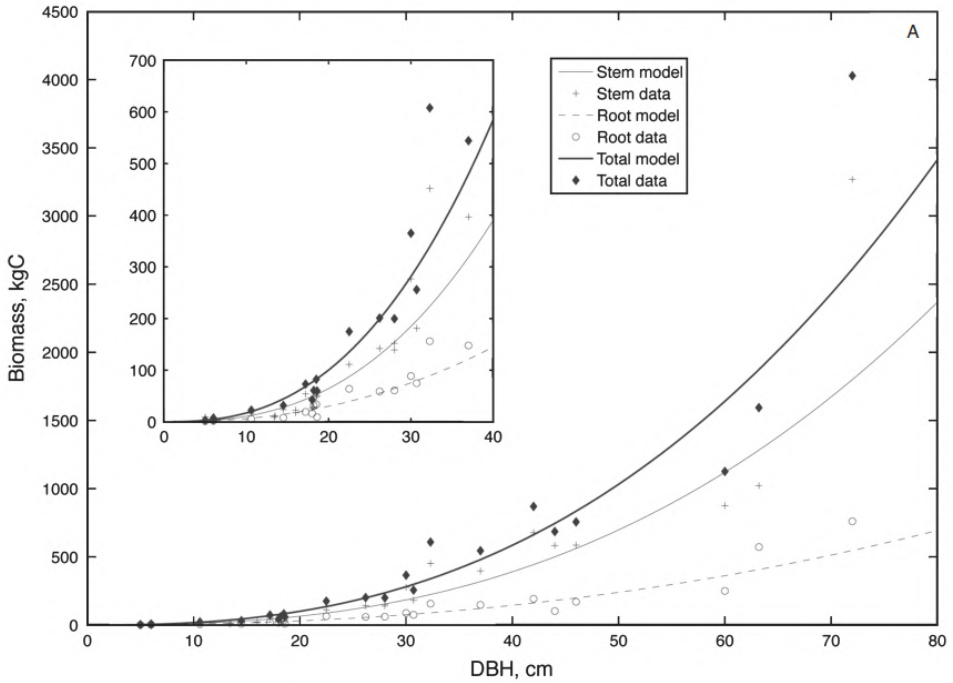


Figure A7.5: Example of one of the allometric relationships developed by Ryan et al. (2011) in Sofala (Mozambique).

SOC changes

SOC changes are calculated using AR-TOOL16: Tool for estimation of change in soil organic carbon stocks due to the implementation of A/R CDM project activities,5 Version 1.1. Based on §11 of the tool, considering uncertainties and inherent limitation of the precision of a factor-based estimation, the value of the rate of change of SOC stock is not accounted as more than 0.8 tC/ha/yr. Note that in a Miombo setting, based on the field survey of Ryan et al. (2011), 69% of all Miombo carbon content in Sofala is stored in the soil pool, showing that a soil sequestration rate of 0.8 tC/ha/yr is extremely conservative.

Potential Leakage

Leakage is defined as a reduction in carbon stocks or increase in greenhouse gas emissions outside the project area, as a result of project activities. The main potential source of leakage would come from displaced timber harvesting and displaced charcoal production. The project directly mitigates such leakage by providing trees from the nursery, allocated for timber harvesting and charcoal making in the project communities, and monitor these in line with livelihood indicator (L1). Overall, the project targets to allocate 3-5% of all nursery seedlings for timber harvest and charcoal production.

Regarding the potential to displaced grazing, this technical specification uses AR-TOOL15 version 2.0 to estimate leakage significance: A/R Methodological tool – Estimation of the increase in GHG emissions attributable to displacement of pre-project agricultural activities in A/R CDM project activity. Overall, animals can continue to graze in the project areas, as long as the project officers are informed, as this may even reduce the fireload.

In theory, displaced timber harvesting and displaced charcoaling would be two main potential sources of leakage. During a baseline survey inside the Nhaumue and Mangunde project areas in 2022, all trees that were cut for timber or charcoaling were counted. The total number of trees cut (n = 210) is very small in this area of 369 ha. It equals to less than 0.1% of the baseline stem density that is impacted by timber harvesting and displaced charcoaling. In line with AR-TOOL04 Tool for testing significance of GHG emissions in A/R CDM project activities, Version 1.0, which is applicable under PU004, the sum of decreases in carbon pools and increases in emissions may be neglected if it is less than 5% of the total decreases in carbon pools and increases in emissions, or less than 5% of net anthropogenic removals by sinks, whichever is lower.

Leakage Risk Mitigation

Project Intervention	Leakage Risk	Mitigation Measures*
Ecosystem Restoration	Displaced grazing	Continue grazing as before Implement cut-and-carry system (see Livelihood Indicator L6) and monitoring grazing pressure (see Ecosystem Indicator E2)
	Displaced timber harvesting and charcoaling	Compensating households with extra trees, see Livelihood Indicator L1

Uncertainty

We refer to AR-Tool14, which states in §8.2: "Ex-ante estimation (projection) of carbon stock in tree biomass is not subjected to uncertainty control, although the project participants should use the best available data and models that apply to the project site and the tree species". It is therefore not necessary to control for uncertainty estimation as described in PU005.

Besides, the comparison of the quantifications here with real-world field data corroborates the conservativeness of our approach. Indeed, our estimations (9.6 tCO2e/ha/yr but only 6.7

tCO2e/ha/yr after correction of all buffers) are on the lower side of other values estimated by Plan Vivo projects in nearby African countries (Kenya, Uganda). The Mikoko Pamoja Project in Kenya for instance estimated a sequestration rate (areas 1 and 2) of 16.6-18.0 tCO2 per hectare per year. Trees for Global Benefits in Uganda estimated a sequestration rate of 10.0 tCO2 per hectare per year (woodlot projects).

Finally, our estimations are also on the lower side of other values from Miombo carbon inventories in Sofala, focussing on mature Miombo woodlands and restoring Miombo woodlands after ~28 years regrowth (Ryan et al., 2011; Williams et al., 2007). Our results are less than the carbon storage in a mature Miombo system in Sofala, as sampled by Ryan et al. (2011), which totalled 403.33 tCO2e/ha (or 110 tC/ha). Thus, the climax predictions are in line with (but much more conservative than) the real-world mature Miombo, which corroborates the usefulness of the intervention model in the project areas.

Despite the conservativeness of our approach, every 5 years, a carbon recalibration and verification will take place. This will allow a continuous evaluation of the carbon estimations over the course of the project.

Expected Carbon Benefits

We refer to the Tables below; see Annex 6 for the calculations.

Expected Carbon Benefits Summary (derived from aboveground and belowground biomass and soil organic carbon)

Project Intervention	Initial carbon stock (tCO2e/ha)*	Baseline Emissions (t CO_2e/ ha)	Project Emission (t CO_2e/ha)	Leakage Emissions (t CO_2e/ha)	Carbon Benefit (see Annex 6) (t CO_2e/ha)
Nhaumue Miombo enrichment	136	0	-288	0%	-288
Mangunde Miombo enrichment	191	0	-288	0%	-288

**See Annex A7B for calculation of the initial carbon stock*

Plan Vivo Certificate Potential

Project Intervention	Carbon Benefit (t CO_2e/ha)	Project Area (ha)	Total Carbon Benefit (t CO_2e)	Risk Buffer (t CO_2e/ha)	Achievement Reserve	Potential PVCs (t CO_2e)
Nhaumue Project Area	288	300	86 400	20%	10%	60 480
Mangunde Project Area	288	69	19 872	20%	10%	13 910
TOTAL	288	369	106 272	20%	10%	**74 390**

Monitoring

1) Sampling strategy

Sampling is performed on the basis of fixed plots of 400m², along North-South oriented vertical transects perpendicularly crossing the project areas. Each plot is 20m by 20m in size, within the plots tree and shrub species density and diameter at breast height for trees are recorded. The project thus uses a stratified random sampling approach, in line with §8.1.1 of AR Tool 14 (version 4.2). Under this method, random sample plots are installed under systematic sampling with a random start.

The corners and center points of all plots are marked using paint. At the same time, the central coordinates are stored on the shared drive. At all times, at least 4 team members are trained in the sampling methodology. This ensures a smooth transfer of knowledge (when changes would occur in the team).

The assembly of the plot is started at a point "A" as the arrival point, and it is followed in an Eastern direction covering 20m until the point "B", then in a Northern direction covering 20m until the point "C", then it is followed in Western direction covering 20m until the Point "D" and finally closed in a Southern direction until the Arrival point "A".

The vertical and horizontal distance between successive plots is 200m, all taken along the North-South oriented transects. As a result, in total 104 plots have been measured in the project areas. The minimal requirement is calculated by the Winrock sample plot calculator (based on: CDM A/R Methodological Tool "Calculation of the number of sample plots for measurements within A/R CDM project activities" Version 2.1.0).

For the identification and counting of the species present, the techniques of direct observation, comparison of specimens and literature review were employed, interacting with botanical

scientists with extensive experience in the identification of forest species in southern Africa as well as with national and international herbaria, such as the Herbarium of the Instituto de Investigação Agrária de Moçambique (IIAM).

Measurement of diameter at breast height (DBH) (at 1.3m height) with respective botanical identification was performed within the plots of 400m². Diameters were derived from circumferences measured in the field. Saplings or shrubs with dbh < 1cm were not included in the circumference recordings. However, the project does record their botanical identification and the number of saplings/shrubs per specie per plot.

A composite soil sample was created within every plot by mixing 5 soil samples taken in the corners of a central 5m subsquare. The soil was collected in the center of the plot at points shaped like a cross and thus collected at the 4 corners of the cross as well as in the center of the cross. Samples were taken by augering in the top 0.3 m depth.

For expansion areas, the project will calculate the required number of samples based on the Winrock calculator.

2) **Aboveground and belowground biomass**

Aboveground and belowground biomass was quantified for all trees based on the allometric equations of Ryan et al. (2011) for Miombo woodlands in Sofala, Mozambique. The equations and root-stem ratio have been developed based on a destructive harvest of 29 Miombo trees combined with an inventory of 12,733 trees on 58 plots.

Tree biomass allometric equations. B_{dest} *is the destructively sampled tree stem biomass (s), tree coarse root biomass (r) and total tree biomass (t, i.e. stem+root), all in kg C.* dbh_{dest} *is diameter at breast height in cm. log is the natural log.* $R{:}S_{dest}$ *is the root stem ratio.*

Equation	r^2	RMSE	N
$\log(B_{dest,s}) = 2.601 \log(dbh_{dest}) - 3.629$	0.93	0.52 log(kg C)	29
$\log(B_{dest,r}) = 2.262 \log(dbh_{dest}) - 3.370$	0.94	0.43 log(kg C)	23
$\log(B_{dest,t}) = 2.545 \log(dbh_{dest}) - 3.018$	0.98	0.30 log(kg C)	23
$(R{:}S_{dest}) = -0.2671 \log(dbh_{dest}) + 1.334$	0.36	0.27	23

3) **Soil organic carbon**

The method of Walkley-Black (Walkley and Black, 1934) was used for soil organic carbon determination (in %C) of the composite soil samples. Analysis was performed in the Kvuno laboratory for soil analysis, Chimoio, after transport in a frigobox. The method of Walkley-Black is a

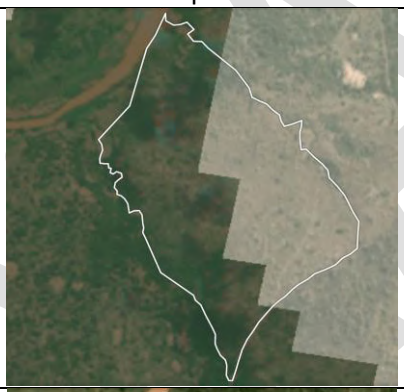
reliable and standard chromic acid wet oxidation method. Oxidisable matter in the soil is oxidised by potassium bichromate solution. There is heat generation when sulfuric acid is mixed with the dichromate. The remaining dichromate is titrated with ferrous sulphate. The titre is inversely related to the amount of C present in the soil sample. Soil organic carbon content (SOC, in ton C/ha) was calculated using the following equations (Hoff et al., 2002):

Where Bd is the bulk density (ton/m^3), D is the thickness of the top soil (0.2m), and α is 10.000 m^2/ha. Bulk density was derived from the same study by Ryan et al. (2011) (averaged at 1.35 ton/m^3).

4) **Monitoring scheme**

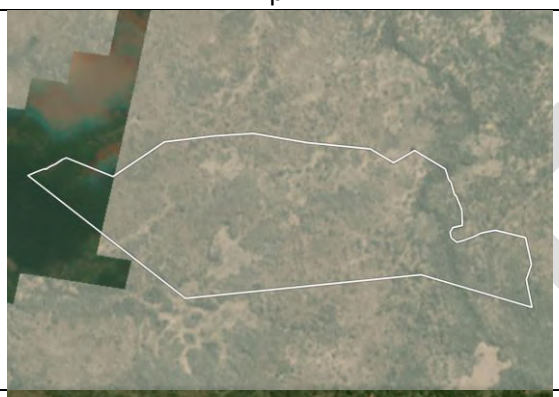
All results are presented in Annex 6 (b and c) together with a summary in Annex A7B. The measurement protocol detailed above will be replicated every 5 years, at the same fixed plots (GPS locations), to recalibrate the initial carbon model predictions. This is in line with AR-TOOL14, § 6.2: Direct estimation of change by re-measurement of sample plots.

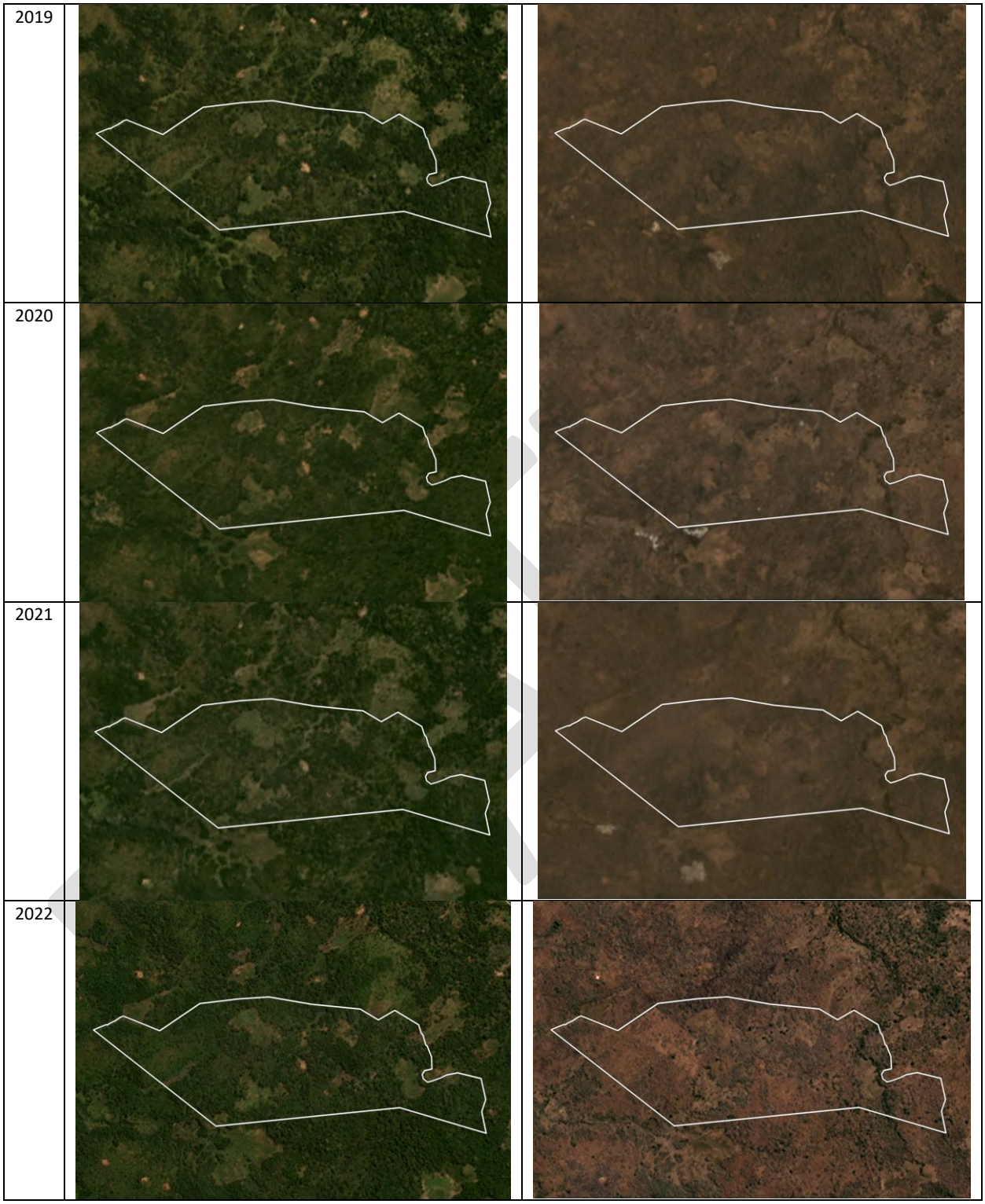
Annex A7A: Planet time series

Annex A7A	April	September
2016		
2017		

2018		
2019		
2020		
2021		

2022		

	April	September
2016		
2017		
2018		



VEGETATION CHANGE
2016-2022

	MANGUNDE	
	2016/2017	2022

M sep		
M apr		
	NHAUMUE	
	2016/2017	2022
N sep		
N apr		

Annex A7B: Results of the baseline measurements

(to be resampled every 5 years to recalibrate the initial carbon sequestration predictions)

Parameters	Nhaumue baseline		Mangunde baseline	
Results & uncertainty	**Results**	**Stdev**	**Results**	**Stdev**
Total woody biomass per plot (both above ground and below ground, kg)	1318.70	164.54	1018.35	112.88
Total woody biomass (ton per ha)	32.97	4.11	25.46	2.82
Woody kgC per plot	619.79	77.33	478.63	53.06
Woody tC per ha	15.49	1.93	11.97	1.33
Average DBH (cm)	8.44	7.04	7.76	6.44
Number of trees sampled	2699	-	549	-
Number of sample plots	67	-	14	-
SOC (%)	0.80	0.59	1.48	0.53
SOC (tC/ha)	21.70	15.80	39.99	14.27
Total carbon content (woody & soil) (tC/ha)	37.19	17.73	51.96	15.60
Total carbon content (woody & soil) (tCO2e/ha)	136.38	65.01	190.52	57.25

Annex A7C: Relevant literature

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Annex A7D: Dictionaries to calculation sheets in Annex 6

Dictionary for Annex 6a Calculation Sheet Kukumuty

Year	Project years
Increase in basal area (m^2/ha)	Increase in basal area based on the growth model of William et al. (2008)
Increase in Btotal (tCO2e/ha)	Increase in biomass carbon based on the allometric model of Ryan et al. (2011)
Increase in SOC (tCO2e/ha)	Increase in SOC based on AR-TOOL16

Total Sequestration (tCO2e/ha)	Total sequestration as sum of Btotal and SOC

Dictionary for Annex 6b&c Mangunde & Nhaumue Baseline data

Nome scientifico	Scientific name
Nome local	Local "common" name
Circunferência (cm)	Measured circumference at breast height
Diâmetro (cm)	Diameter at Breast Height (DBH) derived from circumference
Número de parcela	Plot number
Total Woody Biomass (kg)	Woody biomass (including below ground biomass), derived from DBH using the allometric equation of Ryan et al. (2011)
Above and belowground biomass carbon (kgC)	Aboveground and belowground biomass carbon, based Ryan et al. (2011). Since percentage C values are not different (two-tailedt-test, P = 0.366) between trunk and branch subsamples, the mean (47%) was used for all conversions to carbon mass.
Basal Area	Basal area derived from the Diameter at breast height
Summary table	Derived summary values for Annex A7B parameters: kg total woody biomass per plot; ton total woody biomass per ha; kgC per plot; tC per ha; trees/ha; average DBH and standard deviations for all parameters.

Annex A7E: Application of A/R TOOL04

We applied A/R TOOL04 to justify excluded project emission sources or carbon pool decreases. The tool was not built to exclude carbon pools as a whole. However, we applied it to show the insignificacy of the excluded carbon pools non-tree biomass, dead wood and litter and wood products.

In the table below you find an overview of the carbon pools carbon pool decreases, and project emissions.

Pools or emission sources	Type of pool or emission source	Included?	Step 1, 2, 3, 4: CO2eq carbon pools , carbon pool decrease and project emission (t CO2/ha)	Step 5: relative contributions of carbon pool decreases or project emissions or leakage emissions
Carbon pools	Soil organic carbon	Yes: soil organic carbon is an important pool for carbon sequestration in Miombo woodlands (calculated from AR-TOOL16 Tool for estimation of change in soil organic carbon stocks due to the implementation of A/R CDM project activities, Version 1.1)	88.08t CO2/ha	
	Above-ground biomass	Yes: above-ground biomass (trees, shrubs) is a major pool for carbon sequestration, to be considered and quantified	199.56t CO2/ha	
	Below-ground biomass	Yes: this is a potentially significant pool to be considered for tree planting		
	Non-tree biomass	No: Non-tree biomass and grasses are not included as carbon pools in the above-ground biomass estimations	Grasses = 7.4501 tCO2/ha Herbaceous = 0.0734 tCO2/ha Total = 7.52tCO2/ha	
	Dead wood and litter	No: conservatively excluded	Total = 0.4404 tCO2/ha	
	Wood products	No: conservatively excluded	/	
Carbon pool decrease	Grassland burning to make firebreaks	No: the effect is negligible	0.361 t CO2/ha	0.361/1,091 = 33.09%

Emission sources	Project gasoline use	No: the effect is negligible	0.57tCO2/ha	0.57/1,091 = 52.25%
Leakage emissions	Timber harvesting & charcoaling	No: the effect is negligible	0.032 tCO2/ha 0.16 tCO2/ha	0.16/1,091 = 14.67%

Calculations and sources:

Type of pool or emission source	Value	Calculation	Source
Soil organic carbon	88.08t CO2/ha	/	PDD – Annex7
Above-ground & Below-ground biomass	199.56t CO2/ha	/	PDD – Annex7
Non-tree biomass	7.52tCO2/ha	Grasses: 2.03tC/ha * 3.67 = 7.4501 t CO2/ha Herbaceous: 0.02 tC/ha * 3.67 = 0.0734 tCO2/ha Total = 7.52tCO2/ha	Ribeiro, N.S., Matos, C.N., Moura, I.R. et al. Monitoring vegetation dynamics and carbon stock density in miombo woodlands. Carbon Balance Manage 8, 11 (2013). https://doi.org/10.1186/1750-0680-8-11
Dead wood and litter	0.4404 tCO2/ha	Litter: 0.06 tC/ha * 3.67 = 0.2202 tCO2/ha Dead wood: 0.06 tC/ha * 3.67 = 0.2202 tCO2/ha Total = 0.4404 tCO2/ha	Ribeiro, N.S., Matos, C.N., Moura, I.R. et al. Monitoring vegetation dynamics and carbon stock density in miombo woodlands. Carbon Balance Manage 8, 11 (2013). https://doi.org/10.1186/1750-0680-8-11
Grassland burning to make firebreaks	0.361 t CO2/ha	Firebreaks = 10m width Perimeter of areas calculated with QGIS - Nhaumue 13751m - Mangunde 4178m Area of grass loss: 179 290m Potential loss of stored CO2: (17.29ha * 7.4501 t CO2/ha)/369ha = 0.361 t CO2/ha	Ribeiro, N.S., Matos, C.N., Moura, I.R. et al. Monitoring vegetation dynamics and carbon stock density in miombo woodlands. Carbon Balance Manage 8, 11 (2013). https://doi.org/10.1186/1750-0680-8-11
Project gasoline use	0.57tCO2/ha	The project will use an estimated 93600L of gasoline° over 30years 93600L *2.24kg CO2/L = 209.66 tCO2/369ha= 0.57tCO2/ha	°based on use of 2025 Conversion factor derived from ADEME Base Carbone®v8.4

Timber harvesting & charcoaling	0.16 tCO2/ha	- 210 trees stumps in 369ha. - 0.056 t CO2/tree (0.056 t CO2/tree *210 trees)/369ha = 0.032 t CO2/ha Potential loss of stored CO2: Assumption that this cutting is not yearly but every 5 year: 0.032 t CO2/ha * 5 = 0.16 tCO2/ha	PDD – Annex7 – baseline measurements

Step 6 & 7: Rank the emissions or carbon pool decreases in descending order & make the cumulative sum until threshold of 0.95 is reached. Mark all these sources.

Rank	Emission	Relative Contribution to GHG emission or carbon pool decrease
1	Project gasoline use	52.25%
2	Grassland burning to make firebreaks	33.09%
3	Timber harvesting & charcoaling	14.67%

Step 8: the sum of decreases in carbon pools or increase in emissions shall be less than 5% of the net removals by sink:

Calculation: (1.091 tCO2/ha / (88.08 tCO2/ha + 199.56 tCO2/ha))*100 = 0.38%

Conclusion: the project emissions, carbon pool decreases and leakage emissions are less than 5% of the net removals by sink and are therefore insignificant and can be neglected.

PLAN VIVO

Annex 7b – Technical Specifications Mangrove restoration

Project Intervention:	Mangrove restoration
Version:	1.0
Date Approved:	-
Methodology:	PM001 Agriculture and Forestry Carbon Benefit Assessment Methodology
Modules/Tools:	Module PU001, PU002, PU004, PU005
Certificate Type(s):	rPVC and vPVC

Applicability conditions

We refer to §3.3.1 for a description of the project areas and to the sections below for a description of the baseline scenario.

Inside the project areas, field observations (see further) showed the occurrence of intensive wood cutting and hypersalinity.

Consequently, the applicability conditions for the project zones and potential expansion zones are:

1) Project areas must show field evidence of the presence of hypersalinity.
2) Observations of tree cutting in the project zones must be reported and evidenced at baseline, by project staff and community members.
3) Project areas must be located within the coastal protection of the Inhambane Bay.

Additionality

Below we describe the most likely land use scenario in the absence of project interventions and the additionality of the project interventions using AR-TOOL02 v1.0: "Combined tool to identify the baseline scenario and demonstrate additionality in A/R CDM project activities".

We follow the following steps:

STEP 0. Preliminary screening based on the starting date of the project activity

The starting date of the activity was 1 May 2024. By then, the incentive from the planned plan vivo project was seriously considered in the decision to proceed with the project activity, and the first activities were started.

STEP 1. Identification of alternative land use scenarios to the proposed project activity

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

Based on the socioecological survey (see §3.3.1), we identify the following land use scenarios to be credible:

- Continuation of the pre-project "pressure-as-usual" (combination of mangrove wood cutting and hypersalinity), pushed by climate change impacts;
- Hypothetical afforestation of the land within the project boundary performed without being registered as a plan vivo credit generating project activity;

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

Both alternative land use scenarios are in compliance with mandatory legislation and regulations taking into account their enforcement in Inhambane and Mozambique. Continuation of the status quo is in agreement with laws and regulations, while mangrove afforestation is obviously also a land cover type that is allowed by applicable regulations.

STEP 2. Barrier analysis

Sub-step 2a. Identification of barriers that would prevent the implementation of at least one alternative land use scenarios

No financial, technical, institutional nor social barriers would plausibly hamper the continuation of the pressure-as-usual scenario. Continuation of the status-quo requires no investments, technical knowledge nor legal efforts: the project areas are clearly affected by intensive wood cutting and hypersalinity (see further). However, hypothetical afforestation without extra (plan vivo) funding is not a plausible scenario, given the significant amount of funding required and the lack of mangrove nurseries in the area.

Sub-step 2b. Elimination of land use scenarios that are prevented by the identified barriers

We eliminate the scenario of afforestation without extra plan vivo funding, since it is not a plausible future land cover scenario, given the significant amount of funding required for intensive restoration, and the lack of mangrove nurseries in the area. It remains a hypothetical scenario (there are no known mangrove nurseries in the area).

Sub-step 2c. Determination of baseline scenario (if allowed by the barrier analysis)

Mangrove afforestation without being registered as a plan vivo project is not included in the list of land use scenarios that are not prevented by any barrier. Consequently, only one land use scenario

remains (pressure-as-usual scenario), so according to the tool, this scenario is the baseline scenario. We continue with Step 4: Common practice test.

STEP 4. Common practice analysis

There are no similar previous or ongoing mangrove afforestation activities in or near the project zones, not even remotely similar to this proposed plan vivo project. Consequently, the plan vivo project activity is not the baseline scenario and, hence, it is additional.

Finally, below we present a summary of the basic barriers the project activities are to overcome.

Table A7.1: Main barriers for the project activities to overcome

Ecosystem Restoration	Main Barriers	Activities to Overcome Barriers
Financial	1. Limited funds 2. Other priorities 3. Limited private credit availability	Start-up capital secured by Government of Flanders (Belgium) funds and Government of Granada (Spain) funds to initiate the project; benefit sharing scheme supported by Plan Vivo; funding for initial management, wages and enrichment planting
Technical	Although biodiversity conservation projects are being pursued in other parts of Inhambane Province, these are not focused on the estuarine mangroves of the Ponta da Barra peninsula Limited focus on mangrove restoration projects that include hybrid restoration approach combining passive natural regeneration and active tree planting	Skilled local coordinators with understanding of local agroecosystems for enriching mangroves; inputs of environmental scientists and researchers linked to three universities; construction of plant nurseries for mangrove enrichment Collaboration with Eduardo Mondlane University for mangrove restoration strategy and monitoring
Institutional /Social	"Top-down approach" adopted by government officials, with limited room for local decision-making and grassroots initiatives	Bottom-up approach with first consultation rounds, continued workshops and benefit sharing for participating communities, and

	CCP structures existing in theory, but very weak in practice	insertion of projects within local community associations such as CCPs.

Project activities

For a summary of project activities and input needed to implement the project intervention, including species selection, establishment, and long-term management, we refer to Table A7.2 below.

Table A7.2: Project framework

Aim		
To use an integrated landscape management strategy for enrichment of Miombo woodlands and estuarine mangroves to create climate resilient agroecosystems for sustainable livelihood opportunities in Chibabava District, Sofala Province, and sustainable fisheries in Inhambane, Mozambique.		
	Description	**Assumptions/Risks**
Outcomes		
Carbon Benefit	~ community managed woodlands are enriched by increase in soil organic carbon and Miombo species biomass Degraded estuarine mangroves are managed by communities and allowed to regenerate to increase biomass and soil organic carbon The project expands to adjacent areas and involves neighbouring communities to scale-up the impact.	R1: Uncontrolled fires could continue to affect the project areas. A1: The project establishes mulching zones and fire breaks to protect enriching Miombo lands against uncontrolled annual fires. R2: Community could be uninterested in participating in the Miombo and Mangrove projects. A2: Strong role of stakeholder communities as project designers and involvement of neighbouring households in project activities will build a strong project support base.

Livelihood Benefit	Agroforestry nursery providing additional livelihood benefits to participating households of Mangunde and Nhaumue. Socio-ecological challenges are tackled by community decisions using re-investments. Protection of ecosystem services and non-timber forest products Mangrove restoration leads to coastal protection of the lowest-lying machambas and more sustainable fisheries (as mangroves deliver vital shelter and food for juvenile marine life).	R3: A focus on Miombo restoration alone could be insufficient to create significant community benefits. A3: Intensive agroforestry planting improves soil fertility and provides useful trees for participating households. R4: Project benefits could be insufficient to attract strong community interest. A4: Plan Vivo re-investments are used to improve the well-being of communities. R5: A focus on mangrove restoration alone could be insufficient to create significant community benefits. A5: Community needs are assessed from a broad perspective that includes fisheries, sea fruit collection, occurrence of sea grass, machambas, markets, firewood needs, village infrastructure and other.
Ecosystem Benefit	The floristic biodiversity of the ecosystem is supported through the enrichment, conservation, and improved management of community-managed woodland and mangrove. The project will also contribute to regional habitat diversity for endemic fauna. The project expands to adjacent areas and involves neighbouring communities to scale-up the impact.	R6: The project team itself could be too small to perform all restoration activities alone. A6: The restoration areas are enriched, protected, and expanded by community members.
Outputs and activities		

Output 1-4: see Annex 7a		
Output 5	**Estuarine mangroves restored leading to more productive local fisheries**	R18: Strategies and processes of project interventions may not be clear to most community members A18: Trainings will be practical and given in the field, all the while cooperation with Eduardo Mondlane University will remain close R19: Survival rate of mangrove seedlings may be reduced A19: Project logic follows hybrid restoration approach combining passive natural regeneration and active tree planting
Activity 5.1	Strengthening the structures of the Community Fisheries Councils (Conselhos Comunitarios de Pesca) and implicate them in active mangrove oversight	
Activity 5.2	Community sensibilization at community meetings, schools and churches, and through women ambassador groups	
Activity 5.3	Supporting alternative sources for local wood-based cooking needs	
Activity 5.4	Active mangrove restoration including enrichment planting, sea grass planting and microchannel cleaning	
Activity 5.5	Supporting efficiencies in the local fishery and sea fruit supply chain	

The key project mangrove species that are planted and actively regenerated include:

- *Avicennia marina*
- *Bruguiera gymnorrhiza*
- *Ceriops tagal*
- *Rhizophora mucronate*
- *Sonneratia alba* (closest to the bay)

Carbon benefits

Crediting Period

The project start date was 1 May 2024 (i.e. the date of the first employee hired). The period of time over which the climate benefits will be quantified will be 30 years. This is an estimation of the period during which a stable state of mangrove carbon can be reached under active restoration management. Indeed, there will be a slowdown in carbon storage after maturity will be reached.

Carbon Pools and Emission Sources

Below, we list the carbon pools and emission sources included in the estimation of carbon benefits with the justification for any excluded carbon pools or emission sources. We refer to Annex A7F for the full Application of A/R TOOL04.

Table A7.3: Carbon pools and emissions sources that are included or excluded in quantification.

Pools or emission sources	Type of pool or emission source	Included?
Carbon pools	Soil organic carbon	Yes: soil organic carbon is an important pool for carbon sequestration in mangroves
	Above-ground biomass	Yes: above-ground biomass is a major pool for carbon sequestration in mangroves, to be considered and quantified
	Below-ground biomass	Yes: this is a potentially significant pool to be considered for mangroves
	Non-tree biomass	No: Non-tree biomass and grasses are not included as carbon pools in the above-ground biomass estimations
	Dead wood and litter	No: conservatively excluded
	Wood products	No: conservatively excluded
Emission sources	Grassland cutting and burning Project gasoline use	No: the effect is negligible

Baseline Emissions/Removals

All project areas are currently located in the intertidal area, and within the coastal protection of the Inhambane Bay. The mangrove seedlings are planted near bare spots within the intertidal zone, and in line with their natural zonation.

To understand and assess baseline conditions, the changes of the estuarine mangroves of the Barra Peninsula were followed using the Mangrove Vegetation Index (MVI) as a spectral index developed by Baloloy et al. (2020) for rapid and accurate mapping of mangrove extent using remotely-sensed

imagery. The index was created to overcome the limitations of conventional vegetation indices (like NDVI) and complex, skill-dependent classification techniques often used in mangrove monitoring.

The MVI utilizes a simplified ratio formula that combines three specific spectral bands from Sentinel-2 satellite imagery (Green (B3), Near Infrared (NIR) (B8), and Shortwave Infrared (SWIR1) (B11): MVI = (NIR Green)/(SWIR1 Green)

This structure is designed to capture the unique biophysical properties of mangroves:

1) Greenness: (NIR Green) expresses the differences in greenness between mangrove forests and other terrestrial vegetation.

2) Moisture: (SWIR1 Green) expresses the distinct moisture of mangroves, which is influenced by both the leaf water content and the moist soil resulting from tidal inundation.

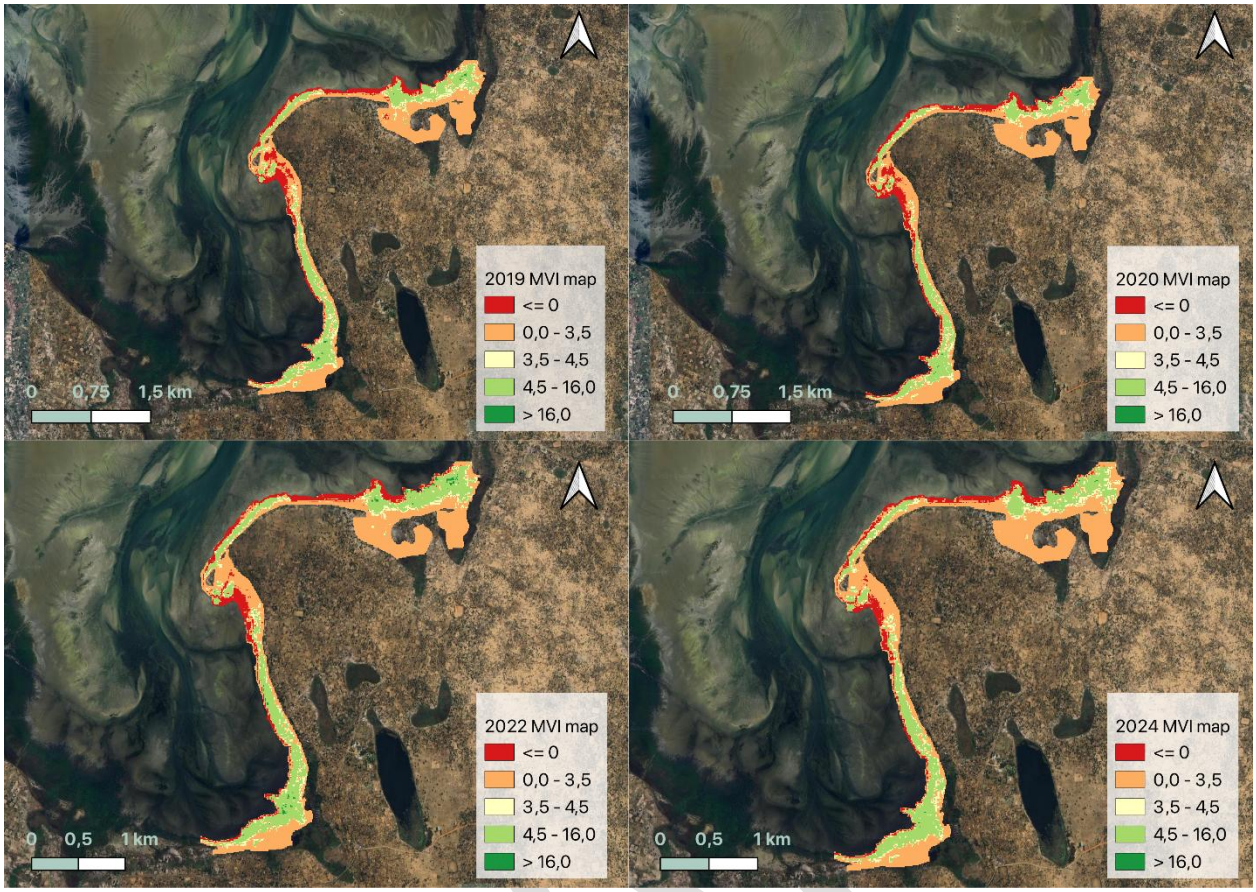
The index value increases as the probability of a pixel being classified as a mangrove increases. A value between 4.5 – 20 is the optimal MVI threshold for the study sites. 7.7 is seen as the average threshold. Lower than 4.5 suggests non-mangrove or damaged mangrove. It is seen that terrestrial vegetation (forest & non-forest) does not reach higher than 3.6.

The MVI provides several key advantages for mangrove mapping:

- High accuracy: The MVI successfully separates mangroves from other land cover types, especially terrestrial vegetation. Validation using high-resolution drone orthophotos and field data showed an overall index accuracy of 92%.
- Efficiency: It allows for rapid and accurate mapping without relying on complex, time-consuming classification techniques or subjective user skill biases in selecting training data.

While robust, the MVI method has some uncertainties. This may include some tidal sensitivity: tidal level at the moment of satellite acquisition. Higher tide events cause lower average MVI values and smaller mapped mangrove areas because more mangrove parts are submerged. This often requires the user to lower the minimum MVI threshold to compensate when using high-tide imagery.

The index value does not always increase proportionally with increasing mangrove health or density. For instance, very dense riverine mangroves sometimes showed lower MVI values compared to fringe mangroves, suggesting MVI is highly influenced by the background moisture properties of the coastal habitat rather than strictly leaf health.


2019 MVI map
<= 0
0,0 - 3,5
3,5 - 4,5
4,5 - 16,0
> 16,0
0 0,75 1,5 km
2020 MVI map
<= 0
0,0 - 3,5
3,5 - 4,5
4,5 - 16,0
> 16,0
0 0,75 1,5 km
2022 MVI map
<= 0
0,0 - 3,5
3,5 - 4,5
4,5 - 16,0
> 16,0
0 0,5 1 km
2024 MVI map
<= 0
0,0 - 3,5
3,5 - 4,5
4,5 - 16,0
> 16,0
0 0,5 1 km


Barra mangrove zone 1
Barra mangrove zone 2
Inhambane project zone
0 1 2 km

Figure A7.1: Mangrove Vegetation Index (MVI) evolution since 2018 and location within the Bay.

Data processing and index derivation

Sentinel-2 Level-2A Surface Reflectance images were ingested and harmonized with corresponding cloud probability data. A cloud masking process was implemented, followed by a scaling correction factor. The MVI was computed for all retained images.

Time-series analysis

To mitigate the influence of temporal variations, particularly those related to tidal cycles, the median MVI value was computed per pixel for each target year, creating a single, representative annual image. A yearly time-series analysis was then conducted (2019, 2020, 2022, 2024), where the mean and standard deviation (SD) of MVI values within the ROI were extracted through a combined regional reduction. Data for 2018 was excluded from the spatial mapping due to limited image availability, which resulted in a large SD (high variance) in the aggregated yearly metric.

The resulting annual mean MVI values for the project zone were compared against MVI statistics derived from a nearby, established "Mature Reference Area (MRA)" (Barra mangrove zone).

Image results

The analysis shows a clear difference in MVI indices between the project and the mature reference zones. The MVI values recorded within the proposed project area consistently fell below the established threshold for healthy mangrove classification (MVI > 4.5), with mean values often lower than 3.5. This indicates that, over the observation period (2019–2024), the project zones comprise predominantly unhealthy or non-vegetated mangrove areas and show no trend of substantial natural regeneration. In contrast, the mature mangrove reference zone (Barra) demonstrated a consistently high annual average MVI value between 9.7 and 14.38.

Table A7.4: MVI spatial averages and standard deviations since 2018, in the mature reference areas as contrasted with the project zone.

Barra Reference Mangrove 2

	2018	2019	2020	2021	2022	2023	2024	2025
Average MVI	15.03	11.82	11.11	12.39	14.38	10.95	9.70	14.28
SD	51.80	5.11	4.78	5.27	6.32	4.47	3.99	5.75

Barra Reference Mangrove 1

	2018	2019	2020	2021	2022	2023	2024	2025
Average MVI	14.84	10.06	12.74	14.21	9.73	11.22	10.07	14.45

SD	24.77	4.05	4.77	6.04	9.29	4.71	4.53	6.11

Project Zone

	2018	2019	2020	2021	2022	2023	2024	2025
Average MVI	3.24	3.01	2.75	3.11	3.46	3.09	3.06	3.43
SD	19.00	3.14	3.2	3.63	3.69	3.19	2.92	3.58

Overall, the satellite images and MVI analysis indicate a clear contrast between the poor-health status of the Project Areas (PA) and the healthy status of the Mature Reference Area (MRA). The time analysis also corroborates the "no-regeneration" trend over time within the project zones.

To corroborate satellite imagery and better understand the local driving factors, a baseline field survey was conducted within the Project Areas (see Expected Project Emissions/Removals). The project mangroves are dominated by four main species: *Avicennia marina, Sonneratia alba, Ceriops tagal* and *Rhizophora mucronata*. There is a significant contribution of Avicennia marina, reinforcing its role as a keystone species in future carbon sequestration. In addition, during transect walks (see Figures A7.2 to A7.4 below), systematic observations of porewater salinity and cutting signs were made. A systematic transect was taken crossing the intertidal zone from the former machamba towards the Bay, where porewater salinity, biomass and tree cutting signs were sampled during low tide. Using a spade, holes of approximately 25cm were created inside the sediment, awaiting the natural refilling with porewater. Porewater samples were extracted using a pipette, and measured using a refractometer. For the biomass assessment, sample plots of 20x20m were created every 100m using ropes and GPS, to include the measurement of all species diameter-at-breast-heights and species heights. In addition, within the plots, the number of regenerates were counted, while the distance to the closest microchannel was measured using measuring tape. Here, in total, 1860 mangrove regenerates were counted, as well as 60 trees. Finally, from a random selection of 15 microchannels, salinity of the surface water was sampled using pipette and refractometer.

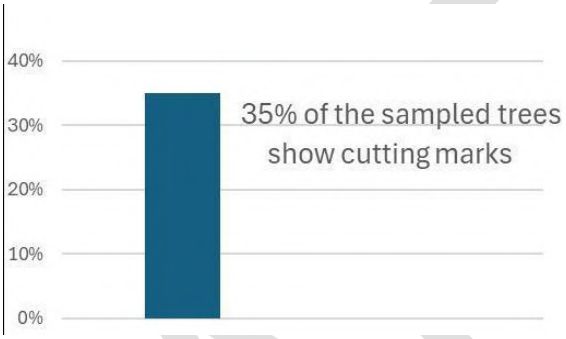
Figure A7.2: Photographs from inside the project area, indicative of current mangrove conditions with large bare spots (above) and low-height vegetation (below).

Figure A7.3: Photographs from inside the project area, indicative of current mangrove conditions with occasional reed beds (left) and large bare lands on former machambas (right).

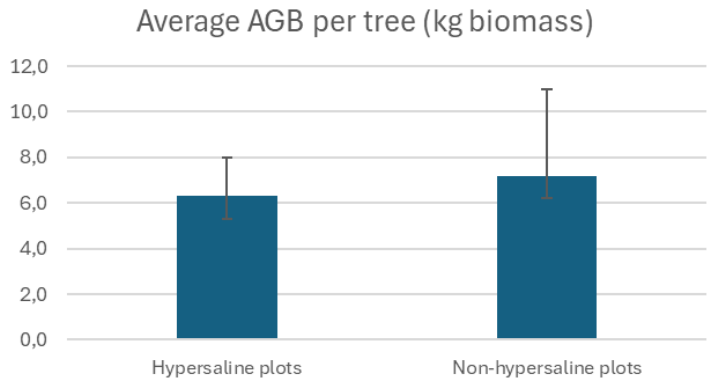
Figure A7.4: Photographs from inside the project area, indicative of current mangrove conditions with *Sonneratia alba* cut for boat construction (above), abandoned fish ponds (middle), and large bare lands (below).

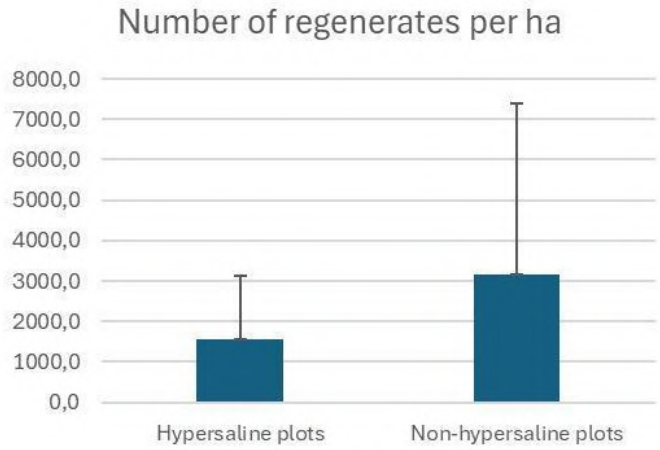
Overall, the findings from the baseline transect study reveal three interesting results.

1) There is a **very frequent occurrence of wood cutting** in the project area mangroves, as 35% of all sampled trees show clear cutting marks. This is corroborated by the social survey (see § 3.3) revealing the high need for firewood for household cooking as well as some Sonneratia cutting near the Bay (for boat construction).

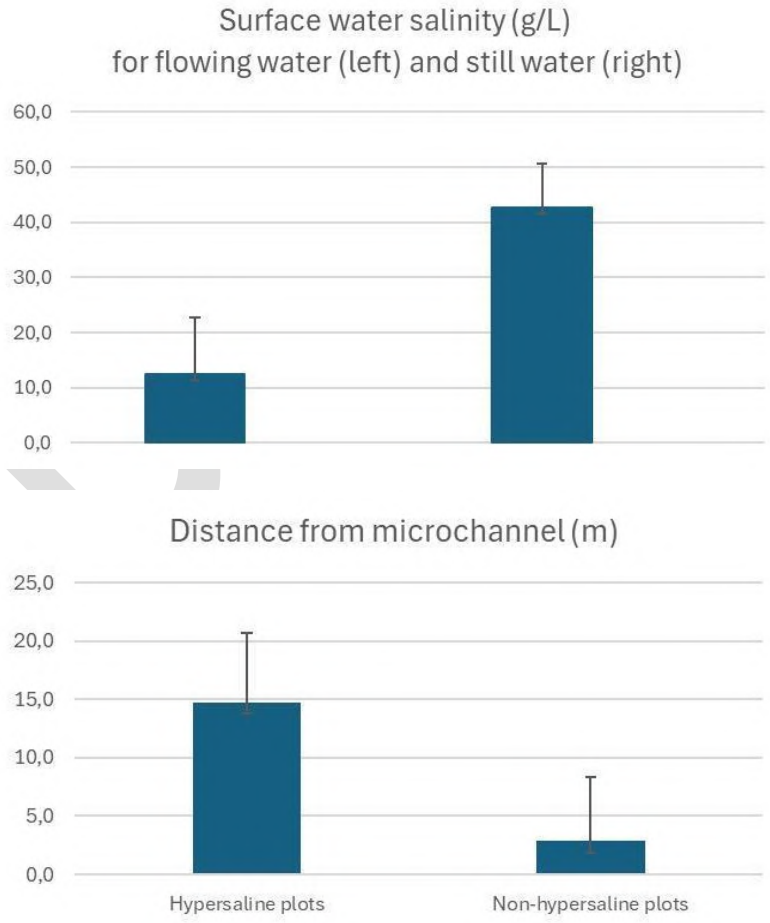


2) Large zones within the project areas show **hypersalinity to extreme hypersalinity**, with pore water levels measured up to 71 g/l. The average number of regenerates per hectare in a hypersaline plot is less than half of the number of regenerates per hectare in a non-hypersaline area. Note that these differences are not significant ($p>0.05$), but this may be because of the small sample size all the while the presence of hypersalinity is evident.





3) Hypersaline plots tend to be farther from microchannels, and microchannels with **good flow contain surface water that is significantly less saline** than microchannels without good flow. This last aspect points to the importance of the mangrove microchannel hydrology and was confirmed by a Mann Whitney U Test, as the difference between both groups was significant at p = 0.00148.



In conclusion, the abundance of wood cutting signs and hypersaline to extremely hypersaline zones that have poor drainage testify to a generally degraded mangrove ecosystem within the project areas. Meanwhile the time series of satellite images show a relatively degraded and stable coastal landscape over the past decade, or:

$$\Delta C_{Baseline\ t0 \rightarrow t30} = 0 \text{ (no-regeneration trend).}$$

This is supported by Module PU001, requiring "no change in woody biomass carbon stocks if the conditions in AR-TOOL14 v4.2 section 5 are met" (§5.1.2). AR-TOOL14 vs 4.2 states in section 5 that changes in carbon stocks in trees and shrubs in the baseline may be accounted as zero ($\Delta C = 0$) for those lands for which the project participants can demonstrate, through documentary evidence or through participatory rural appraisal (PRA), that one or more of the following indicators apply (applicable indicators are underlined):

a) Observed reduction in topsoil depth (e.g. as shown by root exposure, presence of pedestals, exposed sub-soil horizons);
b) Presence of gully, sheet or rill erosion; or landslides, or other forms of mass movement erosion;
c) Presence of plant species locally known to be indicators of infertile land;
d) Land comprises of bare sand dunes, or other bare lands;
e) Land contains contaminated soils, mine spoils, or highly alkaline or saline soils;
f) Land is subjected to periodic cycles (e.g. regular wood cutting and clearing-regrowing cycles after periodic cyclones) so that the biomass oscillates between a minimum and a maximum value in the baseline.

Expected Project Emissions/Removals

The expected project emissions/removals are calculated using PU001, as this is applicable to mangroves and in line with the applicability of mangrove methodology AR-AM0014. Mangrove methodology AR-AM0014 sets forth the use of AR-TOOL14 "Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities, Version 4.2". Every 5 years, the project will perform a direct estimation of change by re-measurement of the mangrove sample plots within the project area (see §Monitoring), in line with AR-TOOL14 §6.2.

At project start, expected project removals in woody mangrove biomass can be estimated through the modelling of mangrove tree growth development following the procedures in AR-TOOL14 v4.2 Section 8.2. That method is used for initial projection of carbon stock in mangrove tree biomass. We use our field data of a Mature Reference Area (MRA) to predict the growth of mangrove trees and

the development of the tree stand over 30 years. The MRA was compared with the baseline carbon stock within the Project Areas (PA).

Figure A7.5: Biomass sampling plots (10m x 10m) (n = 66) within the project area.

The distribution and cover of the mangrove vary in a south-north direction, with greater density in areas further away from Inhambane Bay, where it is more influenced by freshwater courses. Two species dominate the mangrove ecosystem in the region (*Avicennia marina* and *Sonneratia alba*), although the species *Ceriops tagal* and *Rhizophora mucronata also* predominate (Figure A7.6 and A7.8).

Figure A7.6: Example of the occurrence of *Sonneratia alba* in Machavenga

Figure A7.7: Example of the occurrence of *Avicennia marina* in Machavenga

Figure A7.8. Example of the occurrence of *Ceriops tagal* in Machavenga

The 66 plots established in the project area showed a variation of the species diversity in the coast-sea direction and east-west direction. The areas closest to the coast had a composition reasonably dominated by *Avicennia marina*, mostly represented by more adult species. Further inland in the degraded mangrove ecosystem, *Avicennia marina* and *Sonneratia alba* were more dominant. Near the coastline, the mangrove trees were short in stature (120±25 cm), increasing in stature as one walks into the ecosystem (275±75 cm) (Table A7.5).

Table A7.5: Average height (in cm) of mangrove species within the Project Area

Species	Dwarf trees	Adult trees
Avicennia marina	97±15	300±21
Sonneratia alba	132±13	330±24
Ceriops tagal	97±12	123±21
Rhizophora mucronata	80±15	187±12

The analysis of the diameter at breast height (DBH) of the individuals sampled in the mangrove in the study area showed marked differences between the species studied, both in terms of average

values and amplitude of diameters. In total, 2846 individuals belonging to four main species were evaluated.

The species *Sonneratia alba* (S. alba) stood out for presenting the highest values of average diameter, reaching 78.76 cm, with a standard deviation of 34.20 cm. The values ranged between 20cm and 135cm, which demonstrates a predominance of large trees, probably adults, and also the presence of individuals in different stages of growth. This breadth reflects the high capacity of this species to develop robust trunks and accumulate biomass over time, playing a key role in storing carbon above ground. *Avicennia marina* (A. marina) had a mean diameter of 52.09cm (SD = 28.19cm), ranging from 5cm to 99cm. This result indicates a relatively heterogeneous population, composed of young and adult individuals. The higher DBH values observed in some trees reinforce the contribution of this species to the mangrove structure and its ecological relevance, particularly in terms of sediment stability and organic matter production.

The species *Rhizophora mucronata* (R.mucronata) exhibited an average diameter similar to that of Avicennia marina, 49.89cm (SD = 22.51cm), with values ranging from 10cm to 89cm. The pattern found suggests the coexistence of individuals of different diameter classes, reflecting a continuous process of natural regeneration. The presence of larger trees of this species is consistent with its structural role in the mangrove, especially in the formation of extensive aerial root systems that contribute to coastal protection. On the other hand, *Ceriops tagal* (C. tagal) had the lowest mean diameter values, 24.94 cm (SD = 12.40 cm), with a range of 3 cm to 46 cm. This result is consistent with the shrub morphology and the relatively small size of this species, which often settles in more internal and higher areas of the mangrove.

In general, the results show that *Sonneratia alba* stood out for the larger medium size of individuals, while *Avicennia marina* and *Rhizophora mucronata* presented intermediate diameters, but still high, suggesting stable populations capable of accumulating large biomass. *Ceriops tagal* exhibited smaller size, consistent with patterns described in the literature for African tropical mangroves. The wide variation of DBH within each species reveals a complex population structure, with trees of different ages and stages of development, reflecting both the natural dynamics and possible differences in microenvironmental conditions along the mangrove region.

The analysis of the diameter at breast height (DBH) of the individuals sampled in the mangrove of the Josina Machel neighbourhood allowed us to classify the species into different age groups. Three categories based on DBH were adopted: young people (<10 cm), subadults (10–20 cm), and adults (>20 cm). This classification, although somewhat arbitrary, is widely used in studies of tropical mangroves to distinguish individuals in early, intermediate, and mature growth phases. The results reveal marked differences between the species. *Avicennia marina* had 24 juveniles (mean DBH 7.0 cm) and 53 subadults (14.2 cm), but the population is largely dominated by adults (338 individuals;

Average DBH 61.2 cm; standard deviation 22.8 cm). This distribution suggests a more established mature tree stock, with some juvenile recruitment still taking place.

For *Ceriops tagal*, the three age groups were observed in a more balanced way: 97 young individuals (6.1 cm), 120 subadults (14.4 cm) and 413 adults (32.4 cm). This distribution indicates an active regeneration process and a population at different stages of growth, perhaps reflecting the ability of this species to colonize more internal or disturbed microhabitats of the mangrove. *Rhizophora mucronata* showed a significant contingent of adults (736 individuals; Average DBH 53.8 cm; standard deviation 20.2 cm) and a smaller group of subadults (82 individuals; 14.5 cm), with no record of individuals in the juvenile category. This pattern suggests a mature population, with more restricted recent recruitment, possibly conditioned by hydrodynamic or anthropogenic factors. Finally, *Sonneratia alba* had exclusively adult subjects (983 subjects; Average DBH 78.8 cm; standard deviation 34.2 cm), which denotes a population composed of large trees and potentially less dynamic in terms of natural regeneration, at least in the sampled stretch.

Table A7.6: Classification of individuals by age group (based on DBH) for each species.

Species	Age Group	No. of Individuals	Average DBH (cm)	Standard deviation (cm)
Avicennia marina	Youth (<10 cm)	24	7.00	1.47
	Subadult (10-20 cm)	53	14.19	2.59
	Adult (>20 cm)	338	61.24	22.81
Ceriops tagal)	Young	97	6.07	1.97
	Subadult	120	14.42	2.77
	Adult	413	32.43	7.71
Rhizophora mucronata	Subadult	82	14.46	2.97
	Adult	736	53.84	20.16
Sonneratia alba	Adult	983	78.76	34.20

The species *A. marina* presented the highest values of average biomass, reaching 4,263.07 kg per individual, with a standard deviation of 4,082.66 kg, reflecting a great variation in the size of the individuals. The values ranged from 8.81 kg to 13,646.18 kg, indicating the simultaneous presence of seedlings, medium-sized individuals and large-diameter trees capable of accumulating high amounts of biomass. *R. mucronata* also exhibited high mean biomass (4,062.36 kg per individual) and a considerable standard deviation (3,614.40 kg), with minimum and maximum values between 57.19 kg and 12,382.27 kg. On the other hand, the average biomass observed for *S. alba* was more moderate, reaching 1,208.75 kg (SD = 1,029.86 kg), ranging from 31.07 kg to 3,407.14 kg. The species *C. tagal* showed the lowest average values of above-ground biomass (866.33 kg, SD = 793.14 kg), ranging from only 3.30 kg to 2,719.82 kg. This result is consistent with the morphology of this species, characterized by relatively small trees and thinner trunks compared to *Avicennia marina* and *Rhizophora mucronata*.

When considering the total above-ground biomass (sum of all individuals of each species), it is shown that *Rhizophora mucronata* has the largest stock, with approximately 3,321 tons, reflecting both the high individual average biomass and the high number of individuals sampled. Next is *Avicennia marina* with about 1,768 tons, while *Sonneratia alba* contributes with 1,188 tons. *Ceriops tagal*, in turn, has the lowest stock, with approximately 546 tons.

Over all 66 survey plots within the full Project Area, the baseline above-ground biomass is calculated at 71.5 ton biomass / ha, equivalent to an above-ground carbon content of 33.6 tC/ha. It represents an average DBH of 5,5 cm, with an average above-ground biomass of 35.5 kg biomass per tree. By sharp contrast, in the MRA, the average DBH is 27.2 cm, with an average above-ground biomass of 644.8 kg biomass per tree. Hence, assuming an increase of the baseline DBH by factor 2 over a period of 30 years remains a conservative assumption that results in an expected climax above-ground biomass of 184.96 tC/ha. Based on the molar conversion ratio of 3.67, the sequestration rate over a period of 30 years, by comparing the baseline carbon content of the PA with the MRA, is thus calculated at 18.52 tCO2e/ha/yr.

In addition, SOC changes are calculated using AR-TOOL16: Tool for estimation of change in soil organic carbon stocks due to the implementation of A/R CDM project activities, Version 1.1. Based on §11 of the tool, considering uncertainties and inherent limitation of the precision of a factor-based estimation, the value of the rate of change of SOC stock is not accounted as more than 0.8 tC/ha/yr. Note that in a mangrove setting, huge amounts of carbon are stored in the soil pool (e.g. from 254 to 1530 tC/ha, Alongi, 2012), showing that a soil sequestration rate of 0.8 tC/ha/yr is extremely conservative.

Overall, the project area has the potential to generate 83 187 PVCs, over 179.49 ha and 30 years, which represents an average project sequestration rate of **15.4 tCO2e/ha/yr**.

Potential Leakage

Leakage may be defined as a reduction in carbon stocks or increase in greenhouse gas emissions outside a project area, as a result of project activities. We follow PU004 'Estimation of GHG emissions from leakage in Plan Vivo projects', which states that procedures in AR-TOOL04 v1.0 can be used to demonstrate the (in)significance of potential leakage emissions. According to AR-TOOL04 v1.0, the leakage emissions are considered "insignificant if their sum is lower than 5% of net anthropogenic removals by sinks". The key potential source of leakage from this project would be the hypothetical displacement of firewood cutting for cooking purpose towards neighbouring areas.

Firewood-using households make use of 2.9 kg of wood for the day (Mozambique Ministry of Energy, 2012). This is equivalent to ~5.3 kgCO2e per day per household, or 0.5 tCO2e per person per year, as according to the INDE (2019-2023), the District of Inhambane counts 3.9 people per household. Even if 100% of the firewood consumption in the project communities would be derived from the mangroves (*quod non*, this would be an extremely conservative assumption), these hypothetical leakage emissions would remain lower than 5% of net anthropogenic removals by sinks. For instance, the entire annual firewood consumption of the barrios 11 and 12 of Josina, with a total of 180 inhabitants, would amount to 90 tCO2e per year. This is equal to less than 1% of the net anthropogenic removals by sinks (i.e. 9038 tCO2e, see next page).

Uncertainty

AR-Tool14 states in §8.2: "Ex-ante estimation (projection) of carbon stock in tree biomass is not subjected to uncertainty control, although the project participants should use the best available data and models that apply to the project site and the tree species". It is therefore not necessary to control for estimation as described in PU005. Furthermore, a comparison of our results with publications in SCI-ranked scientific journals indicates that our carbon sequestration estimations (15.4 tCO2e/ha/yr) remain conservative for mangroves. As Donato et al. (2011) show, carbon storage of mangroves studied across the Indo-Pacific averaged 1023 tC/ha, the bulk (49%–98%) of which was stored in organic-rich sediments. In mangroves of western Micronesia (Yap and Palau), carbon storage varied from 479 (seaward) to 1385 (landward) tC/ha, of which 70% was stored in sediment (Kauffman et al., 2011). By comparison, our estimations are lower and more in line with a regional study of Jones et al. (2014) who estimate mature mangroves in Northern Madagascar have an average total carbon storage of 593.0 tC/ha (±47.1), though including SOC. Indeed, mangroves are extremely productive, with biomass production rates similar to tropical humid forests while most of the carbon is stored below-ground. The presence of dead roots serves as a nutrient conserving mechanism and rapid sediment accretion is responsible for accumulation of soil organic carbon.

For comparison, we list some carbon sequestration data of mangroves across the globe (Alongi, 2012).

Area	Dominant species	Age (years)	Total (tC/ha)	AGB (tC/ha)	BGB + soil (tC/ha)	Roots/AGB (tC/ha)	Roots (tC/ha)	Soil (tC/ha)	Soil depth (cm)
		80	2205	312	1893	NA	NA	NA	3800
Peninsular	*Rhizophora*	18	1117	193	924	NA	NA	NA	4000
Malaysia	*apiculata*	5	479	87	392	NA	NA	NA	2800
		6	1179	54	1125	NA	NA	NA	3400
Southern	*Rhizophora*	20	979	72	907	NA	NA	NA	2750
Vietnam	*apiculata*	35	1904	153	1752	NA	NA	NA	3600
		NA	619	64	555	2.0	130	425	1850
Southern	*Kandelia*	NA	391	43	348	2.2	94	254	1900
China	*candel*	NA	332	7	325	1.1	8	317	1175
	Avicennia marina	NA	437	24	413	NA	NA	NA	80
	Rhizophora stylosa	NA	703	19	684	NA	NA	NA	62
Indonesia	*Sonneratia caseolaris*	NA	654	28	626	NA	NA	NA	1450
	R. apiculata	25	808	138	670	1.0	142	528	1900
	R. apiculata	5	579	20	559	2.9	57	502	800
Southern Thailand	*Ceriops decandra*	3	600	29	571	4.4	127	444	1000
Western	*R. stylosa*	NA	863	115	621	1.1	127	621	1500
Australia	*A. marina*	NA	662	55	515	1.7	92	515	775
Queens-land, Australia	*R. stylosa*	NA	2139	297	1842	1.1	312	1530	3500

Expected Carbon Benefits

Expected Carbon Benefits Summary (derived from aboveground biomass and soil organic carbon)

Project Intervention	Initial carbon stock (tCO2e/ha)	Baseline Emissions (t CO_2e/ ha)	Project Emission (t CO_2e/ha)	Leakage Emissions (t CO_2e/ha)	Carbon Benefit (see Annex 6) (t CO_2e/ha)
Mangrove restoration	123.3	0	-643.7	0%	-643.7

Plan Vivo Certificate Potential

Project Intervention	Carbon Benefit (t CO_2e/ha)	Project Area (ha)	Total Carbon Benefit (t CO_2e)	Risk Buffer (t CO_2e/ha)	Achievement Reserve	Potential PVCs (t CO_2e)
Josina mangrove	643.7	114.37	73 620	20%	10%	53 006
Machavenga	643.7	51.08	32 880	20%	10%	23 674
Salela	643.7	14.04	9038	20%	10%	6507
TOTAL	643.7	179.49	115 538	20%	10%	**83 187**

Monitoring

1) Biomass survey

The fieldwork is a crucial component of the assessment and focused on the collection of mangrove structural and biomass data. In each sampling area, a 10m x 10m plot was established, randomly placed in the mapped zones. To avoid the edge effect, the plots were positioned at least 5 meters from the shoreline. The evaluation of the mangrove structure consisted of estimating the height of the trees and measuring the diameter at breast height (DBH) for all trees with a diameter greater than 2.5 cm, using a tape measure. In the same sequence, the mangrove species within each plot were identified to evaluate the composition, diversity and density of species. Additionally, regenerating plants were sampled in sub-plots of $1m^2$ (1m x 1m).

Figure A7: Process of establishing the 100m² plots (10m x 10m)

2) Above-ground biomass

The data analysis consists of calculating the parameters described in the data (frequencies, averages and dispersion) for each indicator collected, as well as the calculation of biomass and carbon stock as well as basal area, tree density, species diversity and biomass per unit area. According to the AR-TOOL14-4.2, the allometric equation applied to a tree species must be preferably selected from existing data applicable to the local situation (e.g. represented by similar ecological conditions). A typical equation for above-ground biomass (AGB) is:

$$AGB = 0.251 \rho D^{2.46}$$

Where ρ represents the density of the wood (g/cm^3) and D denotes the DBH (cm). The biomass was based on the use of wood densities of mangrove species that occur worldwide (Avicennia marina – 0.670 g/cm^3; Sonneratia alba – 0.078 g/cm^3; Ceriops tagal - g/cm^3; Rhizophora mucronata – 0.790 g/cm^3), as suggested by Kauffman and Donatto (2012) and Tang et al., (2015) cited by Litulo et al., (2023).

Biomass estimates can then be converted to carbon stock using a standard conversion factor, in this case 0.47 for tropical trees (Stringet et al., 2015).

3) Below-ground biomass

According to the AR-TOOL14-4.2, root-shoot ratios must be applied for estimating below-ground biomass. We use the root-shoot ratio calibrated for tidal marshes, developed by Mokany et al. (2006).

4) Re-measurement of the sample plots over time

Every 5 years, the project will perform a direct estimation of change by measurement of the fixed survey plots of 100 m² within the project areas, in line with AR-TOOL14 §6.2, to re-calibrate the sequestration rates. The minimum number of survey plots required is calculated using the Winrock Sample Plot Calculator.

Annex A7F: Application of A/R TOOL04

In the table below, an overview is presented of the carbon pools carbon pool decreases, and project emissions.

Pools or emission sources	Type of pool or emission source	Included?	CO2eq Pools or emission (t/ha)	relative contributions
Carbon pools	Soil organic carbon	Yes: soil organic carbon is an important pool for carbon sequestration in mangroves	643.7 tCO2/ha	
	Above-ground biomass	Yes: above-ground biomass is a major pool for carbon sequestration in mangroves, to be considered and quantified		
	Below-ground biomass	Yes: this is a potentially significant pool to be considered for mangroves		
	Non-tree biomass	No: Non-tree biomass and grasses are not included as carbon pools in the above-ground biomass estimations	Herbaceous: 7.08 tCO2/ha Pneumatophores: 0.77 tCO2/ha Total: 7.85 tCO2/ha	
	Dead wood and litter	No: conservatively excluded	Dead trees: 6.24 tCO2/ha Litter: 5.1 tCO2/ha Total = 11.34 tCO2/ha	
Project emission sources	Project gasoline use	No: the effect is negligible	0.57tCO2/ha	0.57/24.18 = 2.36%
Leakage emissions	Displacement of firewood cutting	No: the effect is negligible	23.61 tCO2/ha	23.61/24.18 = 97.64%

Calculations and sources:

Type of pool or emission source	Value	Calculation	Source

Soil organic carbon	tCO2/ha	0.8tC*30*3,67 = 88 tCO2/ha	PDD – Annex7
Above-ground & Below-ground biomass	643.7 tCO2/ha	/	PDD – Annex7
Non-tree biomass	7.85 tCO2/ha	Herbaceous: 1.93tC/ha *3.67 =7.08tCO2/ha Pneumatophores: 0.21 tC/ha *3.67 = 0.77 tCO2/ha Total: 7.85 tCO2/ha	Sitoe, A. A., Mandlate, L. J. C., & Guedes, B. S. (2014). Biomass and Carbon Stocks of Sofala Bay Mangrove Forests. *Forests*, *5*(8), 1967-1981. https://doi.org/10.3390/f5081967
Dead wood and litter	11.34 tCO2/ha	Dead trees: 1.7 tC/ha *3.67 = 6.24 tCO2/ha Litter: 1.39 tC/ha*3.67 = 5.1 tCO2/ha Total = 11.34 tCO2/ha	Sitoe, A. A., Mandlate, L. J. C., & Guedes, B. S. (2014). Biomass and Carbon Stocks of Sofala Bay Mangrove Forests. *Forests*, *5*(8), 1967-1981. https://doi.org/10.3390/f5081967
Project gasoline use	0.57tCO2/ha	The project will use an estimated 93600L of gasoline° over 30years 93600L *2.24kg CO2/L = 209.66 tCO2/369ha= 0.57tCO2/ha	°based on the estimations of project region of Chibabava Conversion factor derived from ADEME Base Carbone®v8.4
Displacement of firewood cutting	23.61 tCO2/ha	Annual firewood consumption of the barrios 11 and 12 of Josina, with a total of 180 inhabitants, would amount to 90 tCO2e per year. Over 30 years, taken into account a project area of 114.37 ha this would equal: (90 tCO2e x30)/ 114.37ha= 23.61 tCO2/ha	Baseline measurements – PDD – Annex7

Step 6 & 7: Rank the emissions or carbon pool decreases in descending order & make the cumulative sum until threshold of 0.95 is reached. Mark all these sources.

Rank	**Emission**	**Relative Contribution to GHG emission or carbon pool decrease**
1	Displacement of firewood cutting	97.64%
2	Project gasoline use	2.36%

Step 8: the sum of decreases in carbon pools or increase in emissions shall be less than 5% of the net removals by sink:

Calculation: (23.61tCO2/ha / (643.7 tCO2/ha))*100 = 3.67%

Conclusion: The project emissions, carbon pool decreases and leakage emissions are less than 5% of the net removals by sink and are therefore insignificant and can be neglected.

Annex 8 – Exclusion List

Activities	Included in Project ('Yes' or 'No')
1. Any project activities leading to or requiring the destruction [1] of critical habitat [2] or any forestry project which does not implement a plan for improvement and/or sustainable management.	☐ Yes ☒ No
2. Any activity which could be associated with the significant impairment of areas particularly worthy of protection of cultural heritage (without adequate compensation in accordance with international standards).	☐ Yes ☒ No
3. Trade in animals, plants or any natural products not complying with the provisions of the CITES/Washington convention [3].	☐ Yes ☒ No
4. Destructive fishing methods or drift net fishing with a net more than 2.5 km in length, explosives and/or poison.	☐ Yes ☒ No
5. Large-scale commercial logging operations for use in primary tropical moist forest.	☐ Yes ☒ No
6. Production or trade in wood or other forestry products other than from sustainably managed forests [4].	☐ Yes ☒ No
7. Exploitation of diamond mines and marketing of diamonds where the host country has not adhered to the Kimberley Process.	☐ Yes ☒ No
8. Activities involving harmful or exploitative forms of forced labour [5] or harmful child labour [6].	☐ Yes ☒ No
9. Projects that include involuntary physical displacement and/or forced eviction.	☐ Yes ☒ No

10. Production or activities that encroach on lands owned, or claimed or occupied by Indigenous Peoples, without full documented consent of such peoples.	☐ Yes ☒ No
11. Harmful and unsafe production, use, sale or trade of pharmaceuticals, ozone layer depleting substances [10], and other toxic [11] or dangerous materials such as asbestos or products containing PCB's [12], wildlife or products regulated under CITES, including all products that are banned or are being progressively phased out internationally	☐ Yes ☒ No
12. Production or trade of arms, ammunition, weaponry, controversial weapons, or components thereof (e.g., nuclear weapons and radioactive ammunition, biological and chemical weapons of mass destruction, cluster bombs, anti - personnel mines, enriched uranium).	☐ Yes ☒ No
13. Procurement and use of firearms.	☐ Yes ☒ No
14. Provision of finances to military institutions involved in conservation or security activities.	☐ Yes ☒ No
15. Production or trade of strong alcohol intended for human consumption or other alcoholic beverages (excluding beer and wine).	☐ Yes ☒ No
16. Production or trade of tobacco and other drugs	☐ Yes ☒ No
17. Gambling, gaming establishments, casinos or any equivalent enterprises and undertaking [10].	☐ Yes ☒ No
18. Any trade related to pornography or prostitution.	☐ Yes ☒ No
19. Production or trade in radioactive material. This does not apply to the procurement of medical equipment, quality control equipment or other application for which the radioactive source is insignificant and/or adequately shielded	☐ Yes ☒ No

20. Production or trade in unbound asbestos. This does not apply to the purchase or use of cement linings with bound asbestos and an asbestos content of less than 20%.	☐ Yes ☒ No
21. Production, trade, storage, or transport of significant volumes of hazardous chemicals, or commercial scale usage of hazardous chemicals. Hazardous chemicals include gasoline, kerosene, and other petroleum products.	☐ Yes ☒ No
22. Transboundary trade in wastes, except for those accepted by the Basel Convention and its underlying regulations [11].	☐ Yes ☒ No
23. Any activity leading to an irreversible modification or significant displacement of an element of culturally critical heritage [12].	☐ Yes ☒ No
24. Production and distribution, or investment in, media that are racist, antidemocratic or that advocate discrimination against a part of the population.	☐ Yes ☒ No
25. Projects involving the planting or introduction of invasive species	☐ Yes ☒ No
26. Projects that increase the dependency of primary participants and other stakeholders on fossil fuels.	☐ Yes ☒ No

Notes:

[1] Destruction means (1) the elimination or severe reduction in the integrity of a habitat/area caused by a major and long-term/prolonged change in land-use or water resources or (2) the modification of a habitat such that this habitat's ability to fulfil its function/ role is lost.

[2] The term critical habitat encompasses natural and modified habitats that deserve particular attention. This term includes (1) spaces with high biodiversity value as defined in the IUCN's classification criteria, including, in particular, habitats required for the survival of endangered species as defined by the IUCN's red list of threatened species or by any national legislation; (2) spaces with a particular importance for endemic species or whose geographical range is limited;

(3) critical sites for the survival of migratory species; (4) spaces welcoming a significant number of individuals from congregatory species; (5) spaces presenting unique assemblages of species or containing species which are associated according to key evolution processes or which fulfil key ecosystem services; (6) and territories with socially, economically or culturally significant biodiversity for local communities. Primary forests or high conservation value forests must also be considered as critical habitats

[3] https://cites.org/eng/disc/text.php

[4] Sustainably managed forests are forests managed in a way that balances ecological, economic and socio-cultural needs.

[5] Forced labour means all work or service, not voluntarily performed, that is extracted from an individual under threat of force or penalty.

[6] Harmful child labour means the employment of children that is economically exploitive, or is likely to be hazardous to, or to interfere with, the child's education, or to be harmful to the child's health, or physical, mental, spiritual, moral, or social development. Employees must be at least 14 years of age, as defined in the ILO's Declaration on the Fundamental Principles and Rights at Work (C138 – Minimum Age Convention, Article 2), unless local laws require compulsory school attendance or a minimum working age. In such circumstances, the highest age requirement must be used.

[7] Any chemical component which reacts with, and destroys, the stratospheric ozone layer leading to the formation of holes in this layer. The Montreal Protocol lists Ozone Depleting Substances (ODS), their reduction targets and deadlines for phasing them out

[8] Including substances included under the Rotterdam Convention, Stockholm Convention and WHO "Pharmaceuticals: Restrictions in Use and Availability".

[9] PCBs (polychlorinated biphenyls) are a group of highly toxic chemical products that may be found in oil-filled electrical transformers, capacitors and switchgear dating from 1950 to 1985.

[10] Any direct financing of these projects or activities involving them (for example, a hotel including a casino). Urban improvement plans which could subsequently incorporate such projects are not affected.

[11] Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their disposal (1989).

[12] "Critical cultural heritage" is considered as any heritage element recognised internationally or nationally as being of historical, social and/or cultural interest.

PLAN VIVO

Annex 9 - Environmental and Social Screening Report

SECTION A: PROJECT INFORMATION			
Project title:	Kukumuty		
Project coordinator:	Climate Lab		
Country:	Mozambique		
Geography/ landscape:	Miombo woodland restoration & Mangrove restoration		
Project summary:	The project aims to strengthen climate resilience and improve rural livelihoods in the Chibabava and Inhambane Districts by restoring degraded Miombo woodlands and mangrove ecosystems. Using a landscape-based approach, the project supports the enrichment of Miombo areas through soil and fire management and the planting of native tree species, the establishment of agroforestry plots to diversify income, and the sustainable harvesting of Miombo products such as grasses, honey, and fruits. Along the coast, the project rehabilitates mangroves in collaboration with Community Fisheries Councils (CCPs) to enhance fisheries productivity and protect farmland. Across both landscapes, activities focus on increasing biodiversity, boosting carbon sequestration, and strengthening community-based governance and monitoring systems to ensure long-term ecological and livelihood benefits.		
Name and role of project coordinator staff member filling this questionnaire:	Sil Lanckriet, project leader of Kukumuty		
SECTION B: POTENTIAL E&S RISKS AND IMPACTS			
Topic	**Question**	**Project coordinator response**	**E&S reviewer comments**
Vulnerable Groups	Are there vulnerable or disadvantaged groups or individuals, including people	The populations of Chibabava District can be largely considered	Agree

	with disabilities (consider also landless groups, lower income groups less able to cope with livelihood shocks/ stresses) in the project area, and are their livelihood conditions well understood by the project?	as economically marginalized and politically disadvantaged in relation to those working in urban centres of Sofala and Maputo provinces. Within these populations, women and youth-headed households are particularly vulnerable because of their reliance on subsistence cultivation and very limited income generation opportunities in the area. The population in Inhambane District experiences significant income disparities, with many people still living below the poverty line. Female-headed households are particularly vulnerable, relying heavily on crab and shrimp fishing for their livelihoods.	

	Is there a risk that project activities disproportionately affect vulnerable groups, due to their vulnerability status?	Possibly, if these lower income groups would be underrepresented during decision-making events at Subcomité and CCP meetings. ,	Reviewer comments
	Is there a risk that the project discriminates against vulnerable groups, for example regarding access to project services or benefits and decision-making?	No, vulnerable groups are included in the participatory consultations (§2.5 of the PDD).	Reviewer comments
E&S reviewer conclusions Estimated likelihood of risks (1-5) & justification: Reviewer conclusions Estimated magnitude of risks (1-5) & justification: Reviewer conclusions Risk significance: Reviewer conclusions			
Gender equality	Is there a risk of adverse gender impacts due to the project/ project activities, including for example discrimination or creation/exacerbation or perpetuation of gender-related inequalities?	Possibly, if a perpetuation of gender-related inequality occurs, e.g. when women would be underrepresented during decision-making events at Subcomité and CCP meetings.	Reviewer comments
	Is there a risk that project activities will result in adverse impacts on the situation of women or girls, including their rights and livelihoods? Consider	No, women are included in the participatory consultations and gender parity is safeguarded during Subcomité and CCP decisions (§2.5 of the PDD).	Reviewer comments

	for example where access restrictions disproportionately affect women and girls due to their roles and positions in accessing environmental goods and services?		
	Is there a risk that project activities could cause or contribute to gender-based violence, including risks of sexual exploitation, sexual abuse or sexual harassment (SEAH)? Consider partner and collaborating partner organizations and policies they have in place. Please describe.	No, project partners follow the Mozambican law and signed an ethical charter that is based on respecting the Charter of Fundamental Rights (ratified 7 December 2000).	Reviewer comments
E&S reviewer conclusions Estimated likelihood of risks (1-5) & justification: Reviewer conclusions Estimated magnitude of risks (1-5) & justification: Reviewer conclusions Risk significance: Reviewer conclusions			
Human Rights	Is there a risk that the project prevents peoples from fulfilling their economic or social rights, such as the right to life, the right to self-determination, cultural survival, health, work, water and adequate standard of living?	No, project partners follow the Mozambican law and signed an ethical charter that is based on respecting the Charter of Fundamental Rights (ratified 7 December 2000).	Reviewer comments

	Is there a risk that the project prevents peoples from enjoying their procedural rights, for example through exclusion of individuals or groups from participating in decisions affecting them?	Possibly, if vulnerable individuals would not be present during decision-making by Subcomité and CCP meetings	Reviewer comments
	Are you aware of any severe human rights violations linked to project partners in the last 5 years?	No, project partners follow the Mozambican law and signed an ethical charter that is based on respecting the Charter of Fundamental Rights (ratified 7 December 2000)	Reviewer comments
E&S reviewer conclusions Estimated likelihood of risks (1-5) & justification: Reviewer conclusions Estimated magnitude of risks (1-5) & justification: Reviewer conclusions Risk significance: Reviewer conclusions			
Community, Health, Safety & Security	Is there a risk of exacerbating existing social and stakeholder conflicts through the implementation of project activities? Consider for example existing conflicts over land or natural resources, between communities and the state.	In the Chibabava region there is a risk of conflicts arising within and between communities regarding restriction of hunting, agricultural, pastoral or harvesting activities in the project areas – although such risk of potential conflicts regarding land tenure is low if a DUAT is in place. In the Inhambane region there is a risk of conflict arising within and	Reviewer comments

		between communities regarding the prohibition of mangrove cutting and illegal fishing although such risk over natural resources is low with the strengthening of the CCPs.	
	Does the project provide support (technical, material, financial) to law enforcement activities? Consider support to government agencies and to Community Rangers or members conducting monitoring and patrolling. If so, is there a risk that these activities will harm communities or personnel involved in monitoring and patrolling?	In the Chibabava region the project does not work with law enforcers. In the Inhambane region, the project works in close partnership with governmental agencies through the CCPs, which are responsible for reporting any unresolved issues to these institutions. However, this collaboration does not involve any actions that could cause harm to communities or to the personnel involved in monitoring and patrolling.	Reviewer comments
	Are there any other activities that could adversely affect community health and safety? Consider for example exacerbating human-wildlife conflict, affecting provisioning ecosystem services, and transmission of diseases.	In the Chibabava region, none of the project activities negatively affect community health and safety. In the Inhambane region, none of the project activities negatively affect community health and safety. The only risks are related to	Reviewer comments

		conflicts arising from illegal cutting and fishing.	
E&S reviewer conclusions Estimated likelihood of risks (1-5) & justification: Reviewer conclusions Estimated magnitude of risks (1-5) & justification: Reviewer conclusions Risk significance: Reviewer conclusions			
Labour and working conditions	Is there a risk that the project, including project partners, would lead to working conditions for project workers[1] that are not aligned with national labour laws or the International Labor Organization's (ILO) Declaration on the Fundamental Principles and Rights at Work (discriminatory working conditions, lack of equal opportunity, lack of clear employment terms, failure to prevent harassment or exploitation, failure to ensure freedom of association etc.)?	No risk, as the project will at all times align with national labour laws	Reviewer comments

[1] Project workers include project coordinator staff, staff of other project partners, third party groups fulfilling core functions of the project, and community volunteers or contracted workers.

	Is there an occupational health and safety risk to project workers while completing project activities?	No, project partners follow the Mozambican law and signed an ethical charter that is based on respecting the Charter of Fundamental Rights (ratified 7 December 2000)	Reviewer comments
	Is there a risk that the project support or be linked to forced labour, harmful child labour, or any other damaging forms of labour?	No, project partners follow the Mozambican law and signed an ethical charter that is based on respecting the Charter of Fundamental Rights (ratified 7 December 2000)	Reviewer comments
E&S reviewer conclusions Estimated likelihood of risks (1-5) & justification: Reviewer conclusions Estimated magnitude of risks (1-5) & justification: Reviewer conclusions Risk significance: Reviewer conclusions			
Resource efficiency, pollution, wastes, chemicals and GHG emissions	Is there a risk that project activities might lead to releasing pollutants to the environment, cause significant amounts of waste or hazardous waste or materials?	No risk, as no pollutants are used	Reviewer comments
	Is there a risk that the project will lead to significant consumption of energy, water or other resources, or lead to significant increases of greenhouse gases?	No, project GHG emissions are negligible	Reviewer comments

E&S reviewer conclusions Estimated likelihood of risks (1-5) & justification: Reviewer conclusions Estimated magnitude of risks (1-5) & justification: Reviewer conclusions Risk significance: Reviewer conclusions			
Access restrictions and livelihoods	Will the project include activities that could restrict peoples' access to land or natural resources where they have recognised rights (customary, and legal). Consider projects that introduce new access restrictions (e.g. creation of a community forest), reinforce existing access restrictions (e.g. improve management effectiveness and patrolling of a community forest), or alter the way that land and natural resource access restrictions are decided (e.g. through introducing formal management such as co-management).	In the Chibabava region, there is a risk of conflicts arising within and between communities regarding restriction of hunting, agricultural, pastoral or harvesting activities in the project areas – although such risk of potential conflicts regarding land tenure is low if a DUAT is in place. In the Inhambane region, mangrove cutting is already legally prohibited. The project will reinforce these existing restrictions through the CCPs.	Reviewer comments
	Is there a risk that the access restrictions introduced /reinforced/altered by the project will negatively affect peoples' livelihoods?	In the Chibabava region, there is a risk of conflicts arising within and between communities regarding restriction of hunting, agricultural, pastoral or harvesting activities in the project areas –	Reviewer comments

		although such risk of potential conflicts regarding land tenure is low if a DUAT is in place. In the Inhambane region there is a risk of conflict arising within and between communities regarding the prohibition of mangrove cutting and illegal fishing although such risk over natural resources is low with the strengthening of the CCPs.	
	Have strategies to avoid, minimise and compensate for these negative impacts been identified and planned?	Negative impacts are minimized through participatory decision-making within the subcommittees and CCPs, community awareness activities, and the promotion of sustainable livelihood practices. Strengthening community stewardship to reduce conflict and livelihood risks.	Reviewer comments
E&S reviewer conclusions Estimated likelihood of risks (1-5) & justification: Reviewer conclusions Estimated magnitude of risks (1-5) & justification: Reviewer conclusions Risk significance: Reviewer conclusions			
Cultural heritage	Is the Project Area officially designated or proposed as a cultural site, including international and national designations?	No, the project area does not include any officially designated or proposed cultural sites	Reviewer comments

	Does the project site potentially include important physical cultural resources, including burial sites and monuments, or natural features or resources of cultural significance (e.g. sacred sites and species, ceremonial areas) and is there risk that the project will negatively impact this cultural heritage?	No, the project area does not include any sacred sites	Reviewer comments
	Is there a risk that the project will negatively impact intangible cultural heritage? Consider for example cultural practices, social and cultural norms in relation to land and natural resources.	No, the project area does not include any sacred sites	Reviewer comments
E&S reviewer conclusions Estimated likelihood of risks (1-5) & justification: Reviewer conclusions Estimated magnitude of risks (1-5) & justification: Reviewer conclusions Risk significance: Reviewer conclusions			
Indigenous Peoples	Are there Indigenous Peoples[2] living within the Project Area, using the land	In the Chibabava region, the project works with rural	Reviewer comments

[2] As per the IUCN Environmental and Social Management System, Indigenous Peoples include: "(i) peoples who identify themselves as "indigenous" in strict sense; (ii) tribal peoples whose social, cultural, and economic conditions distinguish them from other sections of the national community, and whose status is regulated wholly or partially by their own customs or traditions or by special laws or regulations; and (iii) traditional peoples not necessarily called indigenous or tribal but who share the same characteristics of social, cultural, and economic

	or natural resources within the project area, or with claims to land or territory within the Project Area?	households in the Mangunde Regulado. Most households rely on a combination of subsistence, cash crop production and seasonal labour migration. Most people speak Ndau/Chindau and may insist on their cultural traditions. In the Inhambane region, participants do not live inside the project area but rather next to it. The mangroves are classified as *Áreas de Conservação Comunitária* according to Article 22 of Law 5/2017 (11 May 2017).	
	Is there a risk that the project negatively affects Indigenous Peoples through economic displacement, negatively affects their rights (including right to FPIC), their self-determination, or any other social or cultural impacts?	The project poses no risk of negatively affecting Indigenous Peoples, as they will be well represented within the subcommittees and CCPs.	Reviewer comments
	Is there a risk that there is inadequate consultation of Indigenous Peoples, and/or that the project does not seek	Possibly, if the Ndau/Chindau or Gitonga traditions would not be involved nor respected in the project	Reviewer comments

conditions that distinguish them from other sections of the national community, whose status is regulated wholly or partially by their own customs or traditions, and whose livelihoods are closely connected to ecosystems and their goods and services" (IUCN 2016).

	the FPIC of Indigenous Peoples, for example leading to lack of benefits or inappropriate activities?		
E&S reviewer conclusions Estimated likelihood of risks (1-5) & justification: Reviewer conclusions Estimated magnitude of risks (1-5) & justification: Reviewer conclusions Risk significance: Reviewer conclusions			
Biodiversity and sustainable use of natural resources	Is there a risk that project activities will cause adverse impacts on biodiversity (both in areas of high biodiversity value, and outside of these areas) or the functioning of ecosystems? Consider issues such as use of pesticides, construction, fencing, disturbance etc.	In the Chibabava region, possibly since several agroforestry species are not native to Mozambique (nevertheless these are "naturalized") In the Inhambane region, no significant risk is expected, as the project does not introduce invasive species. All species used are native or long-established, naturalized species that are commonly used in local restoration practices and pose no invasion risk.	Reviewer comments
	Is there a risk that the project will introduce non-native species or invasive species?	In the Chibabava region, possibly since several agroforestry species are not native to Mozambique (nevertheless these are "naturalized") In the Inhambane region, no significant risk is expected, as the	Reviewer comments

		project does not introduce invasive species. All species used are native or long-established, naturalized species that are commonly used in local restoration practices and pose no invasion risk.	
	Is there a risk that the project will lead to the unsustainable use of natural resources? Consider for example projects promoting value chains and natural resource-based livelihoods.	No , as the project promotes the sustainable use of natural resources through community-based management, strengthened subcommittees and CCPs, awareness-raising activities, and trainings facilitated by natural resources experts.	Reviewer comments
E&S reviewer conclusions Estimated likelihood of risks (1-5) & justification: Estimated magnitude of risks (1-5) & justification: Risk significance:			
Land tenure conflicts	Has the land tenure and use rights in the project area been assessed and understood?	Yes	Reviewer comments
	Is there a risk that project activities will exacerbate any existing land tenure conflicts, or lead to land tenure or use right conflicts?	In the Chibabava region, there is a risk of conflicts arising within and between communities regarding restriction of hunting, agricultural, pastoral or harvesting activities in the project areas, although such risk of potential conflicts regarding	Reviewer comments

		land tenure is low if a DUAT is in place. In the Inhambane region, there are no risks as mangroves are classified as *Áreas de Conservação Comunitária* according to Article 22 of Law 5/2017 (11 May 2017).	
E&S reviewer conclusions Estimated likelihood of risks (1-5) & justification: Reviewer conclusions Estimated magnitude of risks (1-5) & justification: Reviewer conclusions Risk significance: Reviewer conclusions			
Risk of not accounting for climate change	Have trends in climate variability in the project areas been assessed and understood?	Yes, see §3	Reviewer comments
	Has the climate vulnerability of communities and particular social groups been assessed and understood?	Yes, see §3	Reviewer comments
	Is there a risk that climate variability and changes might influence the effectiveness of project activities (e.g. undermine project-supported livelihood activities) or increase community exposure to climate variation and hazards? Consider floods,	Possibly, given the predicted vulnerability of Sofala and Inhambane to hydroclimatic changes (e.g. cyclones and drought)	Reviewer comments

	droughts, wildfires, landslides, cyclones, etc.		
E&S reviewer conclusions Estimated likelihood of risks (1-5) & justification: Reviewer conclusions Estimated magnitude of risks (1-5) & justification: Reviewer conclusions Risk significance: Reviewer conclusions			
Other – e.g. cumulative impacts	Is there a risk that the project will contribute cumulatively to existing environmental or social risks or impacts, for example through introducing new access restrictions in a landscape with existing restrictions and limited land availability?	Possibly, there may be the risk of displacement of degradation towards adjacent areas (addressed in the techspec as leakage risk)	Reviewer comments
	Are there any other environmental and social risks worthy of note that are not covered by the topics and questions above?	Possibly, there may be the risk of displacement of degradation towards adjacent areas (addressed in the techspec as leakage risk)	Reviewer comments
E&S reviewer conclusions Estimated likelihood of risks (1-5) & justification: Reviewer conclusions Estimated magnitude of risks (1-5) & justification: Reviewer conclusions Risk significance: Reviewer conclusions			
SECTION C: SAFEGUARD PROVISIONS			

Stakeholder engagement	Has a stakeholder analysis been conducted that has identified all stakeholders that could influence or be affected by the project, or is this still to be completed? Please describe.	Stakeholder analysis was conducted, see §2.1	Reviewer comments
	Are the local community and indigenous peoples statutory or customary rights to land or resources within the project area already clear and documented, or is further assessment required? Please describe.	Yes, all project lands were covered by DUAT and CCPs managing the respective áreas de conservação comunitária (art. 22 of Law 5/2017 dd. 11 May 2017), see §1.2.2	Reviewer comments
	Are local governance structures and decision-making processes described and understood (including details of the involvement of women and marginalized or vulnerable groups), or is further assessment required? Please describe.	Yes, the project governance structure is based on the "Subcomité" or "Committee", and CCPS (Community Fisheries Councils), see §1.2.2	Reviewer comments
	Are past or ongoing disputes over land or resources in the project area known and documented, or is there need for further assessment? Please describe.	Yes, we refer to §2.1.3 of the PDD: Disputed Land or Resources	Reviewer comments

Stakeholder consultation	Does the project have a Stakeholder Engagement Plan with clear measures to engage Vulnerable Groups, or is this plan still to be developed? Please describe.	Yes, we refer to § 2.5.2 of the PDD: Stakeholder Engagement Plan	Reviewer comments
	Has the Project Coordinator informed all stakeholders of the project, through providing relevant project information in an accessible format, or does this still need to be completed? Please describe.	Yes, we refer to § 2.6.2 and § 2.6.3 of the PDD: FPIC Process & Initial FPIC and DUAT	Reviewer comments
Free, Prior and Informed Consent	Has the project analysed and understood national and international requirements for Free Prior and Informed Consent (FPIC)? Please describe.	Yes, we refer to § 2.6.2 and § 2.6.3 of the PDD: FPIC Process & Initial FPIC	Reviewer comments
	Has the project identified potential FPIC rightsholders and potential representatives in local communities and among indigenous peoples, or is this still to be completed? Please describe.	Yes, we refer to § 2.6.2 and § 2.6.3 of the PDD: FPIC Process & Initial FPIC	Reviewer comments
	Has the project worked with rightsholders and representatives of	Yes, we refer to § 2.6.2 of the PDD: FPIC Process and DUAT	Reviewer comments

	local communities and indigenous peoples to understand the local decision-making process and timeline (ensuring involvement of women and vulnerable groups), or is this still to be completed? Please describe.		
	Has the project sought consent from communities to 'consider the proposed Project', and if so, where is this in principle consent documented? Please describe.	Yes, we refer to § 2.6.2 and § 2.6.3 of the PDD: FPIC Process & Initial FPIC	Reviewer comments
Grievance Mechanism	Does the project already have a Grievance Mechanism, or is this still to be established? Please describe.	Yes, we refer to § 3.17 of the PDD: Grievance Mechanism	Reviewer comments
	For projects with a GRM, is this accessible to project affected people? Please describe.	Yes, we refer to § 3.17 of the PDD: Grievance Mechanism	Reviewer comments
E&S reviewer conclusions for safeguard provisions Are the project Safeguard Provisions adequately addressed, or to be adequately addressed during the project design phase? Reviewer conclusions What additional actions need to be conducted during the project design phase? Reviewer conclusions Any other comments: Reviewer conclusions			
SECTION D: SCREENING REPORT (E&S REVIEWER TO COMPLETE)			
Name of E&S reviewer			

<table>
<tr><td>Date of E&S screening:</td><td></td></tr>
<tr><td>Project risk rating:</td><td>Include the project risk rating and a clear justification</td></tr>
<tr><td>Principle risks and impacts</td><td>Include summary of key project risks & impacts
Populate summary table with risk significance
<table>
<tr><th>E&S topic/ risk area</th><th>Likelihood (1-5)</th><th>Magnitude (1-5)</th><th>Significance (low, moderate, severe, high)</th></tr>
<tr><td>Vulnerable Groups</td><td></td><td></td><td></td></tr>
<tr><td>Gender equality</td><td></td><td></td><td></td></tr>
<tr><td>Human Rights</td><td></td><td></td><td></td></tr>
<tr><td>Community, Health, Safety & Security</td><td></td><td></td><td></td></tr>
<tr><td>Labour and working conditions</td><td></td><td></td><td></td></tr>
<tr><td>Resource efficiency, pollution, wastes, chemicals and GHG emissions</td><td></td><td></td><td></td></tr>
<tr><td>Access restrictions and livelihoods</td><td></td><td></td><td></td></tr>
<tr><td>Cultural heritage</td><td></td><td></td><td></td></tr>
<tr><td>Indigenous Peoples</td><td></td><td></td><td></td></tr>
<tr><td>Biodiversity and sustainable use of natural resources</td><td></td><td></td><td></td></tr>
<tr><td>Land tenure conflicts</td><td></td><td></td><td></td></tr>
<tr><td>Risk of not accounting for climate change</td><td></td><td></td><td></td></tr>
<tr><td>Other – e.g. cumulative impacts</td><td></td><td></td><td></td></tr>
</table></td></tr>
<tr><td>E&S assessment required</td><td>Summarise the type of E&S assessment required, and provide recommendations on the scope of the E&S assessment, including the key areas of likely focus</td></tr>
</table>

Likely safeguard plans required	Indicate if the ESMP section of the PDD will likely be necessary, and any other safeguard plans that could be relevant to the project; justify & explain

Annex 10 – Environmental and Social Assessment Report

Introduction:

This Environmental and Social Assessment (ESA) was conducted for the Chibabava project region (November 2023) and the Inhambane project region (July 2025) to identify and evaluate the key environmental and social risks associated with restoration activities across all participating communities. It also captures community-driven perspectives on how these risks can be effectively mitigated.

The ESA serves as the foundation for the Environmental and Social Management Plan (ESMP) developed for each project region. Together, the two ESMPs guide project partners and community institutions in the responsible implementation, continuous monitoring, and adaptive management of the project throughout its lifespan.

Project Background

For a full description of the project aim, objectives, activities, governance structure, timelines, and partnerships, please refer to Sections 1–3.

Social and environmental Context

For a detailed characterization of the socioeconomic and environmental context including livelihood systems, demographic patterns, gender dynamics, natural resource use, degradation drivers, and ecological baselines, please refer to Sections 3.3–3.4.

1- Chibabava Project Region

Methodology: Community-level Risk Assessment

Communal risk-identification meetings were held in Mangunde and Nhamue on 3, 6, and 9 November 2023. In Mangunde, 10 participants joined the session on 9 November, while in Nhamue, 18 participants attended the meetings on 3 and 6 November. Using the model outlined below, participants discussed the main risk areas and jointly defined appropriate mitigation measures. The discussions highlighted that risks such as elite capture, access restrictions, fire, and climate impacts can be effectively mitigated through inclusive communication, transparent participant rotation, livelihood-support measures, and integrated fire-management and climate-resilience strategies.

Community discussion

Key areas of risk	Community discussion on the importance of risk?	Measures to reduce this risk?
Vulnerable groups: How do you assess the potential costs and benefits of the project and how to ensure representation of vulnerable groups and the poor throughout project design and development? How to avoid benefit capture of the local elite?	It was mentioned that there is a risk of local elite benefit capture, in the sense that community leaders may focus on friends and family for invitations for project activities, or as members of the subcomité.	To include all community members, it is suggested to *decentralise invitations* (i.e. not only by the leader, but also by the project team) and to communicate earlier on upcoming project activities so the news can spread. The project should keep records of community members participating in project activities and use a *smart rotation system* to achieve broad inclusion of the community in the project.
Women: How to assess the potential project costs and benefits for women, and to ensure women's representation throughout project design and development?	Mentioned as insignificant.	Gender parity is safeguarded in the project design (through the hard quorum of 50% female participation).
How to assess the potential costs and benefits of access restrictions (in proposed planting areas)?	There is a risk of deforestation, because the people need construction wood, grass, space for machambas, open new areas to construct new houses or use fires when hunting or to create fresh grazing lands.	Freely distributing tree seedlings and/or seeds for direct seeding of important timber wood species to be planted in individual or communal woodlots. Grass cut-and-carry system (see further) Valorising non-timber forest products and particularly supporting honey production in the Miombo project areas. Established bee-hives in the project area would provide livelihood benefits and function as natural defenders of the area.

		Sensibilization and dissemination of project objectives and benefits to strengthen community ownership of the project.
How to assess the risk of conflict with neighbours and neighbouring communities?	Mentioned as insignificant.	All project lands are covered by a DUAT.
Community health and safety: How do you assess the risk of exacerbation of conflicts in the region: social or ethnic conflict?	There are no ethnic conflicts.	See: Vulnerable groups
Indigenous peoples: how to work with indigenous peoples in the project area, and how to assess the risk of conflict?	There are no indigenous peoples with social, cultural, economic and political characteristics that are distinct from those of the dominant societies in which they live.	The project should respect cultural heritage and support traditional ceremonies when relevant.
Risk of not accounting for climate change: How to assess the potential impacts of extreme weather events on proposed activities?	There is small risk of intensifying drought conditions hindering seedling growth; there can be cyclones*	Seedlings should be micro-irrigated in periods of low rainfall to avoid desiccation. SWC structures such as swales support tree growth in enrichment planting areas.
How to assess fire risks?	There is a risk of uncontrolled fires (late dry season)	Integrated fire management strategy (not stopping all fire, but modulating the intensity and frequency): including firebreaks, fuel breaks and (cold) fires. Engage subcomité members in fire prevention and fire suppression. Support local grass cut-and-carry systems, which provide (roof) grasses for the community members, while also reducing the fuel load in the project areas.

Other risks proposed?	Not keeping promises made to the community is a risk. In that case the community may lose interest.	Pro-active, honest and careful communication towards the project participants. Avoid not delivering the promises. In case, for any reason, delays occur, we should communicate honestly on the process.

**Mangunde is over 100km inland. Project areas are well and truly higher than the areas which would be impacted in the event of cyclone. No project areas are within the Buzi River Floodplain. High winds may knock down some trees but winds in this area are usually much slower than on the coast. See for instance the limited impact of Cyclone Idai in 2019 in Mangunde (versus the significant impact in Beira). Finally, the nurseries have been built to withstand strong winds and/or built from local materials using accessible appropriate technology so reconstruction efforts are minimal.*

Community E&S Risk Management Plan (ESMP)

Table 3.9.4a Environmental and Social Risk and Impact Mitigation Measures for Chibabava Project Region

Risk/Impact	Mitigation Measures	Project Activity	Livelihood Indicator
Potential risk related with spread of uncontrolled fire outbreaks	The neighbouring Miombo zones must be included in the participatory zonation maps and in the monitoring program. Community Subcommittees (SC) will organise regular meetings to discuss strategies and be prepared to act swiftly in cases of fire outbreaks; SCs ensure that community members are involved in fire monitoring around project areas.	**Activity 2.1 to Activity 2.5**	**L7**

	The Miombo restoration zones and nurseries will always be repaired, replenished and rehabilitated after any occurrence of uncontrolled fire, or any other extreme weather events such as high temperatures, low rainfall, or cyclones .		
Potential risk of disproportionate labour demands for mulching or planting activities falling on women.	This could increase female workloads during specific phases of cultivation during the wet and dry seasons. The project aims to mitigate these negative social risks by ensuring 50 % or more representation of women in the Subcommittees so that they can determine how to distribute the labour demands according to women's household needs and circumstances.	**Activity 1.1 to Activity 4.5**	**L2**
Potential risk of local elite capture	To include all community members, it is suggested to decentralise	Activity 1.3 and 1.4 Activity 2.3	**L2,L3**

	invitations (i.e. not only by the leader, but also by the project team) and to communicate earlier on upcoming project activities so the news can spread. The project should keep records of community members participating in project activities and use a smart rotation system to achieve broad inclusion of the community in the project.		
Potential risk of high opportunity costs	Freely distributing tree seedlings and/or seeds for direct seeding of important timber wood species to be planted in individual or communal woodlots. Grass cut-and-carry system (see further) Valorising non-timber forest products and particularly supporting honey production in the Miombo project areas. Established bee-hives	**Activity 2.3 and 3.4** **Activity 4.1 to 4.5**	**L1, L6, L5**

	in the project area would provide livelihood benefits and function as natural defenders of the area. Sensibilization and dissemination of project objectives and benefits to strengthen community ownership of the project.		

2- Inhambane Project Region

Methodology: Community-level Risk Assessment

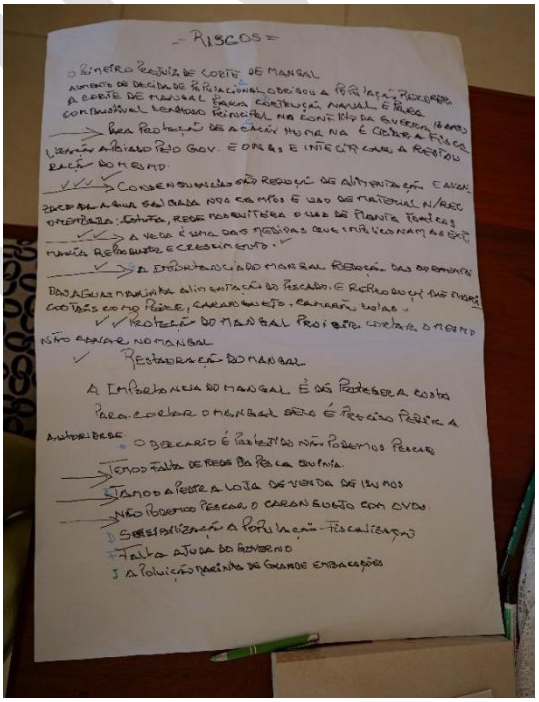
A participatory risk identification session was held the 15th of July 2025 in Machavenga with balanced representation from the three project communities, Machavenga, Salela, and Josina, and their respective líders comunitários. The session was facilitated by two representatives from Climate Lab and one representative from Azada Verde, who supported the process and contributed technical expertise on risk assessment.

Following an introductory discussion on mangrove benefits, community needs, and the overall purpose of the project, participants were divided into three groups, women, leaders, and men, to ensure open dialogue and allow individuals to speak freely. Each group identified project-related risks, presented their findings to the group, and then participated in a voting exercise to prioritise the three most significant risks. The same groups subsequently developed mitigation measures for the prioritised risks.

Across all groups, the most pressing concerns identified were the lack of sensitization, the lack of control and protection, and the continuing cutting of mangroves. Participants highlighted the widespread use of inappropriate fishing materials, including toxic plants and mosquito nets, and harmful practices such as cutting mangrove roots to collect worms for bait. Climate-related

pressures, including increased water movement and sea-level rise, were also noted as factors accelerating ecosystem degradation.

Despite the challenges raised, communities expressed strong willingness to engage in collective restoration efforts. Proposed mitigation measures included establishing community ambassadors to lead awareness campaigns and strengthening the authority and operational capacity of CCPs.



Community discussion

In the table below you can find the identified and discussed key risk areas and their corresponding mitigation measures.

Key areas of risk	Community discussion on the importance of risk	Measures to reduce this risk
Inclusion of vulnerable groups and prevention of elite capture	Participants mentioned that there is a risk of local elite benefit capture. Leaders may focus on friends and family for invitations for project activities, or as members of the CCP.	Decentralize invitations: not only by the leaders, but also by the project team, with early communication about upcoming activities so information spreads broadly. Keep records of community participation to monitor who attends. Use a smart rotation system to ensure broad inclusion of all community members.
Gender equality	Participants didn't identify gender imbalances as a major risk.	Gender parity is safeguarded in the project design (through the hard quorum of 50% female participation).
Political instability and insecurity	Historical or ongoing conflicts may lead to unregulated settlements near mangroves, illegal activities, and reduced community engagement.	Collaborate with local authorities and government to support project protection. Build strong community engagement to maintain

		continuity during unstable periods.
Climate change and extreme weather events	Floods, cyclones, storms, and rising sea levels can destroy mangrove trees, erode sediments, damage nurseries, and reduce survival of newly planted areas, directly threatening the project's objectives. Extreme events can also disrupt community activities and reduce participation in conservation efforts.	After an unexpected environmental shock, the affected project areas will receive extra project attention and enrichment planting.
Lack of community awareness about the project and sustainable practices	Communities may continue harmful activities that damage mangroves and fisheries due to a lack of awareness.	Train CCPs to be project ambassadors and educate at schools, churches, and markets.
Cutting / mangrove exploitation	Mangrove cutting is legally prohibited, however, some level of mangrove cutting still occurs discreetly. Community members often refer to historical practices, when mangrove wood was harvested regularly due to the scarcity of alternative timber resources, long distances to other wood sources, and the higher durability of mangrove wood.	Reinforcing CCP structures and ensuring their active involvement in mangrove monitoring and protection. Supporting alternative sustainable practices by reducing wood consumption through more efficient cooking devices and techniques, and by promoting sustainable wood-use management within community forestry plots.

Use of inappropriate or harmful fishing materials, including toxic plants	Causes long-term ecological damage and health issues within the community.	Support alternative fishing materials to reduce harm. Educate the community on environmental and health risks of toxic practices.
Fishing inside mangrove nurseries	Destroys critical habitats for fish and compromises biodiversity goals.	Promote sustainable fishing practices. Conduct awareness campaigns on the importance of protected habitats.
Children cutting mangrove roots to collect worms for fishing bait	Damages mangrove and their natural regeneration.	Train CCPs to be project ambassadors and raise awareness at schools, churches, and markets about the importance of the mangroves and sustainable practices.
Higher water levels and strong water movements	Higher water levels and strong water movement can erode roots, flood young mangroves, alter salinity, reduce growth, and damage fish habitats.	Implement mangrove restoration and planting to stabilize banks. Promote community-based water management to reduce erosion and flooding impacts.

Community E&S Risk Management Plan (ESMP)

Table 3.9.4b Environmental and Social Risk and Impact Mitigation Measures for Inhambane Project Region

Risk/Impact	Mitigation Measures	Project Activity	Livelihood Indicator
Under-representation of	Decentralized and transparent invitations to meetings.	**Activity 5.2**	**L2**

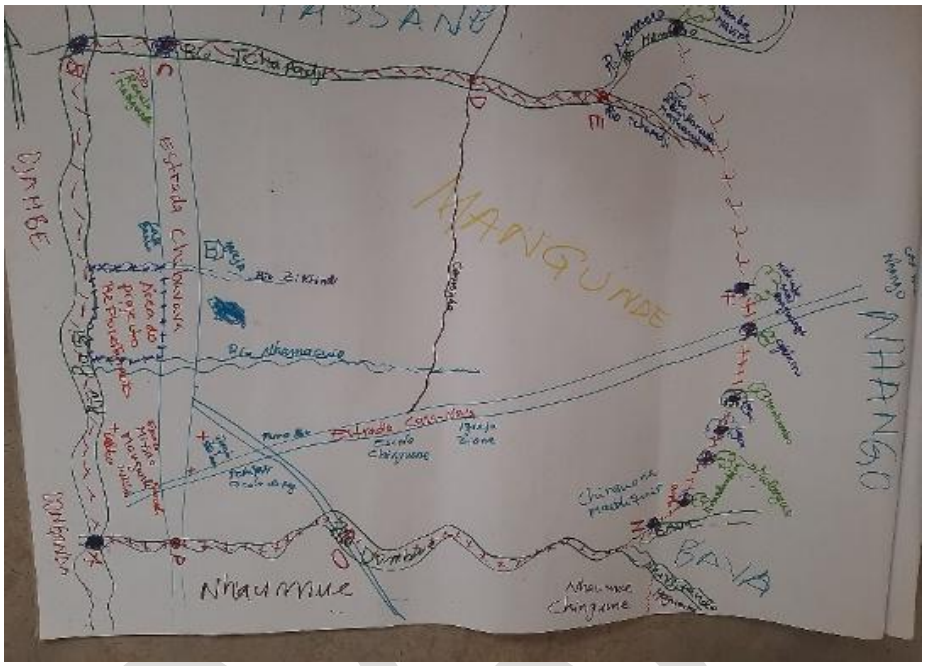
vulnerable groups and local elite capture.	Monitoring of participation. Rotation mechanisms to ensure inclusion.		
Gender equality	Establishment a hard quorum of 50% female participation	**Activity 5.1; 5.2; 5.5**	**L2**
Political instability and insecurity	Strengthen community ownership by engaging members through regular meetings, targeted trainings, and hands-on project activities. Generating direct benefits through socio-environmental investments and income-earning opportunities that help sustain continuity during periods of instability.	**Activity 5.1; 5.2; 5.5**	**L3, L4, L5, L7, L8**
Climate change and extreme weather events	After an unexpected environmental shock, the affected project areas will receive extra project attention and enrichment planting.	**Activity 5.4**	**L7, C4**
Lack of community awareness about the project and sustainable practices	Awareness sessions at schools, churches, and markets.	**Activity 5.1, 5.2, 5.3, 5.5**	**L1, L3**

	Support alternative sources for local wood-based cooking needs.		
Cutting / mangrove exploitation	Reinforcing CCP structures and ensuring their active involvement in mangrove monitoring and protection. Support alternative sources for local wood-based cooking needs.	**Activity 5.1, 5.5**	**L1**
Use of inappropriate or harmful fishing materials, including toxic plants	Reinforcing CCP structures and ensuring their active involvement in mangrove monitoring and protection. Educate at schools, churches, and markets.	**Activity 5.1, 5.2, 5.5**	**L3**
Fishing inside mangrove nurseries	Reinforcing CCP structures and ensuring their active involvement in mangrove monitoring and protection. Educate at schools, churches, and markets.	**Activity 5.1, 5.2, 5.5**	**L3**
Children cutting mangrove roots to collect worms for fishing bait	Reinforcing CCP structures and ensuring their active involvement in mangrove monitoring and protection. Educate at schools, churches, and markets.	**Activity 5.1, 5.2, 5.5**	**L3**

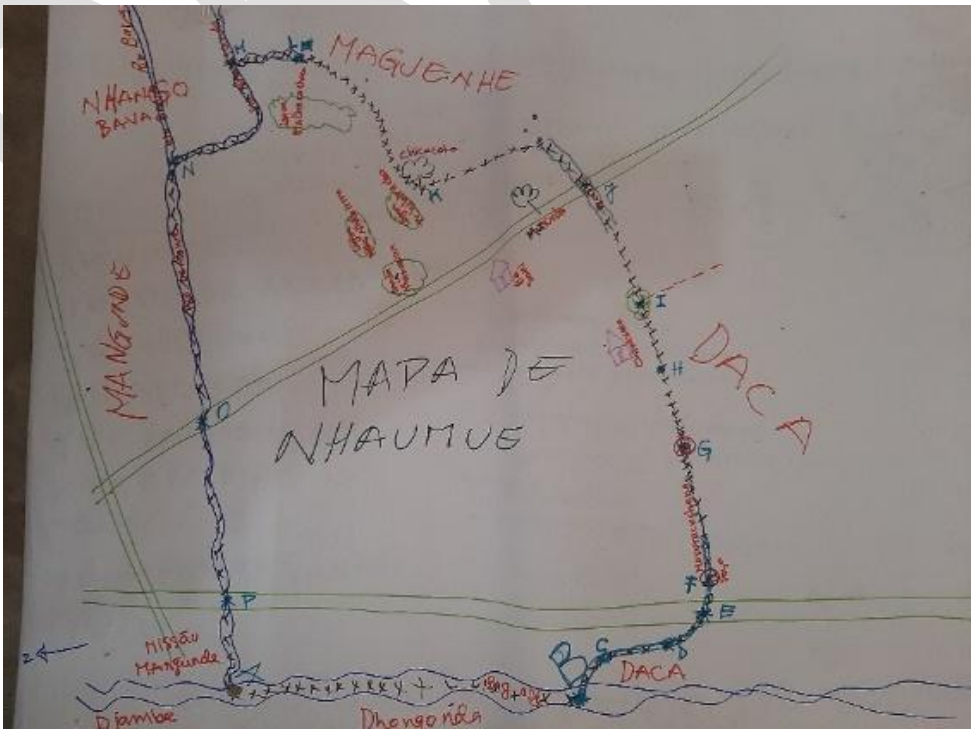
Higher water levels and strong water movements	Implement mangrove restoration and planting to stabilize banks. Promote community-based water management to reduce erosion and flooding impacts.	**Activity 5.4**	**L7**

Annex 11 – Land Management Plans

Esboço do mapa Participativo da Comunidade Mangunde [Parcipatory map, Mangunde community]



Esboço do mapa Participativo da Comunidade Nhaumue [Parcipatory map, Nhaumue community]



Esboço do mapa Participativo da Comunidade Josina [Parcipatory map, Josina community]

Esboço do mapa Participativo da Comunidade Salela [Parcipatory map, Salela community]

Esboço do mapa Participativo da Comunidade Machavenga [Parcipatory map, Machavenga community]

PLAN VIVO

Annex 12 – Project Agreements

Templates added below

PLAN VIVO

Miombo Project Agreement

This document lays out the terms of mutual commitment between the partners of the Kukumuty project and the participating project community ..... in Chibabava, Mozambique. This document is to be available in English, Ndau and Portuguese. The mutual commitments contained in this agreement are as follows:

1. Introduction

1.1 The Project Agreement describes the roles and responsibilities of the project partners in relation to the Kukumuty project (Mozambique), including the involved Subcomités (Community Subcommittees), and the terms and conditions governing the distribution of benefit sharing, non-timber forest products and related management activities. The project partners are Azada Verda, Reseed Indico, Climate Lab, the Subcomité representatives and the community representatives of the participating villages.

This project agreement is valid from ...../...../..... and is valid for 30 years.

1.2 For the purposes of this agreement, carbon sequestration services, as a result of woodland enrichment and related management activities are considered. The provision of all ecosystem services from Miombo enrichment is indicated by monitoring changes in tree and forest cover, biodiversity, carbon sequestration and socio-economic parameters. The delivery of the carbon benefits will be indicated by monitoring changes in socioenvironmental indicators.

1.3 The project is intended to facilitate community ecosystem enrichment and management efforts by strengthening communities that sustainably manage the Miombo area. Ecosystem enrichment consists of sustainable soil and fire management, enrichment planting, restoration and conservation of the forests and trees. Such efforts provide community-wide benefits and valorization of non-timber forest products and agroforestry may improve the wellbeing of the community. In support of this intention, the community will be considered beneficiary. The project partners will enter into a benefit-sharing mechanism to manage the distribution of payments received. Project participants will not be able to generate any other type of carbon credits or be involved in other programmes that deliver the same benefits with other parties or standards.

2. Roles and obligations of the project coordinators

AZADA VERDE RESPONSIBILITIES

Azada Verde is responsible for the following activities:

a. Implementation of the project in the field: The entity will be responsible for the coordination and execution of the activities of the project carried out in Mozambique and specifically in the area of action. Income received from the sale of Plan Vivo Certificates will be paid into a dedicated bank account.

b. Local Reporting: Prepare and send descriptive (word) and financial reports (excels, invoices, receipts, declarations, bank statements...), below the standards agreed by the three parties an on format and frequency decided. All these reports will allow the three parties to follow the progress of the project.

c. Relationship with our local partners: Maintain a good relationship with our local partners and a perfect coordination in the development of joint activities on the field. Currently ESMABAMA and Mezimbite but responsible for maintaining future relationship with new alliances of the project.

d. Identification: As the project evolves, new needs, opportunities, concerns and conflicts will emerge from the field. The field team would deal with it and will be the interlocutor between the community and the project. Besides the identification of annual potential new areas for the project.

e. Institutional relations in the country: Azada Verde will deal with the management and relations with local, district, provincial and national public institutions. At the level of communications, records and necessary certifications of the project.

f. Human Resource: Recruitment and management of all local staff involved in the project. Contracts, social security and payroll.

g. Logistics: Guarantee and ensure the necessary means for the proper development of activities in the field.

h. International Visits: It will be in charge of the management and coordination of the logistics, food, lodging, project activities of the international visits that are made to the project.

i. Audits and evaluations: Develop, accompany and facilitate the teams of auditors and evaluators to carry out their work in all phases to guarantee the transparency of the project.

RESEED INDICO RESPONSIBILITIES

Reseed Indico takes responsibility for the following activities:

a. Project Coordination and Steering: Reseed Indico (hereafter RI) will coordinate the planning, design, and provide guidance to local staff for implementation of the revitalisation and agroforestry activities in the project area. It will advise Azada Verde directors and project staff on addressing new needs, concerns, and conflicts that may arise in relation to the project scope and benefits.

b. Socio-economic, environmental research and baselining: RI will establish baseline information for analysis and monitoring of the socio-economic performance of the project activities and outcomes.

c. Administration: RI will organise monthly meetings with project partners and staff, maintain oversight of the overall project finances, local reporting, and records of meetings.

d. Translation: RI will provide translation of key project documents and correspondence in English and Portuguese as required.

e. Technical support to implementing partner: RI will provide technical support to Azada Verde for agroforestry development and resource management practices in the project area. It will liaise with Mezimbite to develop appropriate agroforestry strategies and integrative approaches to natural resource revitalisation with partners and local community associations involved in the project.

f. Project, grant writing and editing: RI will assist Climate Lab in drafting and editing the annual reports and project-related grant applications.

RESPONSIBILITIES AND SERVICES TO BE PROVIDED BY CLIMATE LAB

Climate Lab takes responsibilities for the following:

a. Development of a PDD: After acceptance of a PIN by the Plan Vivo Foundation (after a PIN review), CL will prepare a Project Design Document (PDD). CL will set up and follow up a field measurement scheme in the project area (soil sampling, biomass & biodiversity sampling). Using all information, CL drafts the PDD although the Parties emphasize that the drafting of this document will require a joint effort. The PDD also includes the Technical

Specifications for each project intervention – this effectively is the carbon sequestration modelling.

b. Project Validation: Once the PDD is completed, CL will submit it to the Plan Vivo Foundation. The document is independently reviewed (desk based review) during this validation stage. Additionally, Plan Vivo will appoint an independent validator and/ or verifier, who will perform a field review. CL will carry the cost of the validation and verification work, but all parties commit to the benevolent cooperation of its local coordinators when interviewed by an auditor.

c. Registration: If the project is found to meet the Plan Vivo Standard, it results in project registration. CL will organise this.

d. Annual reporting: Once registered, Plan Vivo projects can generate Plan Vivo Certificates in respect of ecosystem service benefits (typically climate services) generated. CL is responsible for the drafting of the annual reports, while the other parties must smoothly provide it with information on the project year. The other parties remain responsible for the accuracy of all information and data provided to CL.

e. Registration and reporting towards the National Emissions Reduction Transaction Registry: The Government of Mozambique may require conformity, registration and periodic reporting of the Plan Vivo project and credits towards their National Emissions Reduction Transaction Registry. CL is responsible for the administration of the transactions, in line with the requirements of Mozambican law.

f. Sales of Plan Vivo certificates: the Plan Vivo Foundation will issue certificates following its approval of project annual reports. CL will receive these certificates on its Markit Environmental Registry account and is responsible for the subsequent sales of the carbon credits, which it will do in a transparent manner. All Parties explicitly agree that CL will sell all carbon credits, who will then transfer a portion of the corresponding revenues to the other parties. CL is not an agent of the others in this regard.

g. Expansion reporting: In order to add more project areas to the Plan Vivo project, CL is responsible for the carbon measurements and the carbon modelling at all sites, and the drafting of expansion reports.

h. Cyclic Verification: Verification audits must be carried out in line with the Plan Vivo requirements. CL will carry the cost of the verification work, but aAll parties commit to the benevolent cooperation of its local coordinators when interviewed by an auditor.

The Coordinators will be supported by the Subcommittees, who will help to oversee the use of funds generated from the project and the operations required to achieve the project's targets (e.g. mulching, swales, firebreaks, monitoring, community meetings).

3. Monitoring and payment system

3.1 Monitoring. Monitoring activities, annual activity-based indicators and methods are described in annex A. A simple set of monitoring indicators will be used and monitoring observations will concentrate on three main aspects:

- Ecosystem restoration
- Carbon sequestration
- Livelihoods

The monitoring and payment system is set forth in Annex A. The system shows the monitoring indicators, performance targets and thresholds, and corresponding payments that apply under this agreement. It uses a traffic light system to link payments with monitoring results: green for full payment, orange for partial payment, red for zero payment.

3.2 Payments. Payment will be linked to monitoring results in relation to the targets and thresholds described in Annex A. Payments are directly dependent on sales; this means that in case that there are no sales of carbon credits, it would be impossible to have payments. Payment will only be made if responsibilities and, where applicable, corrective actions are correctly carried out by the parties. The expected annual carbon benefit will be: ..... tCO2e/ha/yr.

3.3 Buffer. There is a deduction of the risk buffer (20% of achieved annual emission reductions), which is pooled by Plan Vivo and therefore not available for participants to claim. This is in addition to at least 10% of the rPVCs received (after deducting contributions to the future risk buffer) that are set aside in the achievement reserve. Uncancelled rPVCs in the achievement reserve can be converted to vPVCs and issued at the time of verification.

4. Use of Payments

4.1 Socioenvironmental investments under this agreement are made in consensus with the community and should be gender balanced. The balance allocation as per article 4.3 of this

agreement will be used to make socioenvironmental investments in accordance with monitoring targets and thresholds (see Annex A).

4.2 Plan Vivo land management plans are consulted for socioenvironmental investments. Investments should strengthen 4 main activities (1) ecosystem enrichment, restoration or protection, (2) agroforestry, (3) livelihood strengthening through non-timber forest production, (4) improve water access or education of local citizens.

4.3 Azada Verde will allocate 60% of the Net Revenue towards socioenvironmental expenses directly benefiting the project areas, project participants, communities and/or other local stakeholders. It is up to the Annual Subcomité Meetings to allocate these social and/or environmental investments and expenditures for the benefit of the project communities.

5. Corrective action

5.1 In the event that corrective action is required during the term of this agreement, the project coordinators, the Subcomités and the communities will reach agreement on the corrective actions necessary, a schedule for the corrective action, and an extension of the term of this agreement.

5.2 All stakeholders (participants, community members or other stakeholders) are encouraged to use the complaint/suggestion book. Mitigation actions to follow up complaints will be performed in mutual agreement between the Community Subcommittee and the community, and will strive towards consensus. In the event that there is a dispute between different stakeholders the Subcommittee will be consulted. If none are able to agree corrective actions, a third party arbitrator, approved by all parties, will be appointed to oversee dispute resolution. In first instance, this will be the régulo of Mangunde. If no amicable solution can be found within 1 month, a new arbitrator will be selected, who needs to be approved by all parties and the Plan Vivo Foundation.

5.3 The payment for costs of any corrective action shall be shared by all signatories and come from the revenues set in article 4.3 of this agreement.

6. Geographic solidarity formula between n villages

The allocation per village is distributed from the Fund F as follows:

Allocation = 1/n*50% F + tCO2e/ha(%)*50% F

7. Term of the agreement

This agreement will remain in force for a period of 30 years from the date of signing, unless payments are withheld in any year, in which case the parties shall agree to an extension and corrective actions as set forth in section 5.

The parties agree to the terms and conditions contained in this agreement and all annexes.

Signatures:

Subcomité Representatives

Comité de Gestão de Recursos Naturais Representatives

Community Representatives

Project Coordinators

Annex A: Annual monitoring targets

	Activity Indicator P1 to P24 (measure annually)	Performance Targets		
		Full Target Achievement	Partial Target Achievement	Missed Target
Miombo enrichment activities	Project area undergoing mulching activities	≥10 ha/yr	-	<10 ha/yr
	Area of each project area surrounded by firebreak or otherwise protected against annual fire	>80%	50-80%	<50%
	Number of SWC in project area (swales or other) installed and/or maintained	6 / yr	4-6 / yr	<4 / yr
	% of participating communities having soil fertility maps, a defined mulching strategy, uncontrolled fire exposure maps, a defined fire strategy, tree maps and a defined planting strategy	100%	-	<100%
Tree Planting	Number of Miombo seedlings planted	>1500 seedlings/yr	1000-1500 / yr	<1000 seedlings / yr
	Survival Rate	>60%	30-60%	<30%

Community Subcommittee meetings	Number of meetings per project area	3 per year	1-2 per year	0 per year
	Female participation	>50%	30-50%	<30%
Risk mitigation Activities	Index of uncontrolled fires, woodcutting and charcoal making in the project zones, per project zone per year	<4 per year	4-10 per year	>10 per year

There are the following consequences for certificate issuance and corrective actions that will be implemented if the performance targets are not met (mitigation actions):

1. If the values for all indicators meet or exceed their performance target, the full issuance is received;
2. If one or more of the indicator values are below its performance target for one monitoring period, the full issuance is received but corrective actions must be implemented by the next year;
3. If one or more of the indicator values are partially achieved for two consecutive monitoring periods, the full issuance is received but corrective actions must be implemented.
4. If one or more of the indicator values are missed for two consecutive monitoring periods, or partially achieved for three consecutive monitoring periods, certificate issuance of the project area concerned is withheld until corrective actions have been implemented and the performance target(s) have been reached.

Mangrove Project Agreement

This document lays out the terms of mutual commitment between the partners of the Kukumuty project and the participating project community ..... in Inhambane, Mozambique. This document is to be available in English, Bitonga and Portuguese. The mutual commitments contained in this agreement are as follows:

1. Introduction

1.1 The Project Agreement describes the roles and responsibilities of the project partners in relation to the Kukumuty project (Mozambique), including the involved CCPs (Conselhos Comunitarios de Pesca), and the terms and conditions governing the distribution of benefit sharing, non-timber forest products and related management activities. The project partners are Azada Verda, Climate Lab, the CCP representatives and the community representatives of the participating villages.

This project agreement is valid from ...../...../..... and is valid for 30 years.

1.2 For the purposes of this agreement, carbon sequestration services, as a result of mangrove restoration and enrichment and related management activities are considered. The provision of all ecosystem services from mangrove restoration is indicated by monitoring changes in tree and forest cover, biodiversity, carbon sequestration and socio-economic parameters. The delivery of the carbon benefits will be indicated by monitoring changes in socioenvironmental indicators.

1.3 The project is intended to facilitate community ecosystem enrichment and management efforts by strengthening communities that sustainably manage the community mangrove area. Ecosystem enrichment consists of sustainable soil and microchannel management, enrichment planting, restoration and conservation of the forests and trees. Such efforts provide community-wide benefits and valorization of sea fruits and fisheries may improve the wellbeing of the community. In support of this intention, the community will be considered beneficiary. The project partners will enter into a benefit-sharing mechanism to manage the distribution of payments received. Project participants will not be able to generate any other type of carbon credits or be involved in other programmes that deliver the same benefits with other parties or standards.

2. Roles and obligations of the project coordinators

AZADA VERDE RESPONSIBILITIES

Azada Verde is responsible for the following activities:

a. Implementation of the project in the field: The entity will be responsible for the coordination and execution of the activities of the project carried out in Mozambique and specifically in the area of action. Income received from the sale of Plan Vivo Certificates will be paid into a dedicated bank account.
b. Local Reporting: Prepare and send descriptive (word) and financial reports (excels, invoices, receipts, declarations, bank statements...), below the standards agreed by the three parties an on format and frequency decided. All these reports will allow the three parties to follow the progress of the project.
c. Relationship with our local partners: Maintain a good relationship with our local partners and a perfect coordination in the development of joint activities on the field. Currently ESMABAMA and Mezimbite but responsible for maintaining future relationship with new alliances of the project.
d. Identification: As the project evolves, new needs, opportunities, concerns and conflicts will emerge from the field. The field team would deal with it and will be the interlocutor between the community and the project. Besides the identification of annual potential new areas for the project.
e. Institutional relations in the country: Azada Verde will deal with the management and relations with local, district, provincial and national public institutions. At the level of communications, records and necessary certifications of the project.
f. Human Resource: Recruitment and management of all local staff involved in the project. Contracts, social security and payroll.
g. Logistics: Guarantee and ensure the necessary means for the proper development of activities in the field.
h. International Visits: It will be in charge of the management and coordination of the logistics, food, lodging, project activities of the international visits that are made to the project.
i. Audits and evaluations: Develop, accompany and facilitate the teams of auditors and evaluators to carry out their work in all phases to guarantee the transparency of the project.

RESPONSIBILITIES AND SERVICES TO BE PROVIDED BY CLIMATE LAB

Climate Lab takes responsibilities for the following:

a. Development of a PDD: After acceptance of a PIN by the Plan Vivo Foundation (after a PIN review), CL will prepare a Project Design Document (PDD). CL will set up and follow up a field measurement scheme in the project area (soil sampling, biomass & biodiversity sampling). Using all information, CL drafts the PDD although the Parties emphasize that the drafting of this document will require a joint effort. The PDD also includes the Technical Specifications for each project intervention – this effectively is the carbon sequestration modelling.
b. Project Validation: Once the PDD is completed, CL will submit it to the Plan Vivo Foundation. The document is independently reviewed (desk based review) during this validation stage. Additionally, Plan Vivo will appoint an independent validator and/ or verifier, who will perform a field review. CL will carry the cost of the validation and verification work, but all parties commit to the benevolent cooperation of its local coordinators when interviewed by an auditor.
c. Registration: If the project is found to meet the Plan Vivo Standard, it results in project registration. CL will organise this.
d. Annual reporting: Once registered, Plan Vivo projects can generate Plan Vivo Certificates in respect of ecosystem service benefits (typically climate services) generated. CL is responsible for the drafting of the annual reports, while the other parties must smoothly provide it with information on the project year. The other parties remain responsible for the accuracy of all information and data provided to CL.
e. Registration and reporting towards the National Emissions Reduction Transaction Registry: The Government of Mozambique may require conformity, registration and periodic reporting of the Plan Vivo project and credits towards their National Emissions Reduction Transaction Registry. CL is responsible for the administration of the transactions, in line with the requirements of Mozambican law.
f. Sales of Plan Vivo certificates: the Plan Vivo Foundation will issue certificates following its approval of project annual reports. CL will receive these certificates on its Markit Environmental Registry account and is responsible for the subsequent sales of the carbon credits, which it will do in a transparent manner. All Parties explicitly agree that CL will sell all carbon credits, who will then transfer a portion of the corresponding revenues to the other parties. CL is not an agent of the others in this regard.

g. Expansion reporting: In order to add more project areas to the Plan Vivo project, CL is responsible for the carbon measurements and the carbon modelling at all sites, and the drafting of expansion reports.

h. Cyclic Verification: Verification audits must be carried out in line with the Plan Vivo requirements. All parties commit to the benevolent cooperation of its local coordinators when interviewed by an auditor.

The Coordinators will be supported by the CCPs, who will help to oversee the use of funds generated from the project and the operations required to achieve the project's targets.

3. Monitoring and payment system

3.1 Monitoring. Monitoring activities, annual activity-based indicators and methods are described in Annex A. A simple set of monitoring indicators will be used and monitoring observations will concentrate on three main aspects:

- Ecosystem restoration
- Carbon sequestration
- Livelihoods

The monitoring and payment system is set forth in Annex A. The system shows the monitoring indicators, performance targets and thresholds, and corresponding payments that apply under this agreement. It uses a traffic light system to link payments with monitoring results: green for full payment, orange for partial payment, red for zero payment.

3.2 Payments. Payment will be linked to monitoring results in relation to the targets and thresholds described in Annex A. Payments are directly dependent on sales; this means that in case that there are no sales of carbon credits, it would be impossible to have payments. Payment will only be made if responsibilities and, where applicable, corrective actions are correctly carried out by the parties. The expected annual carbon benefit will be: ..... tCO2e/ha/yr.

3.3 Buffer. There is a deduction of the risk buffer (20% of achieved annual emission reductions), which is pooled by Plan Vivo and therefore not available for participants to claim. This is in addition to at least 10% of the rPVCs received (after deducting contributions to the future risk buffer) that are set aside in the achievement reserve. Uncancelled rPVCs in the achievement reserve can be converted to vPVCs and issued at the time of verification.

4. Use of Payments

4.1 Socioenvironmental investments under this agreement are made in consensus with the community and should be gender balanced. The balance allocation as per article 4.3 of this agreement will be used to make socioenvironmental investments in accordance with monitoring targets and thresholds (see Annex A).

4.2 Plan Vivo land management plans are consulted for socioenvironmental investments. Investments should strengthen three main activities (1) mangrove enrichment, restoration or protection, (2) livelihood strengthening through sustainable cooking and sustainable fisheries, (3) improve water access, education or other social services to the local citizens.

4.3 Azada Verde will allocate 60% of the Net Revenue towards socioenvironmental expenses directly benefiting the project areas, project participants, communities and/or other local stakeholders. It is up to the Annual CCP Meetings to allocate these social and/or environmental investments and expenditures for the benefit of the project communities.

5. Corrective action

5.1 In the event that corrective action is required during the term of this agreement, the project coordinators, the CCPs and the communities will reach agreement on the corrective actions necessary, a schedule for the corrective action, and an extension of the term of this agreement.

5.2 All stakeholders (participants, community members or other stakeholders) are encouraged to use the complaint/suggestion book. Mitigation actions to follow up complaints will be performed in mutual agreement between the CCP and the community, and will strive towards consensus. In the event that there is a dispute between different stakeholders the CCP will be consulted. If none are able to agree corrective actions, a third party arbitrator, approved by all parties, will be appointed to oversee dispute resolution. In first instance, this will be the Province. If no amicable solution can be found within 1 month, a new arbitrator will be selected, who needs to be approved by all parties and the Plan Vivo Foundation.

5.3 The payment for costs of any corrective action shall be shared by all signatories and come from the revenues set in article 4.3 of this agreement.

6. Geographic solidarity formula between n villages

The allocation per village is distributed from the Fund F as follows:

Allocation = 1/n*50% F + tCO2e/ha(%)*50% F

7. Term of the agreement

This agreement will remain in force for a period of 30 years from the date of signing, unless payments are withheld in any year, in which case the parties shall agree to an extension and corrective actions as set forth in section 5.

The parties agree to the terms and conditions contained in this agreement and all annexes.

Signatures:

CCP Representatives

Community Representatives

Project Coordinators

Annex A: Annual monitoring targets

	Activity Indicator P1 to P30 (measure annually)	Performance Targets		
		Full Target Achievement	Partial Target Achievement	Missed Target
Mangrove Restoration Activities	# hectare mangrove areas under restoration	>150 ha	100-150 ha	<100 ha
	# members active in CCP and/or working with CCP	>6 per CCP	-	<6 per CCP
	# sensibilization actions per year (with community groups, at schools, at churches or with women ambassadors)	3 per year	1-2 per year	0 per year
	# fuel-efficient cooking trainings held or stoves distributed	2 or more per year	1 per year	0 per year
	Number of seedlings, propagules or grass planted or sown	>1500 seedlings/yr	1000-1500 / yr	<1000 seedlings / yr
	Number of trainings organised on the local fisheries value chain	1 or more per year	-	0 per year

There are the following consequences for certificate issuance and corrective actions that will be implemented if the performance targets are not met (mitigation actions):

1. If the values for all indicators meet or exceed their performance target, the full issuance is received;

2. If one or more of the indicator values are below its performance target for one monitoring period, the full issuance is received but corrective actions must be implemented by the next year;
3. If one or more of the indicator values are partially achieved for two consecutive monitoring periods, the full issuance is received but corrective actions must be implemented.
4. If one or more of the indicator values are missed for two consecutive monitoring periods, or partially achieved for three consecutive monitoring periods, certificate issuance of the project area concerned is withheld until corrective actions have been implemented and the performance target(s) have been reached.

Annex 13 – Monitoring Plan

A13.1 Miombo monitoring methods

1. Sampling strategy

Sampling was performed on the basis of fixed plots of 400m². The assembly of the plot is started at a point "A" as the arrival point, and it is followed in an Eastern direction covering 20m until the point "B", then in a Northern direction covering 20m until the point "C", then it is followed in Western direction covering 20m until the Point "D" and finally closed in a Southern direction until the Arrival point "A". Subsequent plots were sampled along transects every 200m. In 2022, 104 plots have been sampled.

For the identification and counting of the species present, the techniques of direct observation, comparison of specimens and literature review were employed, interacting with botanical scientists with extensive experience in the identification of forest species in southern Africa as well as with national and international herbaria, such as the Herbarium of the Instituto de Investigação Agrária de Moçambique (IIAM).

Measurement of diameter at breast height (DBH) (at 1.3m height) and recording of shrub occurrence with respective botanical identification was performed within the plots of 400m². Diameters were derived from circumferences measured in the field.

A composite soil sample was created within every plot by mixing 5 soil samples taken in the corners of a central 5m subsquare. The soil was collected in the center of the plot at points shaped like a cross and thus collected at the 4 corners of the cross as well as in the center of the cross. Samples were taken by augering in the top 0.3 m depth.

For expansion areas, the project will calculate the required number of samples based on the Winrock calculator.

2. Aboveground and belowground biomass

Aboveground and belowground biomass was quantified for all trees based on the allometric equations of Ryan et al. (2011) for Miombo woodlands in Sofala, Mozambique. The equations and root-stem ratio have been developed based on a destructive harvest of 29 Miombo trees combined with an inventory of 12,733 trees on 58 plots.

Tree biomass allometric equations. B_{dest} *is the destructively sampled tree stem biomass (s), tree coarse root biomass (r) and total tree biomass (t, i.e. stem+root), all in kg C.* dbh_{dest} *is diameter at breast height in cm. log is the natural log.* $R:S_{dest}$ *is the root stem ratio.*

Equation	r^2	RMSE	N
$\log(B_{dest,s}) = 2.601 \log(dbh_{dest}) - 3.629$	0.93	0.52 log(kg C)	29
$\log(B_{dest,r}) = 2.262 \log(dbh_{dest}) - 3.370$	0.94	0.43 log(kg C)	23
$\log(B_{dest,t}) = 2.545 \log(dbh_{dest}) - 3.018$	0.98	0.30 log(kg C)	23
$(R:S_{dest}) = -0.2671 \log(dbh_{dest}) + 1.334$	0.36	0.27	23

3. Soil organic carbon

The method of Walkley-Black (Walkley and Black, 1934) was used for soil organic carbon determination (in %C) of the composite soil samples. Analysis was performed in the Kvuno laboratory for soil analysis, Chimoio, after transport in a frigobox. The method of Walkley-Black is a reliable and standard chromic acid wet oxidation method. Oxidisable matter in the soil is oxidised by potassium bichromate solution. There is heat generation when sulfuric acid is mixed with the dichromate. The remaining dichromate is titrated with ferrous sulphate. The titre is inversely related to the amount of C present in the soil sample. Soil organic carbon content (SOC, in ton C/ha) was calculated using the following equations (Hoff et al., 2002):

$$SOC(tonC/ha) = (\%C.\%100).Bd.D.\alpha$$

Where Bd is the bulk density (ton/m³), D is the thickness of the top soil (0.2m), and α is 10.000 m²/ha. Bulk density was derived from the same study by Ryan et al. (2011) (averaged at 1.35 ton/m³).

4. Monitoring scheme

All results are presented in Annex 6 (b and c) together with a summary in Annex A7B. The measurement protocol detailed above will be replicated every 5 years, at the same fixed plots (GPS locations), to recalibrate the initial carbon model predictions. This is in line with AR-TOOL14, § 6.2: Direct estimation of change by re-measurement of sample plots.

A13.2 Mangrove monitoring method

1. Sampling strategy

The fieldwork is a crucial component of the assessment and focused on the collection of mangrove structural and biomass data. In each sampling area, a 10m x 10m plot was established, randomly placed in the mapped zones. To avoid the edge effect, the plots were positioned at least 5 meters from the shoreline. The evaluation of the mangrove structure consisted of estimating the height of the trees and measuring the diameter at breast height (DBH) for all trees with a diameter greater than 2.5 cm, using a tape measure. In the same sequence, the mangrove species within each plot were identified to evaluate the composition, diversity and density of species. Additionally, regenerating plants were sampled in sub-plots of $1m^2$ (1m x 1m).

2. Above-ground biomass

The data analysis consists of calculating the parameters described in the data (frequencies, averages and dispersion) for each indicator collected, as well as the calculation of biomass and carbon stock as well as basal area, tree density, species diversity and biomass per unit area. According to the AR-TOOL14-4.2, the allometric equation applied to a tree species must be preferably selected from existing data applicable to the local situation (e.g. represented by similar ecological conditions). A typical equation for above-ground biomass (AGB) is:

$$AGB = 0.251 \rho D2.46$$

Where ρ represents the density of the wood (g/cm^3) and D denotes the DBH (cm). The biomass was based on the use of wood densities of mangrove species that occur worldwide (Avicennia marina – 0.670 g/cm^3; Sonneratia alba – 0.078 g/cm^3; Ceriops tagal - g/cm^3; Rhizophora mucronata – 0.790 g/cm^3), as suggested by Kauffman and Donatto (2012) and Tang et al., (2015) cited by Litulo et al., (2023).

Biomass estimates can then be converted to carbon stock using a standard conversion factor, in this case 0.47 for tropical trees (Stringet et al., 2015).

3. Below-ground biomass

According to the AR-TOOL14-4.2, root-shoot ratios must be applied for estimating below-ground biomass. We use the root-shoot ratio calibrated for tidal marshes, developed by Mokany et al. (2006).

4. Monitoring scheme

Every 5 years, the project will perform a direct estimation of change by measurement of the fixed survey plots of 100 m² within the project areas, in line with AR-TOOL14 §6.2, to re-calibrate the sequestration rates. The minimum number of survey plots required is calculated using the Winrock Sample Plot Calculator.

A13.3 Monitoring parameter list

Monitoring Parameter	Definition and unit	Method	Frequency	Means of Verification
P1	# hectares of mulching applied per year	GPS delineation	To be checked annually	Reporting of mulching activities; photographic evidence and map of areas covered in Annual Report
P2	% of participating communities having soil fertility maps	Amount of participating communities with soil fertility maps	To be checked in year 1	Participatory fertility maps
P3	% of participating communities having mulching strategy	Amount of participating communities with mulching strategy	To be checked in year 1	Mulching strategy document

P4	# mosaic blocs of mulching applied per year	Counting of mulching mosaic blocs	To be checked annually	Reporting of mulching activities; photographic evidence and map of areas covered in Annual Report
P5	# SWC constructed and/or maintained	Counting of SWC structures	To be checked annually	Photographic evidence in Annual Report
P6	# mulching-related evaluation sessions per year	Amount of mulching-related evaluation sessions organised	To be checked annually	Evaluation note
P7	# soil-related meetings per community per year	Amount of soil-related community meetings organised	To be checked annually	Monthly community reports
P8	Meters of firebreaks installed and maintained	GPS delineation	To be checked annually	Reporting of firebreak activities; photographic evidence and map of areas covered in Annual Report
P9	% of participating communities having uncontrolled fire exposure maps	Amount of participating communities with fire exposure maps	To be checked in year 1	Participatory fire maps

P10	% of participating communities having fire strategy	Amount of participating communities with fire strategy	To be checked in year 1	Fire strategy document
P11	# fire-related evaluation sessions per year	Amount of fire-related evaluation sessions organised	To be checked annually	Evaluation note
P12	# fire-related meetings per community per year	Amount of fire-related community meetings organised	To be checked annually	Monthly community reports
P13	Number of Miombo seedlings planted	Counting of Miombo seedlings planted	To be checked annually	Reporting of planting activities; photographic evidence and map of areas covered in Annual Report
P14	Number of survey plots per project area	Amount of plots surveyed	To be checked in year 1	Reported in Annex 7 of the PDD
P15	% of participating communities having tree maps	Amount of participating communities having tree maps	To be checked in year 1	Participatory tree distribution maps

P16	% of participating communities having planting strategy	Amount of participating communities having planting strategy	To be checked in year 1	Planting strategy document
P17	Number of measurements per year	Reporting on measurement results	To be checked annually	Daily results reported in Annual Report
P18	# plant-related meetings per community per year	Amount of plant-related meetings per community	To be checked annually	Monthly community reports
P19	# hectare agroforestry applied by participating agricultural associations	GPS delineation	To be checked annually	Reporting of agroforestry activities; photographic evidence and map of area and species planted in Annual Report
P20	# team members trained at Mezembite Training Center	Amount of team members trained	To be checked in year 1	Report of training
P21	# seedlings produced per nursery	Counting of seedlings produced per nursery	To be checked annually	Nursery counting, reported in Annual Report
P22	# seedlings planted per nursery	Counting of seedlings	To be checked annually	Planting activities reported in Annual Report

		planted per nursery		
P23	# agroforestry-related meetings per community and/or association per year	Amount of agroforestry-related meetings per community	To be checked annually	Monthly community reports
P24	# participants and/or annual income generated from different agroforestry crops	Survey of income generated from agroforestry	To be checked every 5 years	Report of per capita benefits
P25	# hectare mangrove areas under restoration	GPS delineation	To be checked annually	Project area maps and shapefiles
P26	# members active in CCP and/or working with CCP	Counting of members active and/or participating	To be checked annually	Monthly community reports
P27	# sensibilization actions per year (with community groups, at schools, at churches or with women ambassadors)	Amount of events organised per year	To be checked annually	Monthly community reports
P28	# fuel-efficient cooking trainings held or stoves distributed	Amount of trainings per year	To be checked annually	Report of trainings
P29	Number of seedlings, propagules or grass planted or sown	Counting of seedlings planted	To be checked annually	Reporting of field activities; photographic evidence and map of areas covered

P30	Number of trainings organised on the local fisheries value chain	Amount of trainings per year	To be checked annually	Report of trainings
C1	Number of Miombo seedlings planted across the ecosystem restoration areas	Counting of Miombo seedlings planted	To be checked annually	Registration of tree seedlings leaving the nurseries for enrichment planting across the restoration areas and photographs of planting activities by the project team.
C2	Survival rate of seedlings planted in the Miombo project areas	Counting of survival rate of seedlings planted	To be checked annually at the end of the rainy season	Monitoring report of survival rate of seedlings planted at the end of each rainy season.
C3: Miombo tree density	Number of Miombo species per hectare	Counting of Miombo trees present	To be checked every 5 years	Systematic vegetation and soil survey in nested plots (see tech spec). Survey to be repeated every 5 years.
C4: Number of mangrove seedlings / propagules planted across the ecosystem restoration areas	Number of mangrove seedlings or propagules planted / sown across the ecosystem restoration areas	Counting of mangrove seedlings planted	To be checked annually	Registration of tree seedlings leaving the nurseries for enrichment planting across the restoration areas and photographs of planting activities by the project team.

C5: Survival rate of seedlings planted in the mangrove project areas	Survival rate of seedlings planted in the mangrove project areas	Counting of survival rate of seedlings planted	To be checked annually	Monitoring of survival rate of seedlings planted
L1	# of trees allocated for timber harvesting and charcoal making from agroforestry cultivation	Counting of trees allocated for timber harvesting and charcoal production	To be checked annually	Registration of agroforestry trees allocated for harvesting and charcoal making
L2	% female participation during the Subcommittee meetings per project area	Amount of female participants in subcommitte e meetings	To be checked annually	Reporting and photographic evidence in Annual Report
L3	Formal training in agroforestry and landscape water harvesting techniques	Amount of trainings on agroforestry and landscape water harvesting	To be checked annually	Reporting and photographic evidence of trainings in Annual Report
L4	Metical spent on socioenvironmental reinvestments	Total budget spent on socio-environmenta l reinvestment s	To be checked annually	Financial reporting included in Annual Report

L5	Annual cash income generated from agroforestry activities	Survey on cash income generated from agroforestry activities	To be checked every 5 years	Financial statements of the Agroforestry Work Group
L6	Amount of grass allocated for cut-and-carry (acres)	Registration of cut-and-carry activities	To be checked annually	Reporting on observations (photographs or GPS) by project staff
L7	Metical spent on activities (firebreaks, mulching, swales)	Budget spent	To be checked annually	Financial reporting included in Annual Report
L8	KG captured per surveyed household	Registration during social survey	To be checked every 5 years	Reporting and photographic evidence in Annual Report
E1	Miombo-species Richness in the project areas	Shannon diversity index	To be resampled every 5 years in the same plots	The evolution of the Shannon index will be reported every 5 years.
E2	Number of observations of uncontrolled fires, timber harvesting and charcoal making in the miombo enrichment project areas	Registration of observations of uncontrolled fire, timber harvesting and charcoal	To be checked annually	Reporting on observations (written reports and on maps) by project staff and/or mentioned during the four-monthly Community Subcommittee public meetings.

E3	Miombo understory richness in the project area	Shannon diversity index	To be resampled every 5 years in the same plots	The evolution of the Shannon index will be reported every 5 years.
E4	Mangrove-species Richness in the project areas	Shannon diversity index	To be resampled every 5 years in the same plots	The evolution of the Shannon index will be reported every 5 years.
E5	Occurrence per ha of mangrove trees with cutting signs	Registration of cutting signs in survey plots	To be resampled every 5 years in the same plots	The evolution of the cutting signs will be reported every 5 years.

Annex 14 – Project Database

- 1. Other Plan Vivo Projects
- 2. Azada Verde information
- 3. Climate Lab information
- 4. CERP Meeting Notes
- 5. Collaboration documents
- 6. Relevant Articles
- 7. Relevant Reports and information (REDD+ etc)
- 8. Summaries and External communications
- 9. Maps and potential restoration areas
- 10. Project Idea Note (PIN - Template, notes etc)
- 11. Grants and Funding
- 12. Internal Reports and research
- 13. Logo and design ideas
- 14. Final G-STIC Documents (Successful)
- 15. Miombo Woodlands articles
- 16. Agroforestry and Nursery planning
- 17. Photos
- 18. Budgets and Finances (reporting)
- 19. Human Resources
- 20. Local environmental research
- 21. Social research and community interviews (RESEED)

PLAN VIVO

Annex 15 – Authority Engagement and Approvals

The approved DUATs and Decree of 3 May 2018 have been made available to the Plan Vivo Foundation and are available upon request. See REDD+ license below.

Redução de Emissões por Desmatamento e Degradação Florestal (Redd +)

REPÚBLICA DE MOÇAMBIQUE

MINISTÉRIO DA TERRA E AMBIENTE

Licença para desenvolvimento de actividades REDD+ N°. 04 / 2024

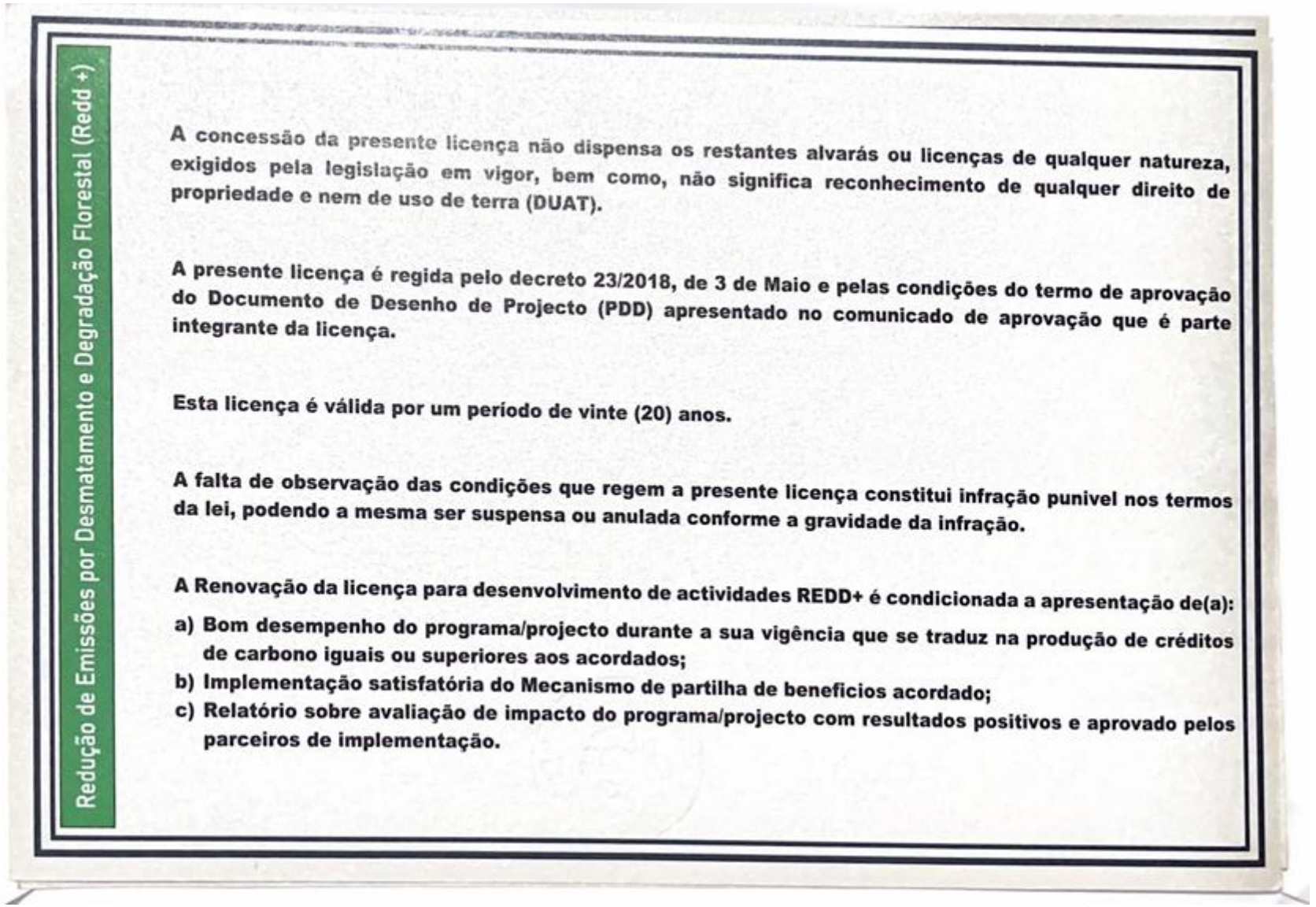
Nos termos do Decreto n.º 23/2018, de 03 de Maio e em presença do processo respeitante ao pedido formulado por ---------- ASSOCIAÇÃO AZADA VERDE ---------- para a aprovação do programa/projecto REDD+ denominado ---------- PROJECTO KUKUMUTY ---------- a ser implementado no Distrito de ---------- Chibabava ---------- na província de ---------- SOFALA ----------

Concedemos a presente licença, por um período de 20 anos, conforme o número 1 do artigo 22 do decreto em referência. O titular desta licença tem direito sobre a titularidade dos créditos de carbono a serem gerados pelo projecto. No entanto, a comercialização dos créditos de carbono somente poderá ser efectuada uma vez cumpridos os requisitos legais vigentes e mediante a apresentação do certificado de créditos de carbono a ser emitido pelo Ministro que superintende o sector das finanças. Para constar, lavrou-se a presente Licença que, depois de assinada e devidamente autenticada com selo branco em uso nesta instituição. A presente licença está sujeita a condições de operação constantes do verso.

Maputo, 31 de Julho de 2024 Validade até 30 de Julho de 2044

Iveta Joaquim Maibaze

A Ministra



Redução de Emissões por Desmatamento e Degradação Florestal (Redd +)

A concessão da presente licença não dispensa os restantes alvarás ou licenças de qualquer natureza, exigidos pela legislação em vigor, bem como, não significa reconhecimento de qualquer direito de propriedade e nem de uso de terra (DUAT).

A presente licença é regida pelo decreto 23/2018, de 3 de Maio e pelas condições do termo de aprovação do Documento de Desenho de Projecto (PDD) apresentado no comunicado de aprovação que é parte integrante da licença.

Esta licença é válida por um período de vinte (20) anos.

A falta de observação das condições que regem a presente licença constitui infração punivel nos termos da lei, podendo a mesma ser suspensa ou anulada conforme a gravidade da infração.

A Renovação da licença para desenvolvimento de actividades REDD+ é condicionada a apresentação de(a):

a) Bom desempenho do programa/projecto durante a sua vigência que se traduz na produção de créditos de carbono iguais ou superiores aos acordados;
b) Implementação satisfatória do Mecanismo de partilha de beneficios acordado;
c) Relatório sobre avaliação de impacto do programa/projecto com resultados positivos e aprovado pelos parceiros de implementação.

PLAN VIVO

Annex 16 – Financial Plan

The financial plan has been made available to the Plan Vivo Foundation.

We added for the partim Inhambane:

	YEAR 1	YEAR 2	YEAR 3
A. PROJECT COSTS			
A1. Investments			
SUBTOTAL	*16 410.00*	*5 650.00*	*1 575.00*
A2. Operational and audit costs			
SUBTOTAL	*19 022.50*	*27 273.00*	*15 013.00*
A3. Personel costs			
SUBTOTAL	*30597.10*	*30597.10*	*27552.10*
A4. Monitoring costs			
SUBTOTAL	***5 942.66***	***5 716.81***	***3 972.61***
TOTAL EURO	71 972.26	69 236.91	48 112.71

B. PROJECT REVENUES

PV revenue : 15.0 tCO2e/ha/yr x 179 ha (à 25€)	**0**	**0**	**201 375**
Partim Direct benefit for the Project Participants and other Local Stakeholders (60%)	*0*	*0*	*120 825*
Partim operational budget Azada Verde (20%)	*0*	*0*	*40 275*
Partim operational budget Climate Lab (20%)	*0*	*0*	*40 275*

Annex 17a - Statutes for Community Subcommittees for Kurarama Kutemba Muty Project

1. Each community with an area of land under the Kurarama Kutemba Muty project shall have a community subcommittee chosen by the community who will help to oversee the use of funds generated from the project and the operations required to achieve the project's targets.
2. During the establishment phase, each subcommittee will consist of 9 people.
3. Six representatives chosen by the community with voting rights
4. At least two representatives from the natural resources management committee (CGRN) without voting rights
5. One representative from Azada Verde without voting rights
6. The subcommittee will eventually consist of a total of 15 people.
7. Twelve community representatives with voting rights
8. At least two representatives from the natural resources management committee (CGRN) without voting rights
9. One representative from Azada Verde without voting rights
10. All community representatives will receive a small "cesta basica" (staple food hamper or cash stipend) every 2 months in compensation for their time, efforts and contribution to the project. This is revoked if a representative misses two or more meetings (see #17 below)
11. All committee members will be elected for a 2-year period. Committee members will be allowed to stay on the committee for a period of up to 6 years but must renominate for their position on the committee every two years. Hence, the maximum number of terms will be three consecutive two-year terms.
12. At the formation of the subcommittee, 6 members will be chosen by the community. After one year, at the first annual general meeting, another 6 members will be put forward by the community, at the second annual general meeting the original 6 members will have completed their first two-year term and will be required to renominate and stand for election if they would like to continue.

13. Elections of members will take place at the annual general meeting. Each year six positions on the subcommittee will become available. These positions may be filled by existing members who are standing down and who have not served more than four years on the committee or by other community members who are not currently on the subcommittee.

14. After a period of 6 years, committee members must stand down and may re-stand for election after one year.

15. At least 50% of the community representatives on the subcommittee must be female and at least one of the representatives of the Committee for Natural Resources Management (CGRN) should also be female.

16. The representative of Azada Verde on the committee will act as the secretary and will be responsible for recording the minutes of meetings.

17. There will be a minimum requirement of at least three meetings per year.

18. Meetings will be used to plan project operations and discuss ways to increase community engagement.

19. The final meeting of the year will be the Annual General Meeting – at this meeting, the budget for the next year's activities will be announced and the amount of money that will go back to the community will also be announced.

20. The meeting prior to the AGM will be used to determine the budget for the next year's activities and a final budget for the following year must be agreed to prior to the AGM.

21. The subcommittee may be required and may choose to call additional meetings throughout the year.

22. At least two-thirds of all voting members must be present at a meeting in order for the meeting to go ahead. If the appointed ex-officio representative from Azada Verde cannot attend, another Azada Verde employee may attend and act in their stead.

23. If subcommittee members miss two or more committee meetings, they may be voted out of the subcommittee by the other committee members unless there are valid extenuating circumstances.

24. There will be a President and Vice-President elected by the subcommittee. At least one of these roles must be filled by a non-male person.

25. In addition to meetings, subcommittee members will also be required to attend training and engagement activities designed to build the overall capacity of the community to manage the project and increase familiarity with project areas and objectives.

26. The role of the subcommittee will be to represent and engage with their community in relation to the activities and outcomes of the Kurarama Kutemba Muty Project.

27. The objective of the subcommittee will be to support the operations of the Kurarama Kutemba Muty Project and to ensure that this project brings benefits to the community through its regeneration activities including the sale of carbon sequestration credits.

28. The scope of the Kurarama Kutemba Muty Project will be thirty years and the subcommittees should operate for the full length of the project.

Dispute resolution

In the case of a deadlock, where subcommittee members are unable to reach a majority decision, the President of the committee can:

1. Choose to give a single casting vote to the three non-voting members (CGNR and Azada Verde) for that decision only
2. Choose to refer the matter to the régulo, sagutas or chefes
3. Choose to call a community meeting to reach consensus on the issue

Where the non-voting representatives of the CGRN and Azada Verde are in agreement that a subcommittee decision is contradictory to the aims and purpose of the Kurarama Kutemba Muty Project and/or rules governing the expenditure of carbon credit income, they have the right to appeal that decision to the President. Examples can be, but are not limited to: Refusal to pursue dispute resolution as per the process defined in the Subcommittee agreement; decisions by the CGRN to undertake logging or sale of KKM project lands to a private party; decisions to use operating funds for non-project activities or allocating carbon credit income for individual gain rather than for socioenvironmental benefits for the whole village community. In this appeal, the non-voting members will be given an opportunity to explain their opposition to the decision and, after hearing these arguments, the committee will vote again. If the decision is still unsatisfactory to the CGRN and Project Coordinators, the issue will be resolved through arbitration by the Régulo.

PLAN VIVO

Annex 17b - Statutes for Community Subcommittees for Kurarama Kutemba Muty Project

Estatutos dos Conselhos Comunitários de Pesca

Projeto Kurarama Kutemba Muty – Mangais

Província de Inhambane

1. Representação Comunitária

Cada comunidade da Província de Inhambane que participe no Projeto Kurarama Kutemba Muty – Mangais, será representada pelo respetivo Conselho Comunitário de Pesca (CCP).

O comité comunitário do projeto corresponde formalmente ao próprio Conselho Comunitário de Pesca (CCP) da comunidade, sendo este o órgão legítimo de representação local no âmbito das atividades de restauração, conservação e uso sustentável de mangais.

A administração e gestão financeira dos recursos do projeto competem exclusivamente à Azada Verde, enquanto entidade executora.

2. Composição do Conselho Comunitario de Pesca

O CCP será composto por sete membros:

• Presidente do CCP

• Adjunto do Presidente

• Quatro Membros do CCP

• Secretário Técnico designado pela Azada Verde

Os seis membros do CCP terão direito a voto nas deliberações do comité.

O Secretário Técnico participará nas reuniões com funções de elaboração de atas, organização documental e acompanhamento técnico, sem direito a voto.

3. Competências do Conselho Comunitário de Pesca (CCP)

O CCP será responsável por:

• Planificar e coordenar as atividades do projeto ao nível comunitário, incluindo plantação, gestão de viveiros, monitoria ecológica, formação, sensibilização e atividades geradoras de rendimento;

• Assegurar a proteção e monitoria da área do projeto;

• Avaliar a implementação das atividades realizadas e identificar desafios;

• Propor e priorizar investimentos comunitários, tais como infraestruturas, equipamentos e apoio social;

• Elaborar propostas e planos de atividades a serem articulados com a Azada Verde.

4. Paridade de Género e Representatividade

Entre os seis representantes com direito a voto, pelo menos cinquenta por cento (50%) deverão ser mulheres, garantindo uma representação equilibrada e inclusiva.

Deverá igualmente ser promovida a participação feminina em cargos de liderança dentro do Conselho Comunitário de Pesca, incentivando que pelo menos um dos cargos principais (Presidente, Adjunto do Presidente) seja ocupado por uma mulher.

A paridade de género constitui princípio estruturante do Projeto Kurarama Kutemba Muty-Mangais, assegurando igualdade de participação na tomada de decisões, acesso à informação e distribuição de responsabilidades.

5. Mandato

Após cada período de dois anos, o comité poderá ser parcialmente renovado, garantindo simultaneamente continuidade institucional e renovação de lideranças.

Após o cumprimento do período máximo de seis anos, o membro deverá cessar funções, podendo voltar a candidatar-se após um intervalo mínimo de um ano.

Os seis membros com direito a voto serão eleitos em Assembleia Comunitária aberta, devidamente convocada com antecedência razoável, garantindo a participação livre de todos os membros da comunidade.

A eleição poderá ocorrer por votação aberta ou secreta, conforme acordado e registado em ata.

Nenhum membro da comunidade poderá ser impedido de participar na Assembleia.

Nenhum dos membros com direito a voto poderá pertencer ao mesmo agregado familiar.

6. Reuniões e Quórum

O Conselho Comunitário de Pesca reunirá, no mínimo, três vezes por ano.

O quórum mínimo para deliberação será de dois terços dos membros com direito a voto.

As decisões serão tomadas por maioria simples. Em caso de empate, o Presidente exercerá voto de qualidade.

A última reunião anual funcionará como Assembleia Geral Anual (AGM), durante a qual será apresentado o plano e orçamento das atividades para o ano seguinte, bem como a informação sobre a aplicação das receitas do projeto.

A reunião imediatamente anterior à AGM será destinada à elaboração e finalização da proposta orçamental do ano seguinte, devendo esta ser previamente acordada antes da sua apresentação na AGM.

O CCP poderá convocar reuniões extraordinárias sempre que necessário.

7. Faltas e Substituições

Caso um membro falte a duas ou mais reuniões consecutivas sem justificação registada em ata, poderá ser proposta a sua substituição.

8. Resolução de Litígios

Em caso de divergência, poderá ser convocada reunião alargada da comunidade ou solicitada mediação do Lider ou autoridades tradicionais.

Sempre que o volume de trabalho o justificar, poderão ser mobilizados guardas comunitários adicionais para tarefas específicas de monitoria e proteção da área do projeto.

Estes colaboradores poderão ser compensados com pagamento diário, utilizando recursos do projeto, incluindo receitas provenientes de créditos de carbono, em conformidade com regras claras definidas em regulamento financeiro próprio.

9. Duração

O Projeto Kurarama Kutemba Muty- Mangais, terá uma duração estimada de trinta (30) anos, mantendo-se o CCP em funcionamento durante todo o período de implementação do projeto.

10. Reconhecimento e Incentivo

Os seis membros do CCP com direito a voto receberão uma cesta básica três vezes por ano, como forma de reconhecimento pela sua dedicação e participação ativa no projeto.

A cesta básica não constitui salário nem vínculo laboral.

O direito à cesta poderá ser revogado em caso de faltas injustificadas a duas ou mais reuniões consecutivas.

Tabela de Cargos

Nº	Cargo	Entidade	Direito a Voto	Competência Principal	
1	Presidente	CCP	Sim	Representação oficial e coordenação	
2	Adjunto do Presidente	CCP	Sim	Substituição e apoio	
3	Membro	CCP	Sim	Participação deliberativa	
4	Membro	CCP	Sim	Participação deliberativa	

5	Membro	CCP	Sim	Participação deliberativa	
6	Membro	CCP	Sim	Participação deliberativa	
7	Secretário Técnico	Azada Verde	Não	Atas e apoio técnico	

Annex 18 - AI Tool use Disclosure

Declaration of AI Tool use

1. Have AI tools been used in the creation or presentation of information within this PDD? Yes
2. If 'Yes' (to Question 1), please specify how these tools were used and in which sections of this document:

Section	Purpose of AI Tool Use	AI-Tools Used
3.3	Improving clarity of English language	Microsoft Copilot
4.3	Improving clarity of English language, check consistency of SDGs	Microsoft Copilot
4.4	Improving clarity of English language, check consistency of SDGs	Microsoft Copilot
4.5	Summarizing existing monitoring plan	Google Gemini

Generative AI tools were used solely for limited technical support, such as checking consistency of English terminology and improving clarity and logical flow. All AI suggestions were manually reviewed prior to implementation. All substantive content, analysis and strategic decisions originate exclusively from the project partners.

Annex 19 – Kukumuty Glossary on Key Social Structures

CGRN: Comité de Gestão dos Recursos Naturais – The CGRN is a registered association with the responsibility of managing land and natural resources across the 11 communities in the Mangunde Regulado. It is the recognised institution for overseeing the utilization of community lands in the region. There are 2 members present for each of the 11 communities, except for Mangunde that has 5 members. Consultation with communities and community leaders determined that the CGRN would be the best body to hold the co-titles for designated enrichment areas under the KKM project.

Subcommittee: A CGRN subcommittee is established per project community (i.e. one in Nhaumue and one in Mangunde). Community Subcommittees are local daughters of the CGRN that are active at the most local level and will take the lead in participatory planning and decision-making.

Agricultural association: Grouping of farmers who can hold equal shares in a single co-owned title over the use rights of all their customary lands in a DUAT. These agricultural associations are also formally organised with their respective office-bearers. The associations enable farmers to collectively invest labour and coordinate cultivation in plots near the Buzi River. The associations also work with the assistance provided by Azada Verde for solar-based pumped irrigation to cultivate vegetable crops for household consumption and market sale. They will be involved in the agroforestry interventions.

GETA: Grupo Especial de Trabalho Agroforestal – The project's agroforestry activities and revenue generation will be overseen by a special working group (Grupo Especial de Trabalho Agroforestal) created from participating households in Nhaumue and Mangunde communities and include both non-members and members of the agricultural associations. GETAs are different from the existing agricultural associations. They are organised by the Subcommittees to be responsible for carrying out the agroforestry activities.

Proposed relation between GETA and Subcommittee: The two GETAs (one per village) will operate under their respective Subcommitees. It was decided that one person from the association and another from the community will represent the Agroforestry intervention by participating in

the subcommittee, with minimum one woman. Thus, Nhaumue and Mangunde agricultural associations will be represented in their respective Subcommittees.

Régulo: Traditional chief who is head of the Regulado. The Mangunde Regulado counts 11 communities. The régulo is not only a decision-maker, but he is also a spiritual leader connected with the ancestors and he acts as an independent arbitrator in local conflicts.

Saguta: Traditional subchief, working at a more local level and under the guidance of the régulo.

CCP: Conselhos Comunitarios de Pesca, or Community Fishery Council, is the recognised institution for overseeing the utilization of the community mangrove area. The CCP includes a President (main representative), a Vice President, a Secretary and Deputy Secretary, a Treasurer and Deputy Treasurer, and a Chair of the fiscal council.

ACC: áreas de conservação comunitária, the mangrove area managed by a CCP (in line with art. 22 of Law 5/2017 dd. 11 May 2017).