Forest Carbon Partnership Facility (FCPF)

Carbon Fund

Revised Emission Reductions Program Document (ER-PD)

ZAMBÉZIA INTEGRATED LANDSCAPE MANAGEMENT PROGRAM (ZILMP)

REPUBLIC OF MOZAMBIQUE

Date of submission: April, 2018

REVISED ER-PD

Ministry of Land, Environement and Rurla Developement of the Republic of Mozambique (MITADER)

National Fund for Sustainable Development (FNDS)

With support from Etc Terra - Rongead

TABLE OF CONTENT

LIST OF TABLES

LISTS OF FIGURES AND MAPS

LIST OF BOXES

ACRONYMS

AGB	Aboveground biomass
ANAC	National Agency for Conservation Areas
ANR	Assisted Natural Regeneration
AQUA	National Agency for Environmental Quality Control
BGB	Belowground biomass
CA	Conservation Area
CBRNM	Community Based-Natural Resource Managements
CDM	Clean Development Mechanism
CDS-Natural Resources	Centre for Sustainable Development for Natural Resources
CDS-ZC	Centre for Sustainable Development in Coastal Zones
CENACARTA	National Centre of Cartography and Detection
CF	Carbon Fund
CFJJ	Justice Center for Legal and Judicial Training
CGRN	Natural Resource Management Committees
CIB	Inter-ministerial Commission of Bioenergy
CIF	Climate Invetsment Fund
CIIMC	Inter-ministerial Group for Climate Change
CLUP	Community Land Use Plan
COGEP	Participatory Management Committees
CONDES	National Council For Sustainable Development
CRM	Constitution of the Republic of Mozambique
CSA	Climate Smart Agriculture
CT	Technical Committee
DGM	Dedicated Grant Mechanism
DINAF	National Department of Forests
DINAGECA	National Directorate of Geography and Cadaster
DINAT	National Direction of Lands
DINAV	Direcção Nacional de Veterinária
DIRN	Department of Natural Resources Inventory
DNA	National Direction for the Environment
DINAS	National Directorate for Agriculture and Silviculture
DNDR	National Direction for Rural Development
DNE	National Direction of Energy
DNEA	National Directorate for Agricultural Extension
DINOTER	National Directorate for Territorial Planning and Resettlement
DNPDR	National Directorate for Rural Development Promotion
DPTADER	Provincial Direction of Land, Environment and Rural Development
DUAF	Legal rights to use and benefit from land and forests
DUAT	Right to use and benefit from the land
EDR	Rural Development Strategy
EIA	Environmental Impact Assessment
ER	Emission Reductions
ER-PD	Emissions Reductions Program Document
ER-PIN	Emissions Reductions Project Idea Note
ERI	ER Program Interventions
ERP	Emission Reductions Program
ERPA	Emission Reduction Purchase Agreement
ESIA	Environmental and Social Impact Assessments
ESMF	Environmental and Social Framework
ESMP	Environmental and Social Management Plans

FAO	Food and Agriculture Organization of the United Nations
FCPF	Forest Carbon Partnership Facility
FDA	Agricultural Development Fund
FFEM	French Fund for Global Environment
FGRM	Feedback and Grievance Redress Mechanism
FIP	Forest Investment Program
FNDS	National Fund for Sustainable Development
FREL	Forest Reference Emissions Level
FRIP	Forest Resource Information Platform
FRL	Forest Reference Level
FUNAE	Energy Fund
GDP	Gross Domestic Product
GEB	Global Environmental Benefits
GEF	Global Environment Facility
GHG	Green House Gas
GIS	Geographical Information System
GNR	Gilé National Reserve
GoM	Government of Mozambique
IDA	International Development Association
IGF	Foundation for Wildlife Management
IIAM	Agricultural Research Institute of Mozambique
INCAJU	Institution for Cashew Promotion
INDC	Intended Nationally Determined Contribution
INE	National Institute for Statistics
INFATEC	Management of Lands and Mapping Training Institute
IPM	Integrated Pest Management
IUCN	International Union for Conservation of Nature
JICA	Japan International Cooperation Agency
LOI	Letter of Intent
M&E	Monitoring and Evaluation
MASA	Ministry of Agriculture and Food Security
MEF	Ministry of Economy and Finance
MF	Methodological Framework
MIREME	Ministry of Mineral Resources and Energy
MITADER	Ministry of Land, Environment and Rural Development
MoU	Memorandum of Understating
MozBio	Conservation Area for Biodiversity and Development Project
MozDGM	Mozambique Dedicated Grant Mechanism for Local Communities
MozFIP	Mozambique Forest Investment Project
MRV	Measurement, Reporting and Verification
MSLF	Multi Stakeholders Landscape Forum
MSME	Micro, Small, and Medium Enterprise
NAMA	National Appropriate Mitigation Actions
NAPA	National Action Program for Climate Change Adaptation in Agriculture
NEA	National Executing Agency
NFI	National Forest Inventory
NFMS	National Forest Monitoring System
NGO	Non Governmental Organization
NPL	New Land Policy
NSC	National Steering Committee
NTPF	Non Timber Forest Products
OIIL	Local Initiative Investment Budget
PA	Protected Area

PAP	Project Affected People
PCU	Project Coordination Unit
PDD	Project Design Document
PEDSA	Strategic Plan for the Development of the Agricultural Sector
PES	Payment for Ecosystem Services
PF	Process Framework
PI&As	Interested and Affected Parties
PIU	Program Implementation Unit
PMP	Pest Management Plan
PMR	Directorate for the Mobilization of Funds
PMRV	Participatory Measurement, Reporting and Verification
PPFD	Decentralized Finance and Planning Program
PROGIP-CG	Cabo-Delgado Integrated Landscape Management Program
RAP	Resettlement Action Plan
RC	Resettlement Committee
REDD	Reducing Emissions from Deforestation and forest Degradation
REDD+	Reducing Emissions from Deforestation and forest Degradation, and foster conservation, sustainable management of forests, and enhancement of forest carbon stocks.
REL	Reference Emission Level
RPF	Resettlement Policy Framework
SDAE	District Service for Economic Activities
SECF	Small Emerging Commercial Farmer
SEP	Stakeholder Engagement Plan
SESA	Strategic Environmental and Social Assessment
SIS	Safeguards Information System
SISFLOF	Forest and Wildlife Management Information System
ToT	Training of Trainers
UEM-FAEF-DEF	Department of Forestry of Eduardo Mondlane University
UMC	Climate Change Unit
UNFCCC	United Nations Framework Convention on Climate Change
VC	Value Chain
VCS	Verified Carbon Standards
WB	World Bank
ZILMP	Zambézia Integrated Landscape Management Program

EXECUTIVE SUMMARY

A more detailed summary is available in Annex 13.

Mozambique is one the few sub-Saharan countries to possess a significant portion of natural forest, which represents 51% of its territory - 40.6 million hectares (ha). Miombo forest is the most extensive forest type, covering two third of the country. However, deforestation and forest degradation have been increasing in the last few years (with an annual deforestation rate of 0.23% between 2000 and 2012), leading the Government of Mozambique (GoM) to considerably intensify its commitment to REDD+ and to promote a landscape-based approach to forest and natural resources management.

A turning point in this process was the recent creation of its Ministry of Environment, Land and Rural Development (MITADER), of which the main functions are to manage and implement policies in the fields of land management, forests and wildlife, environment, conservation areas and rural development. Its creation shows the efforts that the GoM has been carrying out to integrate complex issues and promote synergy between those core challenges for REDD+ in Mozambique. Within the MITADER, the National Fund for Sustainable Development (FNDS) was also cretaing, as the body in charge of coordinating and authorizing REDD+ projects in Mozambique. It will be the entity responsible for implementing, supervising and coordinating the proposed Emissions Reductions (ER) Program: the *Zambézia Integrated Landscape Management Program* (ZILMP).

Designed at jurisdictional scale, the ZILMP is located in Zambézia province, of which it covers 9 districts: Alto Molocue, Gile, Gurue, Ile, Maganja da Costa, Mocuba, Mocubela, Mulevala and Pebane. Its ambition is to reduce emissions due to deforestation in the accounting area by 30% below the reference level in the period (2018-2019)[1] and by 40% in the second period (2020-2024). The Reference Emission Level being 6,487,447 tCO_2e/yr, this represents a total of 10,680,932 tCO_2eq of ER to be achieved by December 2024, of which 10,000,000 tCO_2eq could be bought by FCPF, depending on the final terms of the ERPA[2].

This ambition is highly consistent with national policies and development priorities in Mozambique and the ER Program actually holds a significant place in the national strategy of reducing carbon emissions. Accordingly, the ER Program is not an isolated initiative in Mozambique, but has been designed as a pilot program with the aim of providing both lessons-learnt on ER activities and a strong case for the overall development and implementation of REDD+ policy in Mozambique. As such, its activities and results are expected to to help fine-tune the REDD+ National Strategy, contributing to identify possible unforeseen gaps and needs with the aim of preparing a relevant scaling-up of ER activities at larger-scale. It is therefore logical that the institutional arrangements that have been defined for the ER Program reflect the structures that should, on the long run, help implement REDD+ initiatives in the country.

---

1 Since the ER-Pa is expected to be signed mid-2018, only the second semester of 2018 will be accounted for.

[2] According to the terms of the LOI that was signed in December 2015 between the GoM and the World Bank, it was initially decided that 8,724,732 tCO_2e would be provided to the FCPF. However, following a re-evaluation of the total of ERs that could be achieved by the ER Program, the GoM is willing to offer more to the FCPF. The Maximum Contract Volume could therefore be updated in the future ER-PA.

During the reference period of the Program (from 2005 to 2015), total deforestation in the ER Program accounting area represented 213,202 ha – corresponding to 21,320 ha/yr. In this area, the main form of land-use is small-scale sedentary and shifting cultivation, with “slash-and-burn” agriculture being widely practiced in Miombo areas. Smallholders’ move towards extensification rather than intensification actually is the very basis of the deforestation mechanism we observe in the ER Program area; it is almost exclusively driven by maize and cassava production, constrained by labor availability during peak season. In the ER Program area, small-scale agriculture is interlinked with charcoal production, which is a typical by-product of agriculture: charcoal is actually produced through practices that are already accounted for in the deforestation process linked to small-scale agriculture and is not expected to have any additional impact, relatively to agriculture, on forest cover. However, given the high population growth, it is still an important driver of forest degradation to address. Another cause of forest degradation in the ER Program area is linked to the forestry sector, mainly driven by (i) illegal logging, focused on specific and precious timber; and (ii) non-sustainable exploitation practices in concessions and simple licenses areas (disrespect of management plans). Because it is essentially linked to the international demand and failure of local law enforcement, this driver is difficult to mitigate, although national policies (including the adoption of a ban on exports of unprocessed timber) are being developed.

In order to address those drivers, the ER Program will be based on a comprehensive approach that recognizes the link between agricultural development, natural resources management and governance. Since the ER Program will only account for ERs resulting from reduced deforestation, and not degradation - considered as not significant enough (less than 10% of emissions), activities focusing on the adoption of sustainable agricultural techniques will be key to its success. Nonetheless, the ER Program has four WB investment projects (the *"Sustenta"* project, the MozBio project, MozDGM and MozFIP), and those have a broader approach on land management: their activities extend beyond the agricultural sector *per se*. This is actually coherent with the overall scheme of the ER Program, based on an integrated land management approach. Other measures will focus on livelihood and income generation through the strengthening of key values chains of cash crops that are not responsible for deforestation, on regularizing land tenure and on community awareness so as to secure stakeholders' commitment on the long run. Improvement of land use planning and protection of conservation areas are also essential.

In order to reduce any risk of negative impacts of the ER Program, various safeguard documents were prepared: a Strategic Environmental and Social Assessment (SESA), an Environmental and Social Management Framework (ESMF) and a Process Framework (PF). Safeguards implementation will be monitored throughout the project lifetime, including through a Safeguards Information System (SIS), a Participatory Monitoring, Reporting and Verification (PMRV) system and an efficient Feedback and Grievance Redress Mechanism (FGRM). In any case, because most of the ER Program measures are based on incentives and on the valorization of non-carbon benefits rather than coercive, the ER Program is not expected to generate any displacement of emissions. However, although it provides for the implementation of specific reversal risks mitigation measures, 30% of the ERs generated by the ER Program will be deposited in a buffer managed by the Carbon Fund, as an insurance.

The Measurement, Monitoring and Reporting (MRV) system of the ER Program will be managed by the FNDS, through a national Participative MRV (PMRV) scheme, used to assess performance, with support of the Program Implementation Unit (PIU) at provincial scale. Given its link with the National Forest Monitoring System (SFMS), carbon accounting

for the ER Program will be based on techniques ensuring high qualification and will be managed at national level. Finally, specific arrangements will be created for the distribution of the monetary benefits generated by the ER Program. Although it is still being discussed, an advanced draft of the BSP will be made publicly available prior to ERPA signature, and as soon as it is approved by the GoM.

1. ENTITIES RESPONSIBLE FOR THE MANAGEMENT AND IMPLEMENTATION OF THE PROPOSED ER PROGRAM

1.1 ER Program Entity that is expected to sign the Emission Reduction Payment Agreement (ERPA) with the FCPF Carbon Fund

Name of entity	Ministry of Economy and Finance (MEF)
Type and description of organization	The Mozambican Ministry of Economy and Finance (MEF) is responsible for managing and coordinating national financial planning process. It aims to ensure the integrated and balanced economic and social development of the country, through consolidating an integrated system of planning and implementing a sustainable and decentralized development strategy. . In the ER Program context, the MEF will be in charge of signing the ERPA and managing ER titles transactions.
Main contact person	*Adriano Afonso Maleiane*
Title	Minister of Economy and Finance
Address	Avenida 10 de Novembro, Praça da Marinha, Nº 929, 1º Andar – C.P. 272 - Maputo
Telephone	+258 21 315015/ +258 21 315024 Fax +258 21 313747
Email	
Website	http://www.mef.gov.mz

1.2 Organization(s) responsible for managing the proposed ER Program

Name of organization	National Fund for Sustainable Development (FNDS)
Type and description of organization	The FNDS was created by governmental decree in February 2016 (Decree n°6/2016 of February, 24th). Its organic stature was approved by the Resolution n°19/2017. The FNDS is an independent public body with administrative and financial autonomy, under the sectorial tutelage of the Ministry of Land, Environment and Rural Development (MITADER – which signed the Letter of Intent (LOI) with the Carbon Fund in December 2015) and the financial tutelage of the Ministry of Economy and Finance (MEF). Its objective is to promote and manage the financing of programs and projects contributing to a sustainable and inclusive development in Mozambique that is meeting current needs without negatively affecting the ability of future generations to meet their own needs. One of its core responsibilities is to mobilize and manage financial resources (including international funding) to be used for sustainable development policies and to promote and support such policies through relevant projects and programs linked to improved environmental management, climate change mitigation, the sustainable management of forests, biodiversity conservation and land planning. In the context of the ER Program, the FNDS will manage the funds resulting from ER Payments to the Benefit Sharing Plan. The FNDS will supervise the good implementation of the ER Program and ensure its overall coordination at central level.
Organizational or contractual relation between the organization and the ER Program Entity identified in 1.1 above	The FNDS is placed under the financial tutelage of the Ministry of Economy and Finance. This tutelage includes the approval, by the Ministry of Economy and Finance, of *inter alia*: its budgets; the investment and financial plans; the financial management and annual financial reports and its investments and contracting of loans.
Main contact person	Mr. Momade Nemane
Title	Director of Resources Mobilization
Address	Av. Vladimir Lenine Nº 174 I Millennium Park I 16º Andar - Maputo
Telephone	+258 21421507
Email	momede.nemane@fnds.gov.mz
Website	http://fnds.org.mz

1.3 Partner agencies and organizations involved in the ER Program

Name of partner	Contact name, telephone and email	Core capacity and role in the ER Program
	Government	
Ministry of Economy and Finance (MEF)	Adriano Afonso Maleiane	Signature of ERPA and reception of ER payments to chanelle them to the FNDS; Management of ER Transactions Registry.
Ministry of Land, Environment and Rural Development (MITADER)	Celso Ismael Correia	Sectorial tutelage of the FNDS; national steering of REDD+ activities and programs: signature of ER-PA.
Ministry of Agriculture and Food Security (MASA)	Mahomed Valá (+258) 21415103	Coordination and support to conservation agriculture and cash crops related activities.
National Fund for Sustainable Development (FNDS)	Momade Nemane momede.nemane@fnds.gov.mz (+258) 21421507	General management of the ER program and its financing; management of the ER Payments.
National Administration of Conservation Areas (ANAC)	Madyo Couto (+258) 21420737 madyo.couto@gmail.com	Support and coordination of activities of the MozBio program.
Zambezia Provincial Government	Abdul Noormamad Razak	Governor of the Province. Support to the coordination of ER Program activities at provincial level.

REDD+ Unit in Zambézia	Tomas Bastique tomas.bastique@fnds.gov.mz (+258) 84 49 63 140	Coordination within the national directions of MITADER and inter-ministerial coordination at provincial level; everyday steering of ER Program implantation on the ground; monitoring of ER; management of FGRM at local scale.
Private sector		
Confederation of Economic Associations of Mozambique (CTA)	Assane Chaual chaualparia@yahoo.com.br (+258) 82 57 30 890	Support to development of sustainable businesses and value chains.
Zambezia Timber Associations (AMOMA, AMAZA, APAMAZ)	Several associations	Support on the organization and engagement of individual forest concessionaires.
Zambézia Timber Association	Rui Silva (+258) 86 04 60 277	Promotion and engagement of local loggers with sustainable forest management.
Development partners		
Etc Terra	Corentin Mercier c.mercier@etcterra.org (+258) 84 87 11 327	Redaction of ZILMP Background study and ER-PD; Support to technical assistance for conservation agriculture activities and cash crops.
International Institute for Environment and Development (IIED)	Isilda Nhantumbo isilda.nhantumbo@iied.org	Support/implement activities related to community forest management.

Food and Agriculture Organization of the United Nations (FAO)	Carla Cuambe carla.cuambe@fao.org	Implement a pilot project on payment for environmental services.
Adventist Development and Relief Agency (ADRA)	Farai Muchiguel fmuchiguel@adramozambique.org	Technical assistance for conservation agriculture and sustainable livelihoods
Rural Association of Mutual Help (ORAM)		Technical assistance for conservation agriculture and sustainable livelihoods.
Community Lands Initiative (ITC)	Hilário Patricio (+258) 24 21 77 62 (+258) 84 24 15 538 hpatricio@itc-f.org	Support to participatory and community strengthening, land planning and land zoning.
Network of Environment and Community Sustainable Development Organizations in Zambézia Province (RADEZA)	Daniel Maula radezamoz@yahoo.com.br (+258) 82 43 21 280	Technical assistance to community development and natural resources management.
World vision	Mauricio Munikele (+258) 24 21 20 75	Technical assistance to community development and natural resources management.
International Foundation for Wildlife Management (IGF)	Alessandro Fusari alessandrofusari@yahoo.it	Sustainable Forest and Wildlife Management in the Gilé National Reserve (GNR).
Pedagogic University (GADEC)	Manuel José de Morais (+258) 24 21 62 98	Education, research and capacity building for Environmental Management and community Development.

Uni-Zambeze (FEAF)	Noé Ananias Hofiço (+258) 81 70 940 (+258) 84 26 42 706 n_hofico@yahoo.com.br	Education, research and capacity building in forestry and agriculture.

2. STRATEGIC CONTEXT AND RATIONALE FOR THE ER PROGRAM

2.1 Current status of the Readiness Package and summary of additional achievements of readiness activities in the country

General timeline

The FCPF financially and technically supported the GoM on the REDD+ Readiness process through a first grant of USD 3.8 million in 2013-2017 and an additional USD 5 million grant in 2016-2018 to finalize the Readiness process.

In 2015, the Government of Mozambique (GoM) successfully presented to the Carbon Fund of the Forest Carbon Partnership Facility (FCPF CF) the Early Idea and the Emission Reductions Program Idea Note (ER-PIN) of the Zambézia Integrated Landscape Management Program (ZILMP). The ER-PIN was selected into the Carbon Fund's pipeline in October 2015 (Resolution CFM/13/2015/6). A Letter of Intent (LOI) was signed during the Paris Conference of Parties (COP 21) in December 2015 between the Ministry of Land, Environment and Rural Development (MITADER) of the GoM and the Carbon Fund (CF) on the potential purchase of Emission Reductions (ER) from the ER Program. According to this LOI, the World Bank (WB) could purchase up to 8.7 million of ER from this program[3] – "Maximum Contract Volume".

The final draft of the national REDD+ Strategy and the Definition of Forest were approved by the GoM's Council of Ministers in November 2016. In January 2017, the GoM submitted its Readiness Package[4], which was approved by the Participants Committees Meeting (PC23) in March 2017 (Resolution PC/23/2017/5).

Mozambique issued its first and advanced drafts ER-PD in, repsectively, January and July 2017. The Technical Advisory Panel (TAP) reviewed the ER-PD and issued its TAP Review document in August 2017. The Carbon Fund Participants reviewed the draft ER-PD and the TAP Review document and submitted their consolidated comments to the FCPF Facility Management Team (FMT) in October 2017. **Based on the findings of the TAP Review and the comments of Carbon Fund Participants, Mozambique submitted to the FMT a final ER-PD in December 2017.** The TAP reviewed such final ER-PD and issued its final TAP Review document to the FMT in December 2017. **On January 30, 2018 Mozambique presented its final ERPD at the FCPF Carbon Fund meeting** - *See* **Table 2** *for a detailed chronological summary.*

On January 30, 2018 Mozambique presented its final ERPD at the FCPF Carbon Fund meeting, which was provisionally included into the portfolio of the Carbon Fund in February

3 However, following a re-evaluation of the total of ERs that could be achieved by the ER Program, the GoM is willing to offer more to the FCPF. The Maximum Contract Volume could therefore be updated in the future ER-PA, up to 10.0 million of ER.

4 See FCPF website for Readiness Package and TAP assessment.: https://www.forestcarbonpartnership.org/mozambique

2018, through Resolution CFM/17/2018/1. **The provisional inclusion of Mozambique's ER-PD into the portfolio of the Carbon Fund was deemed approved upon fulfillment of several conditions, including the submission of a revised ER-PD, the approval of the new REDD+ Decree and the availability of an Advanced Draft of Benefit Sharing Plan (BSP).** The country is now presenting this revised ER-PD, along with the other requierements, hoping that it will justify the signature of an Emission Reduction Program Agreement (ERPA).

Readiness achievements

During Readiness phase, relevant national and provincial level studies have been conducted in order to best design the ER Program – *see* Table 1. They include:

- The analysis of the drivers of deforestation and the strategic options to address those drivers (Winrock International and CEAGRE, 2015);
- The analysis of the legal and institutional framework for REDD+ in Mozambique (Beta and Nemus, 2015);
- The establishment of the National Forest Definition (Falcão and Noa, 2016);
- The completion of the National REDD+ Strategy and Action Plan (MITADER, 2016a);
- The preparation of the Safeguard Instruments for REDD+, especially the Strategic Environmental and Social Assessment (SESA), the Environmental and Social Management Framework (ESMF) for REDD+ initiatives and the Process Framework (PF) - updated to cover national REDD+ initiatives (*see section 14 on safeguards*);
- The background study for the preparation of the ER Program (Mercier et al., 2016), which includes a thorough analysis of the drivers of deforestation;
- The definition of the Forest Reference Level and Forest Reference Emissions Level (FRL / FREL), including a national Reference Emissions Level (REL) with national level forest inventory;
- The designing of the Monitoring System for Forest - including national measurement, reporting, and verification system (MRV).

All the approved documents are available on Mozambique REDD+ website.

Table 1: Level of achievement of Readiness package elements

Readiness package documents	Level of achievement	Date of approval (*expected*)
Analysis of the drivers of deforestation and the strategic options to address those drivers	Completed	2015
Analysis of the legal and institutional framework for REDD+ in Mozambique	Completed	2015
Background study for the preparation of the Zambézia Integrated Landscapes Management Program	Completed	August 2016
Establishment of the national forest definition	Completed	November 2016
National REDD+ Strategy	Completed	November 2016

Environmental and Social Management Framework (ESMF) for REDD+ initiatives, MozFIP and MozDGM	Completed	January 2017
Process Framework (PF) for MozBio, updated to cover National REDD+ initiatives, MozFIP and MozDGM	Completed	January 2017
R Package	Completed	March 2017
Forest Reference Level and Forest Reference Emissions Level	Completed	June 2017
National Reference Emission Level	Completed	June 2017
Strategic Environmental and Social Assessment - SESA (safeguard instrument)	Completed	November 2017
National Forest Inventory	In progress	Expected to be concluded early 2018
Monitoring system for forest, including National MRV system	In progress	Expected to be fully operational by July 2018

In addition to those studies, major institutional achievements under Readiness funding include: (i) the creation of the Zambézia Multi-Stakeholders Landscape Forum (MSLF), which is a crucial instrument for stakeholders consultation and participation in the design and implementation of the ER Program – *see section 5;* and (ii) the adoption of Decree 70/2013, which created the REDD+ Technical Unit (UT-REDD+)[5] and the inter-ministerial Technical Committee (CR*)* for REDD+, which was later on completed and merged with the FIP National Steering Committee (NSC) in order to ease cross-sectorial coordination for REDD+ subjects – *see section 6.2*.

Finally, in April 2018, a new REDD+ Decree was adopted by the Council of Ministers in order to best refflect the evolution of REDD+ policies in Mozambique since 2013 and meet all the requirements of the FCPF. The new REDD+ Decree, which now regulates and defines principles and standards for the implementation of all REDD+ programs and projectsin the country, provides a more precise framework with regards to, *inter alia*, REDD+ data management systems and registries, ER titles ownership and institutional arrangements..

2.2 Ambition and strategic rationale for the ER Program

Since the late 1990s and early 2000s, the adoption of various national policies and the valorization of development priorities linked to ER, carbon stock enhancement, sustainable management of forest and conservation areas have shown the commitment of the GoM to REDD+ initiative. In particular, Mozambique has a progressive legal framework for the promotion of sustainable forest management (UT REDD+, 2015a). Through forest sector legislation (Law on Forests and Wildlife, 1999) and regulatory procedures for land management (Land Law, 1997), Mozambique seeks to balance social, environmental and economic issues, paying special attention to the role and benefits to rural communities. Actually, the very Constitution of the Republic of Mozambique of 2004 (Governo de

[5] *Since then, the UT REDD+ has been absorbed into the FNDS (see section 6), which is now responsible for implementing the REDD+ Strategy in Mozambique.*

Moçambique, 2004) specifies that the State shall adopt policies to "ensure the rational use of natural resources to safeguard its renewal capacity, ecological stability and rights of future generations" (Article 117, 2, d) as well as the “rational utilization of its natural resources” (Article 90, 2). This commitment has been confirmed with the new Government, who took office in February 2015 after general elections. In particular, the new administration adopted a Five Year Government Plan (*Plano Quinquenal do Governo - PQG*) for the 2015-2019 period, for economic and social development (Governo de Moçambique, 2015b). The PQG settles five national priorities. In particular, the 5t^{h} strategic pillar is focused on transparent and sustainable management of natural resources and the environment[6]. One of the strategic objectives is to "ensure the integration of the Blue/Green Economy and Green Growth agenda in national development priorities, ensuring conservation of ecosystems, biodiversity and the sustainable use of natural resources." (Governo de Moçambique, 2015b, p. 36)

Standing as its first program of results-based payments for ER in Mozambique, the ZILMP is fully keeping with this momentum. The program is expected to contribute to long-term sustainable management of forest in the province of Zambézia by addressing the main drivers of deforestation and forest degradation while implementing innovative measures aiming to increase rural communities’ income in the area. All in all, the ER Program aims to initiate a virtuous circle reconciling economic development and environmental preservation.

Ambition and strategic rationale

ER Program location

Zambezia province - Accordingly with criterion 1 of the FCPF Methodological Framework (FCPF MF, 2016a), the ZILMP ER Program was designed at jurisdictional scale and covers 9 districts of Zambézia province: Gilé, Pebane, Maganja da Costa, Mocubela, Ilé, Mulevala, Alto-Molocué, Mocuba and Gurué – *see section 3 for maps.* Zambézia province is characterized by relevant qualities for the ER Program: it concentrates 14% of Mozambique’s forest; it is the most densely populated province of Mozambique; 70.5% of its population lives under the poverty line; its economy is based on agriculture and the use of forest resources; it already comprises a strong private sector and civil society involvement.

9 districts of Zambezia province – The ER Program was designed as an up-scale of a previous REDD+ pilot project, launched in the Gilé National Reserve (GNR) and its periphery - *see section 18 for more details*. Considering the success of the project and facing growing deforestation in other part of Zambézia province, the GoM decided in 2015 to extend this initiative and to intensify it in order to make it an innovative REDD+ jurisdictional program, covering several districts of the Zambézia province.

The GoM decided not to develop the ER Program on the whole Zambézia province but, rather, to focus on a portion of it. As such, when the ER-PIN was presented to the FCPF, the ZILMP was actually only covering 5 districts of the Zambézia province, which are characterized by globally important biodiversity with mangrove forests, a significant range of

6 Until today, preliminary results from the PQG between January 2015 and June 2017 include the design of the National Program for Sustainable Development, with (inter alia) the implementation of 26 projects by MITADER (some have began in 2013), the signature of 5 bilateral cooperation agreements and the signature of 11 internaional cooperation agreements.

endemic and vulnerable/endangered species and a protected area: the GNR[7] - *see section 3*.

Following comments and observation from the CFPs in 2015, the total ER Program area was extended to cover 7 and then 9 districts of Zambézia province, for two main reasons. First, within Zambézia province itself, the 9 selected districts especially represent a strong area of expansion for deforestation.

Second, but linked to the first point, because they are particularly subject to deforestation, those 9 districts are those, within Zambézia province, which concentrate the investment activities that will help reduce deforestation in the province. Indeed, the selected districts are geographically coherent with the areas covered by other initiatives already funded by the World Bank (WB), including the Conservation Area for Biodiversity and Development project (MozBio project), the Mozambique Forest Investment Project (MozFIP) and the Dedicated Grant Mechanism (MozDGM), as well as the Agriculture and Natural Resources Landscape Project (the "*Sustenta*" project) - *see section 4.1*. Yet, those existing funds enable to secure long-term financing for the ER Program interventions and ensure the efficiency of the activities - *see section 6.2.* Such investment are for now limited to those 9 districts, and much more funding would be necessary to cover other districts of the province.

However, the ER Program activities could always be replicated further and scaled-up to additional districts of Zambézia province, and further, when proved successful and when other funding are available.

Ambition of ER Program

Accordingly with criterion 1 of the FCPF MF, the ZILMP ER Program is also ambitious, in that it aims to address a significant portion of forest-related emissions and removals in the country. In 2015, the 9 districts involved in the program entail a total of 3.4 million ha of forest. They have suffered significant deforestation over the last 10 years. During the reference period of the Program (from 2005 to 2015), total deforestation in the ER Program accounting area represented 213,202 ha – corresponding to 21,320 ha/yr - *see* Table 38 *in section 8.*

According to the National REDD+ Strategy, *ceteris paribus*, it is estimated that emissions from deforestation and forest degradation could reach 39 $MtCO_2e$/yr by 2030 in Mozambique. The overall National REDD+ Strategy's target in terms of ER is to reduce those emissions to 3 $MtCO_2e$/yr in 2030, through reducing deforestation and increasing carbon stocks. This represents an overall objective of avoiding 170 $MtCO_2e$ during the reference period going from 2016 to 2030.

The ER Program is expected to significantly contribute to this objective, its ambition being to achieve a total of 10.7 $MtCO_2e$ of ER between 2018 and December 2024, which corresponds to reducing deforestation in the ER Program area by 30% in the period

[7] *It should be noted that Zambézia province is home of another protected area: the archipelago of "Ilhas Primeiras e Segundas", located in front of Nampula and Zambézia Province. Although they are not part of the ER Program accounting area for now (no ER Program activities are planned in those islands) they could be the subjects of further attention in the event of a potential up-sale of the ER Program in the future.*

(2018-2019)[8] and by 40% in the second period (2020-2024) - *for more details on the estimation of the ERs expected from the program, see section 13*.

The ER Program should therefore contribute to 6% of the National REDD+ Strategy's objectives in terms of ERs.

Consistency with national policies and development strategies

Generally speaking, the ER Program is highly consistent with national policies and development priorities in Mozambique. In particular, the National Sustainable Development Program (Governo de Moçambique, 2015a), promoted by MITADER, provides the key linkages between the country's priorities and REDD+, stressing the need to invest in resilience to climate change with particular emphasis on the agricultural sector, tourism and infrastructure. The Program aims to achieve the goals and strategies reflected in the PQG by outlining key actions and projects to be implemented in rural Mozambique. More importantly, this vision includes MITADER's *Terra Segura* (Secure Land) Project - aiming at registering 5 million parcels and completing 4,000 community land delimitations - as well as the *Floresta Em Pé* (Standing Forest) project, focusing on strategic policy and management options for the forest sector (UT REDD, 2016) – *see section 4.1 for more details.*

The ER Program will contribute to those goals, reaching for the protection of biodiversity and the sustainable use of forest resources and economic rural development through the promotion of sustainable agricultural practices as well as of diversified agricultural production, increased efficiency of charcoal production through a better management of wood resources and of secure tenure rights, among other components - *details on actions and interventions to be implemented are provided in section 4.3*.

Further, the ER Program has a strong social component and seeks to increase the participation of stakeholders in order to reduce poverty, especially in rural areas: it will support the strategic goals of the Forest Policy and Strategy (2016-2020), especially in relation with its objectives of (i) social participation and equitable benefit sharing mechanisms; (ii) environmental sustainability on the use of forest resources and (iii) increase of the economic contribution of forests to the country's development. It is also fully aligned with the Forest Investment Plan (FIP) of the Climate Investment Fund (CIF), which was approved in January 2017 – *see section 4.1 for details*.

Synergistic potential actions may also be identified in various sectors. The intensification of agriculture to increase production and productivity and improve soil conservation through conservation agriculture techniques, for instance, which is also an important component of the ER Program, is defined as a priority in the Strategic Plan for the Development of the Agricultural Sector (PEDSA - 2011-2020) (Governo de Moçambique, 2011a) and the National REDD+ Strategy. In the same way, the Ministry of Mineral Resources and Energy (MIREME) promotes actions linked to the production and sustainable use of biomass energy. It has been emphasized in the Strategy for Conservation and Sustainable Use of Energy from Biomass (Ministério da Energia, 2013) that lays down general guidelines for the production of biomass and its transformation into energy and sustainable use.

Consistency with the National REDD+ Strategy

[8] *Since the ER-Pa is expected to be signed mid-2018, only the second semester of 2018 will be accounted for. The terms of the ERPA will apply for 6,5 years, from mid 2018 to December 2024.*

The ER Program's ambition is fully aligned with the National REDD+ Strategy, which promotes "integrated multi-sectoral interventions to reduce carbon emissions associated with land use and land use change through adherence to the principles of sustainable management of forest ecosystems (natural and planted), contributing to global mitigation and adaptation to climate change and to the efforts for an integrated rural development" (MITADER, 2016a). Those coincide perfectly with the planned interventions of the ER Program, detailed in section 4.3.

Admittedly, the ER Program is based on multiple actions that reflect a variety of interventions from the national REDD+ strategy in a coordinated manner. Mozambique's REDD+ Strategy comprises six strategic pillars translated into equal number of main sets of activities, namely:

1. Cross-cutting actions: establish an institutional and legal platform for inter-agency coordination to ensure the reduction of deforestation;
2. Agriculture: promoting alternative sustainable practices to shifting cultivation, which ensure increased productivity of food and cash crops;
3. Energy: increase access to alternative sources of biomass in urban areas and increase the efficiency of production and use of biomass energy;
4. Conservation Areas: strengthen the system of protected areas and find safe ways of generating income;
5. Sustainable Forest Management: promote the system of forest concessions, community management and strengthening forest governance;
6. Restoration of degraded forests and planting trees: establishing a favorable environment for forest businesses, restoration of natural forests and planting of trees for various purposes, production and use of biomass energy.

All the above interventions are established as priorities for the ER Program. The totality of the ER Program interventions are related to those objectives and were defined according to the six pillars of the National REDD+ Strategy. *They are detailed and classified according to those pillars in section 4.3.*

2.3 Political commitment

Inter-relation between the political commitment to REDD+ and to the ER Program

Since the approval of its the Readiness Project Idea Note (R-PIN) in 2008, Mozambique has been developing its capacities in terms of Monitoring, Reporting and Verification (MRV) - which is a crucial element for ER initiatives and for the ER Program - and has engaged into a thorough consultation process on various aspects related to REDD+ (legal instruments, definition of forest, safeguards, etc.), which has benefited to the ER Program. In only two years (2015 – 2016), the GoM submitted to the FCPF its Early Idea and its Emission Reductions Project Idea Note (ER-PIN) related to the ER Program and engaged itself to long-term commitment to this Program with the signature of a LOI with the World Bank.

As stated before, this tendency was intensified with the new Government, who has publicly recognized forest-related challenges and shown commitment to addressing them: over the last two years, a number of remarkable changes took place, pointing to a change of direction in the management of the forest sector. They encompass measures related to the

strengthening of the ER Program, with lots of progress in 2015 – 2016, including (*inter alia*): an analysis of the drivers of deforestation and the strategic options to address those drivers, an analysis of the legal and institutional framework for REDD+ in Mozambique, the intensification of MRV preparation for REDD+, a background study for the preparation of the ZILMP, the approval of the ESMF, SESA and PF for REDD+ initiatives, the establishment of the National Forest Definition, etc.

In particular, the GoM's commitment to the ER Program was recently especially obvious with the creation of the Zambézia Multi-Stakeholders Landscape Forum (MSLF) – *see section 5* - and, more importantly, with the adoption of the National REDD+ Strategy, which lays out clear institutional arrangements to facilitate the flow of information within the State institutions and ease cooperation with the private sector and civil society, service providers and members of local communities who are expected to highly contribute to the ER Program (UT REDD+, 2015a). Those institutional arrangements completed the initial institutional design for REDD+ implementation, described in the Decree No. 70/13 of December 20th, 2013 ("Regulation of the procedures for approval of projects for reducing emissions from deforestation and degradation") (Governo de Moçambique, 2013) and were refined to enable a more efficient implementation of the ER Program, with the creation of the FNDS and the establishment of the provincial Program Implementation Unit (PIU) - *for more information on institutional arrangements for REDD+ and for the ER Program, see section 6*. They were even more clarified in the new REDD+ Decree, approved in April 2018.

Those evolutions show that the GoM's commitment to REDD+ is inextricably linked to its commitment to the ER Program in particular. Admittedly, the design and progressive implementation of the ER Program has helped to shape mechanisms that, although they were primarily initiated for the ER Program, are now serving REDD+ initiatives in general, as shown in **Table 2**, which chronologically summarizes the complementary processes of the GoM's political commitment to REDD+ and to the ER Program.

Table 2: Chronological summary of political commitment to REDD+

Significant events with regards to political commitment to the ER Program	Significant events with regards to political commitment to REDD+
2008	
Submission and approval of the Readiness Project Idea Note (R-PIN).	
2012	
Submission and approval of the final version of the Readiness Preparation Proposal (R-PP).	Start of consultations on the legal instruments to regulate REDD+ projects in Mozambique; Participation in SADC meeting on MRV in Johannesburg (South Africa) to discuss the possibilities of MRV development considering forest types in the region; DNTF officer sent to the JICA training on REDD+ MRV in Japan;
2013 - 2014	

Start of public consultations on the regulations of pilot projects for REDD+; Due diligence in view of signing a Grant Agreement for R-PP implementation; The GoM is granted a 3.8 M USD grant from the FCPF Readiness Fund.	Adoption of the Decree No. 70/13 of December 20th, 2013 ("Regulation of the procedures for approval of projects for reducing emissions from deforestation and degradation") National Stakeholder meeting on SADC REDD+ MRV held Maputo; Participation of Mozambique at the Participants Committee Sixteenth Meeting (PC16).
2014 - 2015	
Selection of the ZILMP as a REDD+ pilot project.	Two days workshop for the operation of the Rules of Procedures for approving REDD+ projects, with the participation of technicians from MICOA and MINAG: Workshop on social and environmental safeguards organized at the World Bank office in Maputo; Start of consultations on the definition of forest; Start of SESA preparation with public consultation on TORs; Mozambique selected by SADC as a pilot country for Mopane ecosystem for SADCGIZ regional MRV system project, with capacity building training on Remote Sensing in DNTF-MINAG and training in forest inventory.
2015 - 2016	
Presentation of the Early idea of the ZILMP ER Program; Creation of the Zambézia Provincial Forum for REDD+; Submission and approval of the Emission Reductions Project Idea Not (ER-PIN) for the ZILMP ER Program; Signature of Letter of Intent (LOI) between the FCPF CF and the GoM for the ZILMP ER Program.	Creation of a website for dissemination of REDD+; Analysis of the Drivers of Deforestation and the strategic options to address those drivers; Analysis of the Legal and Institutional Framework for REDD+ in Mozambique; **Creation of the Ministry of Land, Environment and Rural Development (MITADER);** Adoption of the Five Year Government Plan (*Plano Quinquenal do Governo - PQG*) for the 2015-2019 period; Adoption of the National Sustainable Development Program with the *Terra Segura* (Secure Land) Project and the *Floresta Em Pé* (Standing Forest) project;

	Forest Sector Review, including a forest license moratorium, new incentives toward sustainable forest management and the assessment of forest operators; Intensifying of MRV preparation for REDD+: (i) hiring of an international consultant to conduct the implementation of MRV in Mozambique; (ii) preparation of the MRV implementation plan for 2016-2018 period; (iii) participation of Mozambique at the GFOI open forum to share the experience and challenges on the implementation of MRV; Creation of DGM steering committee for MozFIP.
2016	
Preparation of the first draft of the Forest Investment Plan (FIP) that will support the first stage of implementation of the ZILMP ER Program; The GoM is granted an additional 5 M USD grant from the FCPF Readiness Fund; Creation of the Zambézia Multi-Stakeholders Landscape Forum (MSLF) Establishment of the Zambézia Program Implementation Unit (PIU); Background study for the preparation of the Zambézia Integrated Landscapes Management Program; Start of the preparation of the Emission Reductions Program Document (ER-PD);	**Creation of National Fund for Sustainable Development (FNDS)**. Approval of the National REDD+ Strategy; Establishment of the National Forest Definition; Consultations for the National REDD+ strategies and for safeguard documents;
2017	
Approval of R Package; Final ER-PD submitted for validation to the FCPF CF	Approval of the Environmental and Social Management Framework for the Mozambique Forest Investment Project, the Dedicated Grant Mechanism to Local Communities and REDD+ Initiatives; Approval of the MozBio Process Framework (PF), updated to cover REDD+ initiatives, and approval of the SESA. Revision of the 2013 REDD+ Decree.
2018	
Submission of a revised ER-PD Submission of the Avdanced Draft of Benefit	Approval of the new REDD+ Decree (April 2018)

Sharing Plan (BSP)
Expected signature of ERPA (mid-2018)

Highest level of political commitment to the ER Program

The highest level of political commitment to the ER Program is embodied in the MITADER and its FNDS, the latter being responsible for managing the proposed ER Program.

Recently created – respectively, in January 2015 and in February 2016 – those bodies show that the current Government has publicly recognized forest-related challenges and shown commitment to addressing them. Their role in the design and implementation of the ER Program is a clear sign that their creation coincides – and strengthens – the GoM's commitment to the ER Program.

Ministry of Land, Environment and Rural Development (MITADER)

Since its creation three years ago, the MITADER has fully been operationalized, with clear mandate. It is today the leading entity in Mozambique with regards to policies in the fields of land management and administration (demarcation, land use planning and registry), forests and wildlife, environment, conservation areas and rural development (poverty reduction in rural areas) – *see*

Table 3 - which all are significant areas of interventions for the ER Program. More precisely, with regards to forests management, MITADER is responsible for proposing development strategies linked to the forest sector and to the sustainable use of forest resources.

Actually, MITADER already adopted several strategic actions to address challenges in the forest sector, including a participatory audit of all forest concessions, the suspension of new requests for exploration areas, a ban on log exports, the updating of forest policies and regulations, and an ambitious project called "*Floresta em Pé" (already mentioned in 2.1)*, which aims to promote sustainable integrated rural development though the protection, conservation, valorization, creation and sustainable management of forests – *see section 4.1*

Table 3: MITADER's main responsibilities and relevance for REDD+

Land management	- Ensure the development, implementation and supervision of territorial planning instruments - Develop a sustainable national land registration and information system on land including the rights of occupation in good faith and communal lands
Forest management	- Propose the approval of legislation, policies and development strategies in the area of forests - Establish standards for licensing, management, protection, conservation, supervision and monitoring of sustainable use of forest resources - Develop and implement policies and procedures on the use and sustainable management of forest resources - Assess quantitative and qualitative forest resources and the reduction of emissions from deforestation and forest degradation - Establish measures of prevention and control of uncontrolled fires; - Ensure sustainable use of woody biomass - Promote rational use of secondary forest species and non-timber forest

	products - Promoting community participation in sustainable management of forest resources
Environment	- Propose policies and legislation and standards for preservation actions of environmental quality - Establish and implement policies and procedures for environmental licensing of development projects - Promote the adoption of integration policies of the green economy, biodiversity and of climate change in sectorial programs - Ensure participation of local communities in co-management of natural resources and ecosystems
Rural development	- Propose policies and rural development strategies that are integrated and sustainable - Promote community participation and empowerment of associations in local economic development processes - Strengthen the local economic actors to contribute in the sustainable exploitation of natural resources and in boosting the local economy
Conservation and wildlife management	- Ensure the licensing, management, protection, conservation, supervision and monitoring of the use of wildlife resources - Establish and implement policies and procedures for licensing, management and operation of the national protected areas network - Administer the national parks and reserves and conservancies and other conservation areas - Ensure the protection, conservation and wildlife recovery of endangered species and endangered species and fragile ecosystems

To sum up, the MITADER brings together responsibilities that were previously spread across several ministries; in order to facilitate the coordination needed to address challenges of cross-sectorial nature[9]. As a consequence, its creation coincided with (i) the suppression of the former Ministry for the Coordination of Environmental Affairs (MICOA), whose mandate was taken over by MITADER; and (ii) the re-definition of the mandate of the Ministry of Agriculture (MINAG), which became the Ministry for Agriculture and Food Security (MASA), of which the mandate is to guarantee food security through increase agricultural production – *see section 6*. MITADER's coordination role is expected to be improved in a situation where it has direct management mandate over a wider number of important natural resources and social issues and particularly to manage rural development and forests. Note is taken of the fact that rural development is a cross-cutting subject. Its materialization relies on the coordination of multiple interventions (Beta and Nemus, 2016).

[9] *For many years (1994 - 2014), environmental issues had only been managed through the Ministry responsible for environmental coordination (the Ministry for the Coordination of Environmental Affairs / Ministério para a Coordenação da Acção Ambiental - MICOA), without vertical mandate or direct responsibility of implementing development programs on the ground (Beta and Nemus, 2016). Agricultural policies were only managed by the Ministry responsible for Agriculture (MINAG).*

The creation of MITADER is therefore a turning point, showing the efforts that the GoM has been carrying out to integrate complex issues and promote synergy between core challenges for REDD+ policies. This restructuring is a clear indication of the Government's vision and commitment to promote a landscape-based approach to forest and natural resources management. It is therefore coherent that most of the planned interventions under the proposed ER Program will fall under MITADER itself, which has the bulk of the responsibilities to manage forests and rural development.

With regards to the ER Program precisely, MITADER is the overarching body to which the FNDS, in charge of coordinating and of ensuring the good implementation of ER initiatives, is attached - *see section 6*. It will be in charge of coordinating the land-based actions of the ER Program with the other ministries involved, including MASA, for cross-sectorial ER Program interventions – *see section 4.3*. For instance, the activities comprised in ERI-D2, for the structuring of key sustainable value-chains, will be led both by MITADER and MASA, with Service providers being hired and supervised by MITADER under the guidance of MASA.

The National Fund for Sustainable Development (FNDS)

The GoM's commitment is also evidenced by the subsequent creation of the FNDS, in February 2016 (national decree n°6/2016) (Governo de Moçambique, 2016) under the sectorial tutelage of MITADER. The FNDS aims to, precisely, contribute to the strategic planning of the land, environment and rural development sector in Mozambique and to give impetus to the integrated and sustainable rural development process in a coherent and sustainable way. **Its main objective is to promote and finance programs and projects that guarantee sustainable, harmonious and inclusive development, with particular emphasis on rural areas.**

The FNDS is especially responsible for managing REDD+ funding and reports directly to the Minister. In particular, the FNDS is the entity in charge of managing the ER Program, including with technical and financial coordination, working closely with some of MITADER's technical directorates, mainly the National Directorate of Forests (DINAF), the National Directorate of Land (DINAT), the National Agency for Environmental Quality Control (AQUA) and the National Agency of Conservation Areas (ANAC), which are all playing a key role in the ER Program. On every REDD+ issues, the FNDS also liaises with other ministries such as the MASA and MIREME, amongst others.

Box 1: Summary of the relation between the ER Program and the overall REDD+ process in Mozambique

The analysis in this sections 2.2 and 2.3 really show that **the ER Program is not an isolated initiative in Mozambique, but has been designed as a pilot program with the aim of providing both lessons-learnt on ER activities and a strong case for the overall development and implementation of REDD+ in Mozambique**. As previsouly explained, Mozambique's political commitment to the ER Program is concomitant with the ever growing commitment of the GoM to REDD+ in general, which, since 2008, has been straightforward, and this is clearly demonstrated in **Table 2**, that chronologically summarizes the complementary processes of the GoM's political commitment to REDD+ and to the ER Program.

It is therefore logical that the institutional arrangements that have been defined for the ER Program (see section 6.1) reflect the structures that should, on the long run, help implement REDD+ initiatives in the country, including on a national scale. The fact that the entity in charge of implementing and coordinating the ER Program is the FNDS is meaningful: the FNDS was created as, and is today, the body responsible for ensuring the development of a national framework promoting improved environmental management, climate change mitigation, the sustainable management of forests, biodiversity conservation and land planning. It is also is the entity in charge if piloting and authorizing REDD+ projects and program in Mozambique. It makes no doubt that the practical implementation of the ER Program by the FNDS will reinforce its future experience in and understanding of ER initiatives and will provide it with strong expertise for future REDD+ policies development in the country.

In addition, during Readiness phase, the GoM have been strengthening lots of competencies related to REDD+ management that will be carried out over the long-term, including in terms of MRV. Those competencies will directly serve and are expected to be reinforced by the implementation of the ER Program that will enable their sustainable appropriation for national REDD+ commitment. In the same way, the safeguard instruments that have been developed or strengthen for the ER Program, such as the Safeguard Information System (SIS) of the Feedback and Grievance Redress Mechanism (FGMR), are planned to be implemented at national scale: as stated in section 14, they are part of the Participatory MRV (PRMV) that will be tested as a pilot in 2018, including in Zambézia province as part of the ER Program, with the objective of being replicated at larger scale later on.

As stated in this section 2, the ER Program's ambition is therefore fully aligned with the National REDD+ Strategy, so as to enable to test its relevancy. The totality of the ER Program interventions being related to the objectives of the National REDD+ Strategy, as shown in section 4.3, the lessons-learnt provided by the ER Program will fuel future possible reflections on the National REDD+ Strategy that could be adapted accordingly. Consequently, the activities and results from the ER Program are also expected to generate lessons learnt to help fine-tune REDD+ National Strategy and extend REDD+ activities and interventions to other areas of the country in the future. It will also contribute to identify possible unforeseen gaps and need of the REDD+ strategy.

Cross sectorial commitment

Cross-sectorial commitment in REDD+ in Mozambique is enhanced through various Ministries' cooperation, including for the implementation of the ER Program.

The Ministry of Agriculture and Food Security (MASA) maintains its focus on promoting agriculture productivity and management of planted forests in the country. However, most of the affairs related to REDD+ that were under the management of MASA have migrated to MITADER's coordination[10]. The next table summarizes specific tasks of MASA under each area of important responsibility for REDD+ (Beta and Nemus, 2016).

The Ministry of Mineral Resources and Energy (MIREME) also plays a critical role in REDD+ through the promotion of sustainable use of energy and managing the mining sector (UT

[10] *Except for silviculture, planted forests and conservation agriculture.*

REDD+, 2015a). Rural development is part of its priority axis of actions, with one of the objectives being to increase the offer of alternative energy to charcoal (Beta and Nemus, 2016) – the production of charcoal is an important driver of forest degradation in the ER Program area[11], as explained in section 4.1.

This has been embodied in the adoption in 2013 of the Strategy for Conservation and Sustainable Use of Energy from Biomass (Ministério da Energia, 2013). MIREME especially contains the National Direction of Energy (DNE) as well as the FUNAE (*Fundo de Energia* – Energy Fund) – *see section 6.*

Table 4: MASA's responsibilities under REDD+

Relevant areas of performance for REDD+	Specific task
Agro-forest plantations[12]	• Proposing legal and institutional frameworks that are appropriate for development of agro-forest plantations; • Implementing sector policies, plans, programs and strategies; • Proposing and establishing operational norms for agro-forest projects; • Ensuring development of agro-forest plantations for conservation, energetic, commercial and industrial purposes; • Promoting research activities and ensuring dissemination of results; • Promoting local/internal processing of agro-forest products.
Agriculture	• Proposing policy framework for agrarian development in Mozambique; • Establishing norms for sector licensing, monitoring of activities; • Ensuring quality and phyto-sanitary measures in the sector; • Promoting research activities and ensuring dissemination of results; • Promoting extension services and ensuring these services are rendered to farmers; • Providing capacity building to farmers; • Promoting development of infrastructures that are relevant for the

[11] As explained in section 4.1, in the ER Program area, even though charcoal production is responsible for forest degradation, it is for now almost exclusively restricted to areas that would be deforested for agricultural purpose in the near future; therefore, currently, charcoal production does not have any additional impact of forest cover, relatively to agriculture. However, given the high population growth and the increasing need in charcoal and energy (see (Mercier et al., 2016), and section 4.1), especially around urban centers, it is expected that charcoal production will remain stable or increase in the future: ***it is, therefore, still an important driver of forest degradation to address.***

[12] Agro forestry activities in Zambezia and in the context of the ER Program are managed by MITADER or IIAM, in cooperation with MASA.

	sector; • Managing sector related information.
Food security	• Promoting food security related to legal framework, strategies, policies and plans; • Managing food security related information; • Promoting information access on food conservation and processing; • Promoting food security education of communities to ensure nutrition; • Ensuring inter-institutional coordination in food security policy formulation, implementation, monitoring and evaluation.

3. ER PROGRAM LOCATION

3.1 Accounting Area for the ER Program

Mozambique is divided in Provinces, districts and municipalities that were first defined by its 1975 Constitution. The current administrative national organization comprises 11 provinces: Niassa, Cabo Delgado, Nampula, Zambézia, Tete, Manica, Sofala, Gaza, Inhambane, Maputo and Maputo City. Since the new Law of Administrative division 26/2013, which created 23 new districts, those provinces are divided in 151 districts.

The ER Program will be implemented in Central-Northern Mozambique, in Zambézia province, of which it will cover 9 districts: Gilé, Pebane, Maganja da Costa, Mocubela, Ilé, Mulevala and Alto-Molocué, Mocuba and Gurué – *see section 2.2*. As shown in Table 5, it covers a total area of 6 million ha[13], including, in 2015, 3.4 million ha of forest (see Table 38) – which is 56% of the ER Program area.

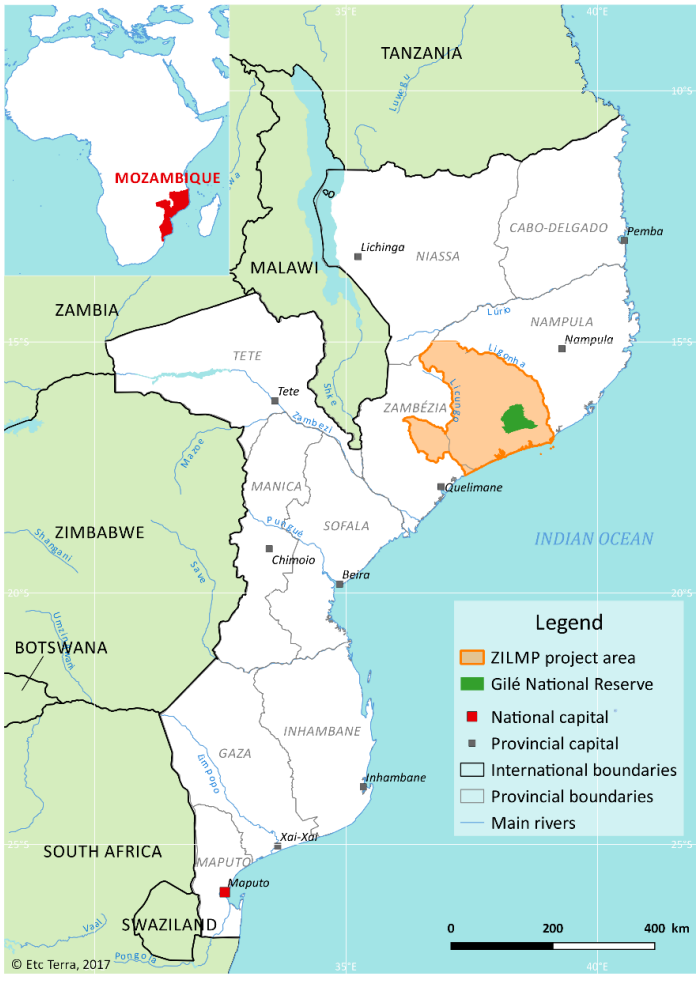


Figure 1: Location of Zambézia province and of the ER Program area

[13] *Based on national data*

Table 5: Surface of the ZILMP area

ER Program districts	6,009,414 ha
Forest area in ER Program area (2015, national grid)	3,382,328 ha
Percentage of forest cover in ER Program area	56%

In Zambézia province and in the ER Program area, the Gilé National Reserve (GNR), long considered as one of Mozambique's main biodiversity hot spots, extends over the districts of Pebane and Gilé. It covers 436,400 ha, divided between a full protection zone - commonly called the Reserve (283,600 ha) - and a peripheral buffer zone (152,800 ha), where some activities are allowed, located mainly west of the Reserve (Mercier et al., 2016)[14].

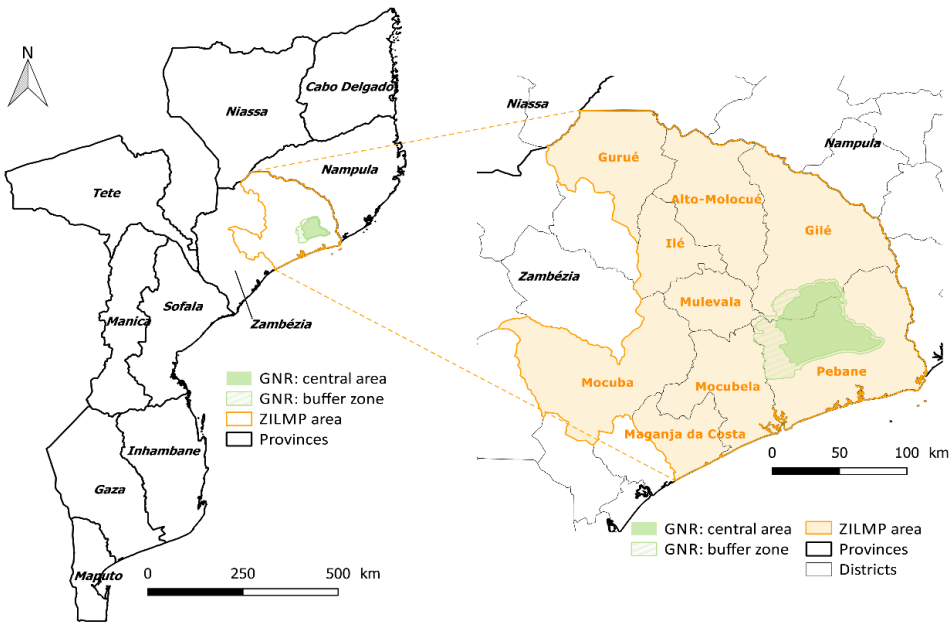


Figure 2: Location of the ER Program Accounting Area, including the GNR

3.2 Environmental and social conditions in the Accounting Area of the ER Program

Environmental conditions in the Accounting Area of the ER Program

[14] *It should be noted that Zambézia province is home of another protected area: the archipelago of "Ilhas Primeiras e Segundas", located in front of Nampula and Zambézia Province. Although they are not part of the ER Program accounting area for now (no ER Program activities are planned in those islands) they could be the subjects of further attention in the event of a potential up-sale of the ER Program in the future.*

Existing vegetation type

Mozambique is one the few sub-Saharan countries to possess a significant portion of natural forest: 51% of its territory is composed of natural forest - that is 40.6 million ha (Marzoli, 2007). Miombo forest is the most extensive forest type, covering approximately two third of the country and, especially, vast areas of the central and northern regions of Mozambique, where the ER Program area is located – *see* Figure 3.

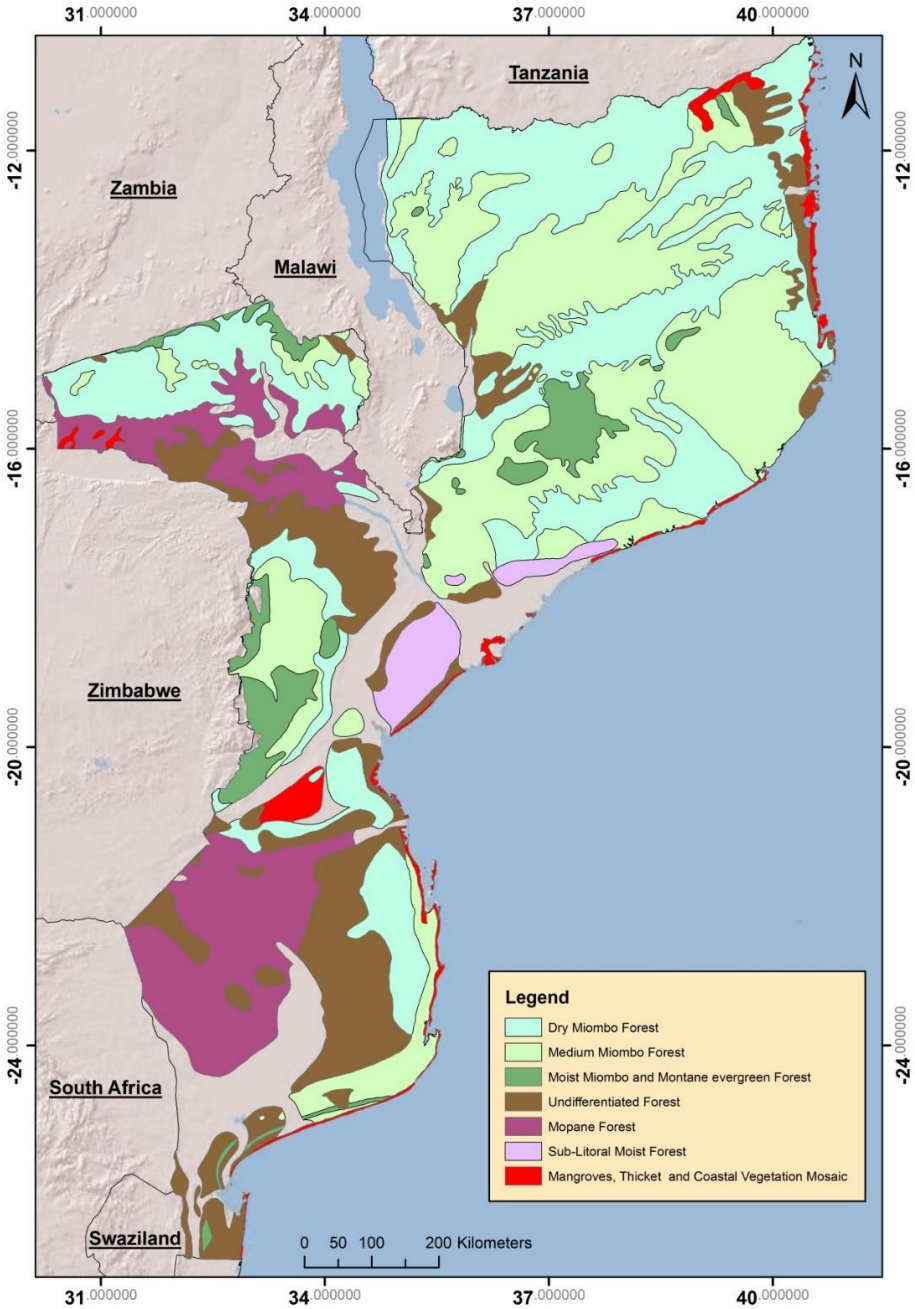


Figure 3: Main vegetation types in Mozambique (MITADER, 2016d)

The ER Program area is located in the Zambézian Regional Centre of Endemism (MITADER, 2016c) and more precisely, as shown in Figure 3, in a zone of « Miombo dense forest », composed of medium Miombo forest and dry Miombo forest (Figure 4). Miombo

forest represents 56% of the ER Program area - see Table 5. It is characterized by trees height reaching in average 12m to 18m, with a canopy cover that is superior to 40% and lower layers composed of bushes and grass (White, 1983 – cited in Fusari et al., 2010). This formation, widely found across Southern and Central Africa, is mainly composed of deciduous woody vegetation where *Brachystagia spp* and *Strichnos spinosa* are the dominant species. *Brachystagia* is commonly associated with *Julbernadia globiflora*, *Pterocarpus angolensis* (called "*Umbila*" in Mozambique), *Burkea africana*, *Bridelia micrantha*, *Cynometra* sp., *Dalbergia melanoxylon*, *Swartzia madagascariensis* (called "*Pau Ferro*" in Mozambique) and *Millettia stuhlmannii* (called "*Panga-Panga*" in Mozambique). *Strichnos* is usually associated with *Combretum spp*, *Terminalia spp, Pteleopsis myrtilifolia* (MITADER, 2016d).

Miombo can store large amount of carbon: it is estimated that mean total biomass in Miombo forest is 84.7 tC/ha or 310.7 tCO_2e/ha (90% CI) (Mercier et al., 2016).

Table 6: Carbon stocks in the natural Miombo forest (pre-deforestation)

	Aboveground	**Belowground**	**Total**
Carbon stocks in tC/ha			
Average	65.9	18.4	84.3
Standard deviation	28.3	7.7	36.2
90% CI [tC/ha]	4.7	1.3	6
90% CI **[%]**	7%	7%	7%
Carbon stocks in tCO_2e/ha			
Average	241.6	68.2	309.8
Standard deviation	103.7	28.3	131.8
90% CI [tCO_2/ha]	17.1	4.7	21.7
90% CI **[%]**	7%	7%	7%

In coastal areas, the vegetation is mainly composed of Mangroves, but they only represent 1% of the ER Program area – 52,397.00 ha out of 6 million ha.

In the ER Program area, the GNR is a significant share of undisturbed natural forest. The forests of the GNR and its buffer zone represent 6.4 % of the ER Program area - 384,431.00 ha out of 6 million ha[15]. The GNR and its adjacent areas are mainly composed of trees belonging to the *Caesalpinoidae* legume sub-family: *Brachystegia*, *Julbernardia* and *Isoberlinia* (Campbell, 1996). *Diplorhynchus condylocarpon, Brachystegia boehmii, Julbernardia globiflora, Dalbergia nitidula, Brachystegia spiciformis, Parinari curatellifolia* and *Pterocarpus angolensis* account for more than 54% of the trees (Etc Terra, 2014).

In addition to this dense forest, the GNR and its surroundings also entail Dambos areas: concentrated in low and wet land, dambos are very common at the base of the inselbergs and act as a buffer, capturing water and releasing it slowly throughout the year (MITADER, 2016d) – see figures below. The herbaceous cover is mainly composed of *Themeda triandra* (63% of transcripts), which is, most of the time (85%), dominant (Prin, 2008).

[15] *They are already accounted for in the 56% of total Miombo forest share in the ER Program area - see above.*

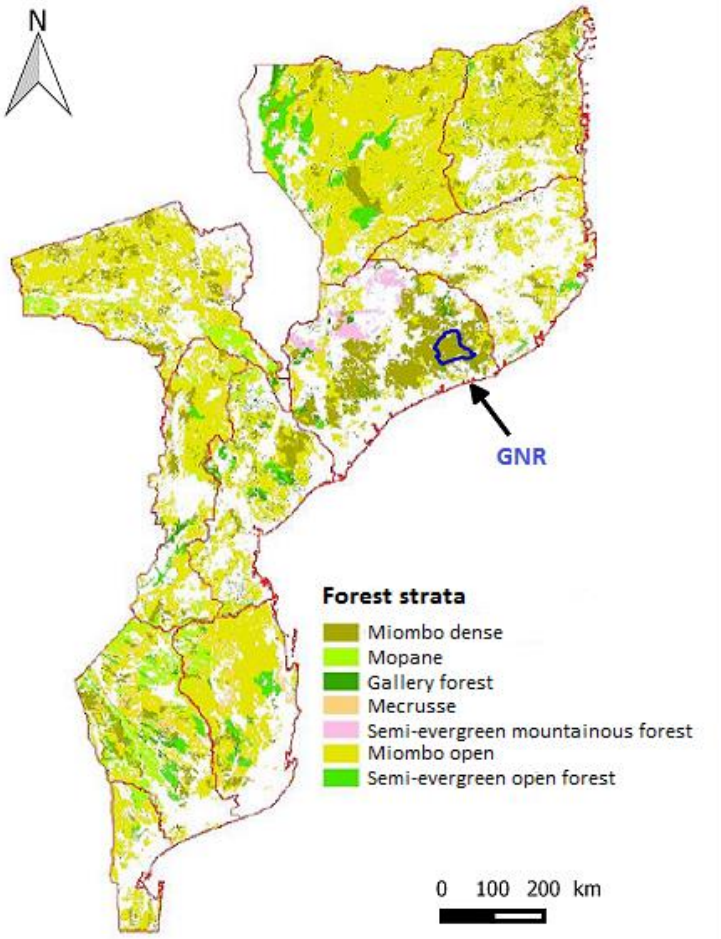


Figure 4: Forest strata in Mozambique
(Government of Mozambique - MRV team / FNDS)

1 2

Figure 5: Miombo forest (1) in the GNR and its surrounding and Dambo (2) in the GNR Delbergue, 2015.

Climatic conditions

In the ER Program area, the climate is tropical continental, with one rainy season from November to April. This pattern of rainfall provides for only one good agricultural season per

year, with a moderate water deficiency in winter, from April to October. Climatic conditions differ from hinterlands to the coastal areas, where rainfall is strongly influenced by proximity of the sea; the annual average rainfall vary between 500 and 1,400 mm per year, generally decreasing from North to South. Mean air temperature is related to altitude and varies from 18 to 24°C (MITADER, 2016c).

Today, Mozambique is one of the highest ranked African countries in terms of exposure to risks from weather-related hazards. It is especially subject to drought, floods and tropical cyclones, originated in the Mozambican Channel or to the east of the Channel, depending on the atmospheric conditions. Its low adaptive capacity and the high dependence of its population and economy on natural resources exacerbates this vulnerability to climate change (UT REDD, 2016): Mozambique is actually expected to be one of the countries that will be the most affected by climate change in the coming years. In addition, as stated in (UT REDD, 2016) forest degradation and deforestation may increase the vulnerability of rural communities to changing climatic conditions in the future.

Soil characteristics

The interior land (Ile, Gilé, Alto Molocué, Mulevala) is predominantly formed by medium textured red soils and clay grayish brown soils, produced from the weathering of granitic rocks and resulting from residual or limited transported soils. This area is predominated by red clay soils, characterized by depth and high retention capacity for water. Most of the soil has a medium texture to sandy loam and is generally well drained. The river valleys are dominated by alluvial soils, dark, deep, heavy texture and average to moderately drained, subject to regular flooding (FAO, 1995 - cited in MITADER, 2016c). The coastal zone of the Accounting Area (Pebane, Maganja da Costa and Mocubela) comprises yellow sandy, gray, soils. The coastal line is formed by loose, high permeable sandy soils, with scarce vegetation (MITADER, 2016c).

Rare and endangered species and habitat

Mozambique is endowed with considerable biodiversity associated with the high diversity of its existing ecosystems. Floristically, 4 phytogeographic regions of endemism are recognized in the country: (i) Zambezian, (ii) Swahilian, (iii) Swahilian-Maputaland transitional zone and (iv) Maputalalad-Tongoland (Ministry for the Coordination of Environmental Affairs, 2014). The Accounting Area is mainly located within the Zambezian Regional Centre of Endemism, which is the second largest phytogeographic region in Africa, probably having the richest and more diversified flora. There are at least 8,500 different species, 54% of which could be endemic species (White, 1983 - cited in MITADER, 2016c).

As stated in the ESMF (MITADER, 2016c), with regards to fauna, Zambézia is recognized as one of the richest provinces due to its edaphic and climate conditions. In particular, the forests in Zambézia province are especially important for birds, including the Namuli Apalis (*Apalis Linesy*), the Dapple-throat (*Arcanator Orostruthus*), the Cholo Alethe (Chamaetylas choloensi) - which is endemic to southeastern Malawi and adjacent Northern Mozambique - the Green Barbet (*Cryptolybia Olivacea*) - in mount Namuli, located in the ER Program area (Gurue district) - the Spotted Ground Thrush (*Geokichla Guttata*) - known to breed in only a few mid-altitude forests in eastern Africa - and the White-winged Apalis (*Apalis Chariessa*) - known from mid-altitude forest in central Tanzania, southeastern Malawi (cited in MITADER, 2016c). In the same way, In the GNR and its buffer zone, located within the ER Program

area, up to 210 species of birds have been identified (Fondation IGF, 2011).

As shown in Table 7, most of those species are considered to be globally vulnerable, according to the IUCN Red List. The bird diversity of the region may be comparable to that of other sub-tropical Miombo woodlands. Biogeographically, of the Afromontane endemic or near-endemic bird species, 27 are known to occur in Namuli - located in the ER Program area, in the district of Gurué - which compares favorably with 31 on the larger Mount Mulanje (Malawi). One is found only on Namuli (Dapple-throat) (Timberlake et al 2009 - cited in MITADER, 2016c). Actually, most of the inselbergs in Zambézia can be an Important Bird Area (IBA) based on the occurrence of those species (MITADER, 2016c).

Generally speaking, the GNR and it buffer zone contain regionally and nationally significant concentrations of biodiversity values - the GNR currently holds the status of a national reserve and can be classified in IUCN "Management Category II" (Fusari, Lamarque, Chardonnet & Boulet, 2010) - with 70 different identified tree species and 10 different identified gramineae species (Prin, 2008). Wildlife is significant with, possibly, 75 different species of mammals (Deffontaines, 2012), ten of which are considered to be globally vulnerable, near threatened or endangered have been identified - *see* Table 7 and see "Annex 1: Lists of mammals and reptiles in the GNR and its buffer zone" for a full list of wildlife species identified in the GNR and its surroundings. Actually, the GNR and its buffer zone include a site of high biodiversity conservation priority on the basis of Key Biodiversity Area (KBA) framework of vulnerability and irreplaceability, as defined by IUCN: more than 30 individuals of a vulnerable species have been identified, with 58 African elephants being present in the area (Ntumi et al., 2012). The existence of other few remarkable species is worth noticing: for instance, Lichtenstein Hartebeests, who have been identified in the GRN and its buffer zone - they are estimated to be between 5 and 10 individuals (Brugière, 2013) - are in danger of extinction in Mozambique (Fusari, Lamarque, Chardonnet & Boulet, 2010).

All in all, although Miombo forest is not a rare woodland formation, the size and density of forest habitat make the Accounting Area be of particular biodiversity value. It also contains some of the world most precious hardwood timbers, including *Pterocarpus angolensis*, *Millettia stuhlmannii*, *Pericopsis angolensis* and *Swartzia madagascariensis*. The Accounting Area is, therefore, an important concentration of natural forest and threatened habitat to be preserved.

Table 7: Near threatened and vulnerable species in the ER Program area (GNR)

English name	Scientific name	UICN Status
Mammals		
African clawless otter	Aonyx capensis	Near Threatened
Chequered sengi	Rhynchocyon cirnei	Near Threatened
European Rabbit	Oryctolagus cuniculus	Near Threatened
Leopard	Panthera pardus	Near Threatened

Spotted-necked otter	Lutra maculicollis	Near Threatened
African elephant	Loxodonta africana	Vulnerable
Temminck's ground pangolin	Smutsia temminckii	Vulnerable
Hippopotamus	Hippopotamus amphibius	Vulnerable
Lion	Panthera leo	Vulnerable
African wild dog	Lycaon pictus	Endangered
Birds		
Bateleur	*Terathopius ecaudatus*	Near threatened
Namuli Apalis*	*Apalis Linesy*	Near threatened
Southern ground hornbill	*Bucorvus cafer*	Vulnerable
Dapple-throat*	*Arcanator Orostruthus*	Vulnerable
White-winged Apalis*	*Apalis Chariessa*	Vulnerable
Cholo Alethe*	*Chamaetylas choloensi*	Endangered
Spotted Ground Thrush*	*Geokichla Guttata*	Endangered

** Species identified in Zambézia province and expected to be also present in the ER Program area*

This list is based on the IUCN Red List of Threatened Species and (Deffontaines, 2012), (Mésochina et al., 2010), (MITADER, 2016c) and (Fusari et al., 2010)

Social conditions in the Accounting Area of the ER Program

Population demographics and growth

Zambézia province is the most densely populated and the second most populated province of Mozambique, with an estimated population of 5 million people in 2017,[16] it concentrates about 19% of Mozambique's total population

The population composition in Zambézia is representative of the rest of the country with more than 51% of women and a significant share of young people, with over 80% of the population being younger than 40 years old. Most of the population of Zambézia province lives in rural area: 82.55% in 2007 and 79% in 2015 – at national scale, rural population is estimated to represent almost 70% of the population (INE, 2014).

[16] *Those estimations are based on projection from the last population census of 2007 (INE, 2007b).*

The last population census in Mozambique was realized in 2007. It showed a significant rate of population growth in the country, with an average annual population growth rate of 2.9% for Zambézia province between 1997 and 2007. The average population growth in the ER Program area is slightly above, reaching 3.1% per year – see Table 8.

Table 8: Population growth in program area

District	Population 1997*	Population 2007*	Population growth rate (exponential) between 1997 – 2007*	Population 2017**
Alto-Molocué	186,849	275,155	3.9%	407,341
Gilé	128,476	171,091	2.9%	204,078
Gurué	198,907	301,034	4.2%	429,261
Ilé	173,595	216,780	2.2%	251,636
Maganja da Costa	149,395	173,320	1.5%	199,446
Mocuba	220,260	303,973	3.3%	404,748
Mocubela	81,394	106,282	2.7%	122,303
Mulevala	51,721	75,343	3.8%	87,458
Pebane	137,085	187,289	3.2%	232,833
Total ER Program	**1,327,682**	**1,810,267**	**3.1%**	**2,339,104**
Total Zambézia	**2,926,123**	**3,897,064**	**2.9%**	**5,043,120**

**INE census*
*** INE projections*

Overview of stakeholders and rights holders

The linguistic diversity of Mozambique is very significant. Although Portuguese is the official language of the country, lots of various other languages are used: for the majority of the population, these sub-national languages constitute their mother tongue and are the most used in daily communication (INE, 2007a). As for the Zambézia province, it is the most diverse province of Mozambique in terms of ethnicity, even though 37.1% of its population

primarily speaks Lomué and 23.5% primarily speak Chuabo. Only 9,2% of the population in Zambézia speak Portuguese as its mother tongue (INE, 2007a). In the ER Program area, more precisely, five major ethnic groups co-exist (Chuabo, Macua-Lomué, Manhaua, Marenge and Senas), with the Macua-Lomwé being predominant (Tanner, 2017a). Their main distribution per district is described in Table 9.

Table 9: Main ethnic groups in the ER Program area

ZILMP Districts	Main Ethno-Linguistic Group
Alto-Molocué	Macua / Lomué
Gilé	Macua / Lomué
Ilé	Macua / Lomué
Maganja da Costa	Manhaua
Mocubela	Manhaua / Macua / Lomué
Mulevala	Macua / Lomué / Chuabo
Pebane	Macua / Lomué
Mocuba	Chuabo
Gurué	Macua / Lomué

Main livelihood and economic activities

Forest-based activities and industries are important contributors to the Mozambican economy and a major source of employment in Mozambique's rural areas. The forest economy contributes to about 2% of Mozambique's GDP. In 2011, this figure was approximately 2.8%. Twenty-two thousand people are directly employed by the forestry sector (IDA, 2017).

In the ER Program area, this situation is also prevalent and dependence on forest resources is significant. Most of the economy in Zambézia province is actually based on direct and integrated exploitation of natural resources with very little transformation (MITADER, 2016d). The collection of timber and non-timber forest resources is part of the everyday life of those populations.

Accordingly, agriculture is the main economic sector in Zambézia province, with 91,1% of the economically active population working in the agricultural sector (INE, 2010). The level of production is low, agricultural activities being essentially subsistence means. The main form of land use is small-scale sedentary and shifting cultivation of maize, cassava, small grains and pulses. "Slash-and-burn" agriculture, in particular, is widely practiced in Miombo areas. This practice appears well adapted to the generally infertile soils of Miombo but has become the first driver of deforestation in the ER Program area – *see section 4*.

Table 10: Economically Active People (EAP) by sector and province (2008/09)

Territory	EAP by Sector (%)			
	Agriculture	Industry	Service	Others
Zambezia	**91.1**	**1.3**	**6.6**	**1**
National	**81**	**2.8**	**13.6**	**2.7**

INE, 2010

Those socio-economic conditions and, especially, stakeholders' high dependence on forest resources, are key elements to be considered for the ER program. Ultimately, finding ways of changing natural resources unsustainable exploitation, transforming agricultural practices and securing income for rural population in the ER Program area should is central to the REDD+ jurisdictional program (Mercier et al., 2016).

4. DESCRIPTION OF ACTIONS AND INTERVENTIONS TO BE IMPLEMENTED UNDER THE PROPOSED ER PROGRAM

4.1 Analysis of drivers and underlying causes of deforestation and forest degradation and existing activities that can lead to conservation or enhancement of forest carbon stocks

This sub-section is based on (i) the study on the drivers of deforestation and forest degradation realized during the Readiness phase by Winrock International and CEAGRE (2015) for national (Mozambique) and regional (Northern Mozambique) estimates; and on (ii) the analysis provided in Mercier et al. (2016) for the ranking of the main drivers of deforestation and forest degradation in the ER Program area more specifically.

Between 2000 and 2012, in Mozambique, the mean historical deforestation rate is 0.23% per year. This represents an annual loss of 138,000 ha of forest and an amount of emissions close to 12 $MtCO_2e$ per year (Winrock International and CEAGRE, 2015 - data based on Hansen et al., 2013). According to Winrock International and CEAGRE (2015), in Mozambique, deforestation is concentrated in areas of greater population density: it is the most intense in Northern Mozambique, where the ER Program area is located. In Northern Mozambique, between 2000 and 2012, the mean historical deforestation rate is 0.29% per year. The main drivers of deforestation and forest degradation in Northern Mozambique are described in the figure below, based on the model of Winrock International and CEAGRE (2015), in which it was assumed that the impact of forest degradation is captured in the estimates of deforestation.

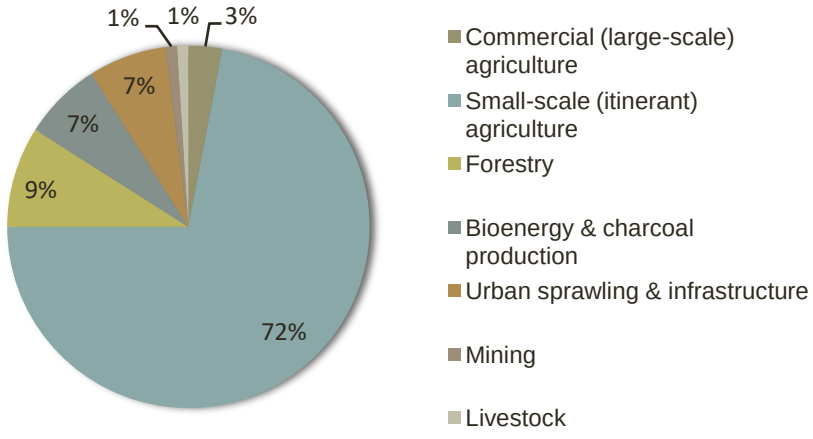


Figure 6: Part of deforestation and forest degradation in Northern Mozambique (Winrock international and CEAGRE, 2015)

Direct drivers of deforestation and forest degradation in the ER Program area

As stated earlier, in Northern Mozambique and in Zambézia province, the ER Program area is an especially important front of deforestation - *see section 2.2*. According to extraction from national data, between 2005 and 2015, total deforestation in the ER Program accounting area represented 213,202 ha – corresponding to 21,320 ha/yr - *see* Table 38 *in section 8.*

Although they are not exactly the same[17], the shares of the drivers of deforestation and forest degradation in Northern Mozambique and in the ER Program area present some similarities; in both cases: (i) small-scale agriculture is, by far, the first driver of deforestation; (ii) forestry account for a significant part of forest degradation; (iii) large-scale agriculture is not considered as a significant driver of deforestation. An important difference is charcoal production: in the ER Program area, it is not considered as a driver of deforestation but as a driver of forest degradation almost exclusively (Mercier et al., 2016). The main drivers of deforestation and forest degradation in the ER Program area are summarized in Box 2 and detailed below.

Box 2: Summary of the main direct drivers of deforestation and forest degradation in the ER Program area and how they inter-relate

Although large-scale agriculture is almost non-existent in the ER Program area, **small-scale agriculture is, by far, the first driver of deforestation in the ER Program area**. It is due to itinerant ("slash and burn") agriculture, especially for the production of maize and cassava, based on a land extension strategy, aiming at optimizing work productivity – and, to a lesser extent, overcoming poor soil fertility. **Deforestation practices linked to slash and burn agriculture are also serving charcoal production**: in the ER Program area, it has been observed that the production of charcoal is almost exclusively derived from trees that are selected in areas that will be deforested for the opening of agricultural fields in the near future. Consequently, **in the ER Program area, small-scale agriculture and charcoal production are highly linked and, currently, charcoal production does not have any additional impact on forest cover**, relatively to agriculture. However, given the high population growth and the increasing need in charcoal and energy in the area, charcoal production might increase in the future. Because it is produced through a process of tree selection based on species and geographical position (next to the roads and cities), **it is still an important driver of forest degradation to address**.

Another important driver in the ER Program is the forestry sector, through too fast attribution of lands, leading to a rapid exploitation of the available timber, with low selection of tree species. With this regard, it should be noted that few forest concession operators are fully compliant with legislation and operational requirements. To the contrary of small-scale agriculture, which only is responsible for deforestation, **the forestry sector is also, and especially, an important driver of forest degradation**, due to miss-respect of concessions management plans. Outside of forest concessions - and, especially, in the buffer zone of the GNR - **illegal logging accounts for most of forest degradation**, with a thorough process of tree selection based on precious timber species.

[17] *This could partly be explained by the fact that, in the study by Winrock International and CEAGRE (2015), the impact of forest degradation on forest cover is captured in the estimates of deforestation.*

To sum up, in the ER Program area, deforestation is, by far, mainly driven by small-scale agriculture and, to a far lesser extent, by the forestry sector, whereas forest degradation is mainly caused by forest exploitation - in forest concessions and outside, through illegal logging - and, to a lesser extend, by charcoal production - which is for now strongly linked to deforestation practices for agricultural purpose but remains an important driver of forest degradation to address.

Small-scale agriculture

In Mozambique, small-scale agriculture is defined as subsistence agriculture, with most of the production being consumed within the household. It is a familial agriculture, practiced by smallholders in rural area. These smallholders' farming systems are capital extensive and use few inputs: less than 5% of households use mineral fertilizers (Leonardo et al. 2015). The cultivation system is usually made in mix fields, including cereals (especially maize), tubers (cassava, sweet potatoes, yams), legumes (peanuts, beans) and horticulture, but the two main food crops are, by far, cassava and maize, for which the production techniques are defined by itinerant agriculture (Sitoe et al., 2013). Maize and cassava play a key role in the population's diet: those two crops alone represent more than 50% of caloric intake across the country, according to FAO 2011 Food balance sheet (Mercier et al., 2016).

Just like at national scale and in central-northern Mozambique – where it accounts for, respectively, 65% and 72% of deforestation (Winrock International and CEAGRE, 2015) – small-scale agriculture is, by far, the first driver of deforestation in the ER Program area (Mercier et al., 2016). It is related to the unsustainable land use practices including land clearing - continuous expansion of total area of cultivated lands for subsistence agriculture, based on "slash and burn" techniques.

In the ER Program area too, the two main food crops are cassava and maize, of which most of the production is also realized in mixed-fields (Mercier et al., 2016). The link between maize and cassava production and deforestation in the ER Program area is twofold (Mercier et al., 2016):

- First, it should be noted that in, the ER Program area, maize and cassava production cannot be separated, as small producers are used to culture associations and rotations within a same cleared plot. Most of the time, the first year of cultivation is restricted to maize because it is more demanding than cassava and needs to benefit from soil fertility; cassava is introduced in the same field from the second year.
- Second, the production pattern of maize (and associated cassava) follows a land expansion strategy. Savanna lands are characterized by poor soil fertility and, without any appropriate measures, they require a high amount of work for poor yields. Consequently, smallholders, looking for better soil fertility and optimization of their work productivity, deforest small part of forested land and grow on these new plots. Eventually, with soil fertility depletion or excessive presence of weeds, they abandon this field (called "*ruina*" in Mozambique) and open a new field next to it by deforesting a new part of forest: this dynamic explains continuous extension of deforestation around rural localities that are mostly inhabited by farmers.

For seven districts of Alto Molocué, Gilé, Ilé, Maganja da Costa, Mocubela, Mulelava and Pebane, and according to the production statistics elaborated by the District Services for Economic Activities (*Serviço Distrital das Atividades Económicas* - SDAE), maize and

cassava account for more than 56% of the agricultural area. However, Mercier et al. (2016) estimated this surface to reach 75% of total cultivated areas in the same seven districts. Both assumptions strengthen the position of the maize - cassava couple as the primary driver of land occupation in ER Program area.

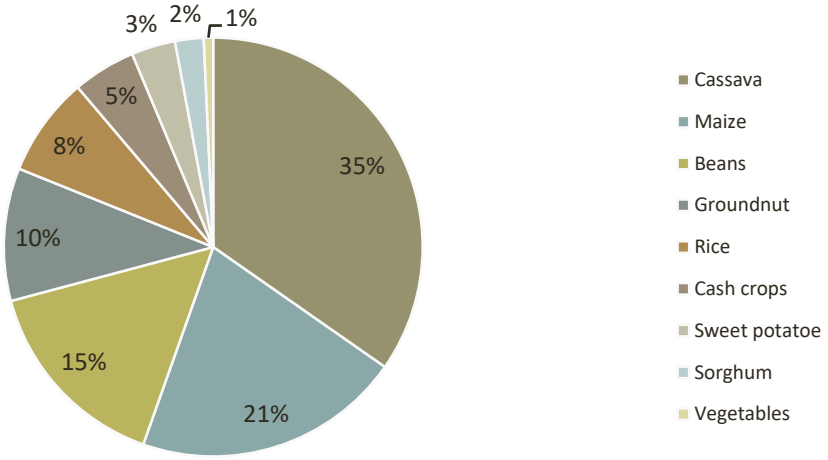


Figure 7: Breakdown of surfaces by crop in 2014 in the districts of Alto Molocué, Gilé, Ilé, Maganja da Costa, Mocubela, Mulelava and Pebane
(SDAE)

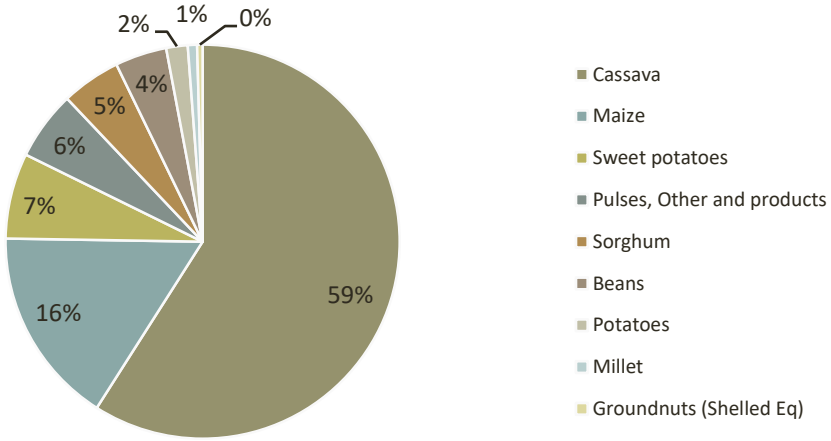


Figure 8: Breakdown of surfaces by crop in 2014 in the districts of Alto Molocué, Gilé, Ilé, Maganja da Costa, Mocubela, Mulelava and Pebane
Rongead & Etc Terra in (Mercier et al, 2016)

Just like in the rest of the country, where only 5% of households use mineral fertilizers, the main available resources for farmers in the ER Program area are their land and labor (Leonardo et al. 2015). Studies have shown that maize cultivation by smallholders is not constrained by land but by labor availability during peak season, especially for weeding (Leonardo et al., 2015; Baudron, 2009). In the context of the ZILMP, with no access to external inputs (no animal traction, no mechanization, no fertilizers) and as long as forest land is available, the easiest way to increase labor productivity is to seek better natural fertility and lesser weed presence in newly cleared areas. Admittedly, smallholders' move

towards extensification rather than intensification is the very basis of the deforestation mechanism we observe in the ER Program area (Baudron et al. 2012).

Charcoal production

In Mozambique, the consumption of fuel wood is estimated to reach 9.3 and 5.5 million tons per year in, respectively, rural and urban areas. This represents a total consumption of 14.8 million tons per year at national level (Sitoe et al., 2013). The high demand through the informal markets for biomass energy in the urban areas has led to unsustainable exploitation of wood for charcoal in rural areas.

As stated in Mercier et al. (2016), because the production of charcoal is especially concentrated around urban areas, where the consumption is higher, and because it focuses on a few species only, it might be a driver of forest degradation almost exclusively - see **Box 3**. However, in the ER Program area, it seems that charcoal production is already accounted for in the deforestation process linked to small-scale agriculture. Indeed, charcoal production is associated with slash and burn agriculture: the majority of it is derived from trees that are selected on areas that will be deforested for the settlement of agricultural fields the same year or the year after. This assumption is significant as it means that charcoal production does not, currently, have any additional impact, relatively to agriculture, on forest cover - may it be in terms of deforestation and forest degradation. This is coherent with the facts that on field surveys have shown that, in the ER Program area, few producers have made charcoal production their unique economic activity: it usually constitutes their secondary revenues source, with 83% of charcoal producers also having another economic activity that often is, if not always, agriculture (Mercier et al., 2016)[18]. However, given the high population growth and the increasing need in charcoal and energy in the ER Program area, especially around urban centers, charcoal production is expected to remain stable or increase in the future (Mercier et al., 2016). It is, therefore, still an important driver of forest degradation to address.

Box 3: Charcoal production in the ER Program area

In the ER Program area, charcoal production is concentrated next to the roads (on a 2 km radius in average) and especially in areas characterized by a good availability of resources – that is, areas where forest cover is higher (Gilé and Maganja da Costa districts). The main supply basin in size and production is located around Alto-Molocué. The basins of Gilé, Maganja and Ilé are similar in size and production, which can be explained by their distance to main roads (Ilé) and to high forest cover (Gilé and Maganja).

According to Mercier et al. (2016), charcoal producers make, on average, 21 kilns of 3 to 6 m long every year. Their yields are usually low, hardly reaching 20% (Falcão, 2008), with an averaged production of 1.6 bags of 48 kg per m^3.

The *Brachystegia spiciformis* and *Julbernardia globiflora species*, which are the main species found in the Miombo forest in ER Program area, are preferred species used for charcoal production, thanks to their size, abundance and combustion properties. In addition, trees are selected in a small area located around kilns (25 meters radius in average) to ease wood transport.

[18] *Based on data for the districts seven district of Gilé, Pebane, Ilé, Alto Molocué, Mulelava, Mocubela and Maganja da Costa*

Based on the production data and total consumption in the main district capitals of the ER Program area, (Mercier et al., 2016) deducted the average number of charcoal producer around urban centers in the seven districts of Gilé, Pebane, Ilé, Alto Molocué, Mulelava, Mocubela and Maganja da Costa.

Table 11: Characterization of charcoal consumption in urban centers in the districts of Gilé, Pebane, Ilé, Alto Molocué, Mulelava, Mocubela and Maganja da Costa

	Gilé	Pebane	Maganja da Costa	Alto Molocué	Ilé	Total
Number of inhabitants	21,969	22,535	13,438	37,437	15,570	110,949
Percentage of charcoal consumers in the city population	74%	63%	86%	93%	90%	
Mean number of bags consumed per month per households	2.8	2.6	2.6	2.4	2.7	
Equivalent in tons per year	3,707	3,684	3,036	7,634	3,363	21,424
Consumption of charcoal in t/year/household	1.5	1.6	1.7	1.3	1.4	

Mercier et al., 2016

Table 12: Characterization of the charcoal production in the supply basins of urban centers in the districts of Gilé, Pebane, Ilé, Alto Molocué, Mulelava, Mocubela and Maganja da Costa

Urban centers sampled in the ER Program area	**Gilé**	**Pebane -** from the Miombo forest	**Pebane** - from mangroves	**Maganja da Costa**	**Alto Molocué**	**Ilé**	**Average**
Radius of the supply basin in km	22	17	3	17	29	17	22
Estimates of the number of producers working in the supply basin	580	185	98	401	930	729	487
Mean number of kilns per producer per month	19	18	29	11	29	22	21
Mean length of kilns in m	3.3	6.2	5.6	5.5	5.2	4.3	5.4

Mercier et al., 2016

Forestry

In the ER Program area, the share of forestry in forest degradation can be explained by: (i) illegal logging, focused on specific rare and precious timber; (ii) a too rapid expansion of areas granted under simple licensing exploitation, with subsequent fast exploitation of available timber; non-sustainable exploitation practices in concessions and simple licenses areas.

Box 4: Forestry in the ER Program area

In Mozambique, forestry is defined by forest concessions (allocation of lands to private companies for 50 years, which requires a precise management plan) and simple licenses (5 years permit for a maximal harvesting amount of 500 m^3 per year on an area that should not exceed 10,000 ha; for Mozambican citizens only). In recent years, the total surface of land granted in concessions and simple licensing has significantly increased in Zambézia province: in 2011, operational concessions and simple licenses represented, respectively, 15% and 4% of the area covered by the seven districts of Gilé, Pebane, Ilé, Alto Molocué, Mulelava, Mocubela and Maganja da Costa; in 2015, they represented, respectively, 31% and 21% of this area (Mercier et al., 2016).

The commercial exploitation of native trees species is done through a selective regime (species and sizes). Although the list of commercial timber species in Mozambique's legislation recognizes about 118 species, less than 10 species are actually exploited for commercial purposes, including Umbila (*pterocarpus angolensis*), panga-panga (*Millettia stuhlmannii*), chanfuta (*Afzelia quanzensis*), blackwood (*Dalbergia melanoxylon*) and mondzo (*Combretum imberbe*) (Sitoe et al., 2013).

Forest degradation due to forestry is a different issue for the ER Program, as it is essentially driven by the international demand and failure of local law enforcement. As stated by Mercier et al. (2016), in Mozambique, the total exported wood quantities are higher than the licensed quantities: most exports are illegal and, therefore, excluded from official reports (Mackenzie 2006; Mackenzie and Ribiero, 2009). Statistical analysis conducted by the Environmental Investigation Agency (EIA, 2014) estimated that, in 2013, 93% of all commercial logging in Mozambique was illegal; between 2007 and 2013 it was, in average, 81% of commercial logging (EIA, 2014). More importantly, 50% of the quantities of timber shipped out of Zambézia is believed to be illegal (Ekamn et al., 2013; Mackenzie 2006; Mackenzie and Ribiero 2009). Illegality lies in different practices, from illegal harvest that do not respect management plans to violation of labor laws, violation of transport laws and illegal exports of unprocessed timber for first class species (Ekamn et al., 2013; Mackenzie 2006; Wertz-Kanounnikoff et al., 2013).

Table 13: Concession or simple license status and deforestation rate in the districts of Gilé, Pebane, Ilé, Alto Molocué, Mulelava, Mocubela and Maganja da Costa

Land cover classes	Area	**2011**		**2015**	
		Concessions	Simple licenses	Concessions	Simple licenses
Total area (ha)	3,865,062	594,925	157,794	1,208,748	799,292
Proportion of the area	100%	15%	4%	31%	21%
Forest cover in 2013 (ha)	1,983,784	461,045	82,829	766,025	348,119
Proportion of the forest	100%	23%	4%	39%	18%
Historical annual deforestation rate between 2010-2013	-0.86%	-0.39%	-1.12%	-1.09%	-1.75%

Mercier et al., 2016

The impact of forestry on forest conservation should therefore be degradation rather than deforestation, as illegal logging and exploitation pressure are concentrated on a few species, and forest degradation is expected to be higher in areas under simple licensing,

due to a fast attribution of lands, leading to a rapid exploitation of the available timber. Some cases of deforestation have nevertheless been identified by (Mercier et al., 2016), especially in areas under simple licensing where deforestation can reach up to 0.86% per year. However, since land use is actually not restricted by law in forest concessions and in areas under simple licenses - which only guarantee ownership on timber - this may be explained by "slash and burn" agricultural practices conducted by smallholders inside of forest concessions and areas under simple licenses.

In addition, in Mozambique and in Zambézia province especially, current practices are based on short cutting cycles that jeopardize logging sustainability: although it is acknowledged that a 30 years rotation would be necessary in the Miombo forest to ensure regeneration after selective logging (Mackenzie and Ribiero 2009), management plans are usually based on a 20 years rotation, or less - often 5 to 10 years rotation. EIA (2014) estimates that, with a linear evolution of the 8% exploitation growth rate, the exploited species stocks would be exhausted within 15 years. With this regard it should be noted that, in 2015, DINAF held a nation-wide evaluation (audit) of 154 forest concessionaires and 727 simple license holders to assess their compliance against a set of criteria based primarily on national legislation. This first evaluation revealed low levels of compliance of the sector with national legislation (IDA, 2017). In the same way, according to a an assessment of forest operators realized by MITADER in 2016, only 35% of forest concessionaires in Zambézia province demonstrated minimum compliance with key forest management environmental and social standards – in this case, minimum compliance is defined as at least 50% compliance with the standards (PROFOR, 2017).

Other potential drivers

Large-scale agriculture - In Mozambique, commercial agriculture, or large-scale agriculture, is limited and represents, in 2013, only 5.7% of total cultivated lands in Mozambique – that is 321,314 ha out of 5,634 million ha of cultivated lands. According to (Winrock International and CEAGRE, 2015), large-scale agriculture, which is mainly driver by tobacco and cotton cultivation, only accounts for 4% of total deforestation in Mozambique. In the ER Program area, large-scale agriculture is not identified as a significant driver either.

In the districts of Gilé, Pebane, Ilé, Alto Molocué, Mulelava, Mocubela and Maganja da Costa, large-scale agriculture is almost non-existent. Little large-scale exploitations were settled during colonization, especially in Pebane and Maganja da Costa; they entail coconut plantations, which have been abandoned since then, and irrigated perimeter for rice, which have partly been rehabilitated.

In recent years, only one DUAT for large-scale agriculture was granted, to *Cister* company, for 250 ha of beans, in Alto-Molocué district. According to Mercier et al. (2016), large-scale exploitations are not responsible for current deforestation in those seven districts, with one exception in Ilé with the *Chá de Socone* tea plantation: created during colonization and abandoned during the war, it is now being restored through forest clearing.

It should be noted that, while commercial agriculture is not considered to be a significant driver of deforestation today, it could become one, if growth corridors envisaged by the Government are developed without adequate spatial and land-use planning.

In the two additional districts of Mocuba and Gurué, added in the ER Program area (see section 3) large-scale agriculture is more significant. However, although it may be higher in Mocuba and Gurué, the role played by large-scale agriculture in the ER Program as whole is still not expected to out-weight the role played by small scale agriculture, which is by far the main driver of deforestation in Mozambique in general. In addition, in Northern Mozambique, it is established that large-scale agriculture only account for 2% of deforestation (Winrock International and CEAGRE, 2015). Consequently, the intervention planned in the proposed ER Program, while being defined in a comprehensive approach, does not especially focus on large-scale agriculture – *see section 4.3 for more details.*

Other drivers - No other factor has been identified as significant enough to be considered as a driver of deforestation in the ER Program area. It should be noted that mining in the ER Program area only focuses on two commodities: tantalum and heavy sands. Although a few concessions have been granted for tantalum exploitation, the deforestation impact of tantalum mining concessions is low, as the exploitation pit were opened a long time ago. In the same way, although two heavy sand prospection licenses were successful in the ZILMP area, exploitation has not started yet – and is not expected to start in near future. Likewise, urban sprawling is not considered as a direct driver of deforestation in the ER Program area - no plan at provincial level for new transport infrastructure in the ZILMP area and new houses are usually implanted on fields that already are opened for agriculture. However, urban extension reveals a growing demography that has to be sustained by additional agriculture production (Mercier et al., 2016).

Indirect drivers of deforestation and forest degradation

The analysis of the direct drivers of deforestation and forest degradation shows that these processes have complex roots that extend across different sectors of development. The direct drivers of deforestation are all interlinked with indirect and underlying causes that are both economic and social. They are related to population growth, poverty and the demand for timber products on the international market and include: (i) limited access to high productivity technologies by much of smallholders or means to implement them including sparse extension network; (ii) poor governance and weak enforcement of land, forests and environmental legislation; (iii) demand for food and wood products in the domestic and international markets and inadequate employment and income opportunities in the rural areas.

Poverty is the most important underlying cause of deforestation, with small income and poor access to alternative source of income for rural population being primary drivers for their unsustainable exploitation of forest. Their social environment is meaningful, forest and natural resources being used for traditional and hunting purposes – *see section 3.*

Demography and high population growth are other underlying causes, linked to the fact that the main identified drivers of deforestation and forest degradation in the ER Program area are anthropic activities. Mercier et al. (2016) identified four major demographic forces in the ER Program area:

- Natural demography, especially from the historical Molocué settlement: Cultural and social organization, based on low centralization and little accumulation strategies (whether in the form of “plantation” or “cattle”), favors a diffuse population and extensive land use;

- Resettlement of people displaced by the war: In some scarcely populated areas and still highly forested, we can observe households re-opening plots that had been occupied a few decades ago, as attested by the presence of mango and cashew trees within the forest;
- Extension of coastal populations: coastal settlements - which are denser and have received influx of people during the war - supplied by international aid, are redeploying towards forest areas. This is especially true for southern area of the GNR;
- People who settle for mining and gather the typical characteristics of colonization as “veins” farms. They are especially present in the area northeast of Gilé.

Admittedly, with increasing demography in the ER Program area, pressure on forest is expected to rise, increasing deforestation and forest degradation rates, while the available lands will be reduced in some districts; this may intensify rural migration towards urban centers, with a subsequent increase of the demand for charcoal (Mercier et al., 2016).

At this stage, it should be noted that wildfires - which are frequent in the ER Program area - *are not* considered as a systematic underlying driver of deforestation and forest degradation. Each year, fires occur in the ER Program area, may they be natural or triggered by human activities - for hunting purpose or due to losing control when opening agricultural fields through "slash and burn" practices. Depending on when exactly they happen during the dry season, fires can reach different intensities, which vary with the quantity of available dry herbaceous. Their impact on forest cover depends on this intensity (Ryan and William, 2011) but it is not systematically significant - there is no systematic death of trees resulting in a loss of carbon stock loss.

This can be explained by the fact that Miombo forest is adapted to this pressure: although not all the woody species are equally sensitive to fire, the overall Miombo woodland species and most species present in ER Program area (especially *Brachystegia* and *Julbernardia*) are tolerant to fire (Cauldwell and Zieger, 2000). As a consequence, only late and very frequent fires can cause small scale forest degradation: generally speaking, Miombo forests are adapted to these events (Ryan and William 2011) and, actually, fires are one of the most significant ecological factors that control their structure (Chidumayo 1997).

However, despite the high capacity of Miombo species to coppice (Williams et al. 2008a), when those fires are too frequent, they may have a higher impact on regeneration potential, preventing seedlings from growing. In addition, wildfires may cause changes in chemical composition, compaction and soil erosion (MINAG/SPFFB, 2002).

Frequent fires may raise soil and atmospheric temperatures, reduce organic matter, release gaseous elements and, indirectly, modify both the post-fire microclimate and the activity of the soil biota (Zolho, 2005). This may have direct consequences on vegetation composition and carbon cycles in the ER Program area, both influenced by fires frequency and fires intensity. Several ER Program planned interventions therefore focus on fire management – *see section 4.3*.

Existing policies that can lead to conservation or the enhancement of carbon stocks

This subsection describes complementary programs, projects and initiatives related to REDD+ and upon which the ER Program will partly rely for its implementation.

National programs

◆Agricultural sector

The agricultural sector is both a key for the national economy and the main driver of deforestation in Mozambique, as explained previously. The MASA has shown its commitment, those past few years, to raising rural incomes and improving food security with, *inter alia*, initiatives such as the Strategic Plan for the Development of the Agricultural Sector (PEDSA) - *see section 2.2* - and the Adaptation Program for Action (NAPA). Through promoting an integrated competitive and sustainable agriculture sector, they set a political and practical relevant environment for the implementation of the ER Program, of which the core planned interventions are based on the promotion of sustainable agricultural practices - *see ERI-D1 & ERI-D2 in section 4.3*.

◆The national Program for Sustainable Development and the *Projecto Floresta em Pé*

To implement its vision, MITADER formulated a new sustainable rural development program known as the National Program for Sustainable Development, which is a vision of integrated rural development guided by the priorities of PQG - *see section 2.2*. The National Program for Sustainable Development provides for an integrated development model for rural areas and is a key component of both MITADER's mandate and of the underlying landscape vision of the ER Program. This program is bolstered by complementary projects in, *inter alia*, conservation areas (see the MozBio project, below) and land rights (see the "*Terra Segura*" project, below). It is also strongly linked to the Standing Forest project ("*Floresta em Pé*").

The project *Floresta em Pé* aims to promote the protection, conservation, creation, use and valuing of forest resources in a rational, responsible and transparent manner that is expected to foster economic, social and environmental benefits and build resilience to climate change. To this end, *Floresta em Pé* has developed seven specific objectives that are also meaningful components of the proposed ER Program. They include: (i) the adaptation of forest policy and legislation to current challenges[19]; (ii) the improvement of transparency in the forest sector, with the introduction of effective and participatory mechanisms based on the active involvement of communities, forest operators and civil society; (iii) the promotion of forest conservation activities; (iv) support to private sector through the development of the national timber industry in order to diversify and maximize the value chains in the forestry sector; (v) support to community management of forest resources - particularly of non-timber forest products ; (vi) the promotion of increased job opportunities in the forest sector; (vii) the identification of available international funds and national revenue sources for the protection, and conservation of forests.

Defined at national scale, those objectives, which reflect a new political commitment to forest conservation in Mozambique (as explained in section 2.2), are expected to enhance the ER Program, of which most the planned interventions are reaching for the same goals.

---

[19] A new Forestry Law is currently being designed to replace the forestry elements of the 1999 Forest and Wildlife Law – it is reaching an advanced pre-publication stage. The Land Law may also be revised during 2017/18

Internationally funded programs

The four programs below are contributing to the ER Program – see section 4.3.

◆ **MOZFIP - Mozambique Forest Investment Project - USD 47 million**

The Forest Investment Program (FIP) provides financing for REDD+ efforts in developing countries in order to address key drivers of deforestation and forest degradation with a focus on transformational change.

MozFIP is a five years program (2017 – 2022) financed by the World Bank IDA, a Multi Donor Trust Fund and the Climate Investment Fund (CIF) that was endorsed by the FIP committee in June 2016 with a total budget of USD 47 million; and approved by the World Bank board in March of 2017. The main objective of MozFIP is to improve the practices and enabling environment for forest and land management in targeted landscapes in Mozambique. Guided by the National REDD+ Strategy and governmental strategies, MozFIP represents the GoM's ambition for transformational change to address the drivers of deforestation and promote sustainable rural development. It is envisioned as a large-scale, modular framework for implementing the National REDD+ strategy across two provinces, and at the national level including ambitious reforms in the forest sector and strengthening of the law enforcement activities.

One of its three components is based in the promotion of integrated landscape management, including through supporting the Zambezia landscape ER Program, in order to address the most important drivers of deforestation while reducing rural poverty. MozFIP will actually be crucial for the implementation of the ER Program in Zambézia, which it will partly contribute to finance: it will especially support the regularization of land tenure, the promotion of integrated landscape management tools, multipurpose planted forests, the development of agroforestry systems and the introduction of sustainable charcoal production techniques. It will also set the basis to foster sustainable forest management with the development of the national land use plan[20], the strengthening of forest governance and the promotion of sustainable forest management initiatives.

◆**MOZDGM - The Dedicated Grand Mechanism in Mozambique - USD 4.5 million**

The Dedicated Grant Mechanism (DGM) for Local Communities[21] is part of a global program - the Dedicated Grant Mechanism for Indigenous Peoples and Local Communities (DGM) under the FIP. Its objective is to provide grants that enhance the capacity and support specific initiatives of local communities in FIP pilot countries. Acting as a funding mechanism, but with independent governance and decision-making, the DGM in Mozambique (MozDGM) has a 5-year project execution period.

MozDGM will promote synergies between MozFIP and other REDD+ activities in Mozambique, including with the ER Program. Its main objective is to strengthen the capacity of local communities, community-based and civil society organizations to participate actively

[20] *The National Land Use Plan (NLUP), supported by MozFIP (see section 4.1), is currently being developed and actually is comprised as an enabling activity of the ER Program (EA-B2, see section 4.3). It is not in force yet: the Spatial Planning Directorate (DINOTER) of the MITADER, in charge of developing it, is currently hiring consultants who will help the GoM to design the NLUP. It is expected to start by the end of January 2018, and should be fully operational in two years.*

[21] *Mozambique is one of the new pilot countries, following Brazil, Burkina Faso, Democratic Republic of Congo, Peru, Indonesia, Ghana, Lao and Mexico.*

in sustainable forest and land management and REDD+ processes. It operates at two levels: (i) the national level, focusing on capacity building and institutional strengthening and (ii) the landscape level, focusing on the implementation of activities that promote sustainable local community initiatives in the two selected landscapes, including in the ER Program in Zambézia.

◆ **"*Sustenta*" project - Agriculture and Natural Resources Landscape Management project (2016 – 2021) - USD 40 million**

The Agriculture and Natural Resources Landscape Management project (the "*Sustenta*" project) was approved in June 2016 for a total budget of USD 40 million. It covers 5 districts in Nampula province and 5 districts in Zambézia province – which are all part of the ER Program area. Its main objective is to contribute to improving the livelihoods of rural households and the sustainability of natural resources, with a strong emphasis on supporting new private sector investments in agriculture and on creating new value chains that can integrate local farmers and thus diversify and enhance their incomes. This objective will be achieved by promoting inclusive and sustainable agricultural and forest-based value chains through, *inter alia*, expanding the network of Small Emerging Commercial Farmer (SECF), supporting key investments of agribusinesses along the value chains and improving land tenure security.

The "*Sustenta*" project is therefore fully aligned with the ER Program, to which it is expected to highly contribute. The project encompasses 450,000 rural households, who mostly use traditional, low productivity agriculture practices: reducing "slash and burn" agriculture through the strengthening of value chains, which is a core objective of this project, is also a crucial component for and complementary to the ER Program initiatives. In addition, this project has an important land rights dimension: it will support the identification of land registration of collectively-held community "land use and benefit rights" (DUAT) and it will support the titling of DUATs of individual households within these communities. These activities create the tenure security needed for local people to take part in new economic activities and value chains that are also supported by the ER Program. They are essential for is successful implementation (Tanner, 2017a) – *see section 4.4 on land tenure assessment.*

◆ **MOZBIO - Conservation Area for Biodiversity and Development Project (2016 – 2018) - USD 46.32 million**

The Conservation Area for Biodiversity and Development Project (MozBio) project is a 4 years project funded by the World Bank through the International Development Association (IDA) and the Global Environment Facility (GEF) for a total budget of USD 46.32 million. It is implemented in Mozambique by the MITADER. Its overall objective is to increase the effective management of conservation areas and to enhance the contribution of these areas to the living conditions of surrounding communities. It is expected to directly benefit local people living within and around the targeted conservation areas through the promotion of sustainable livelihood activities.

The project is based on 5 components that are all relevant with regard to the ER Program. They include: (i) the institutional strengthening of conservation areas' management at national scale; (ii) the promotion of tourism in conservation areas, in order to increase revenues and the number of beneficiaries from tourism-related economic activities in conservation areas; (iii) the improvement of conservation areas management (including

through wildlife surveys and monitoring); and (iv) piloting sustainable community livelihoods around conservation areas, in order to foster the sustainable management of natural resources by local communities and to reduce deforestation and forest degradation.

This last component is especially important for the ER Program. It is applied in the surroundings of the GNR, located in the ER Program area, in the two districts of Gilé and Pebane, where pilot activities are implemented to address the main drivers of deforestation, promote sustainable forest resource management and sustainable economic development. The activities carried out in this context are fully complementary to the ER Program ambitions and are expected to highly contribute to the forecasted emissions reductions:

(i) Law enforcement and enhanced protection of biodiversity in and around the GNR through capacity strengthening and improved surveillance;

(ii) Development of community management plans for non-timber products;

(iii) Promotion of conservation agriculture practices and agro-forestry;

(iv) Promotion of improved techniques for charcoal production;

(v) Promotion of a sustainable use of forest based on natural regeneration;

(vi) Valorization of the cashew value chain to increase smallholders' revenues.

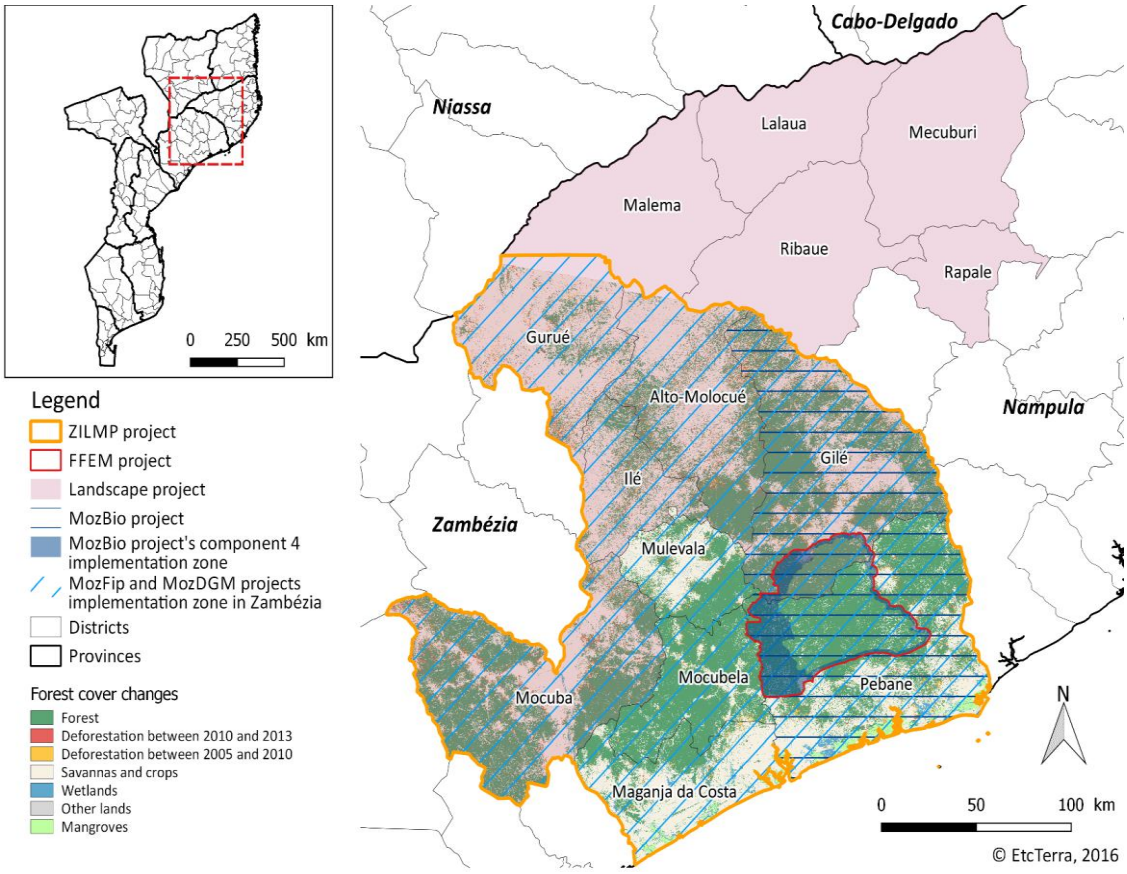


Figure 9: Map of projects in the ER Program area with forest cover change

4.2 Assessment of the major barriers to REDD+

The barriers to applying REDD+ initiatives and therefore reducing deforestation are at the same time political, financial and institutional. From a more practical point of view, the application of REDD+ initiatives is also undermined by the lack of tangible information as a base for REDD+ projects designing. At local scale, with regards to the agents of deforestation themselves, the main barriers include poverty and the lack of alternative sources of income, among other factors.

Political, institutional and financial barriers to REDD+

From a political and institutional point of view, it should be noted that REDD+ implies high commitment from the government in order to meet its requirements. Although strong progress has been made in Mozambique, there still is room for improvement of the political and institutional framework for REDD+ and ER Program implementation.

Legal framework, law implementation and institutional challenges

Admittedly, Mozambique has a progressive legal framework for the promotion of sustainable forest management, even though its implementation might have had mixed success. Transparency and, especially, the accountability to the law by private sector entities and government officials is still a challenge, particularly in the timber industry. The current scenario is characterized by irrational and unsustainable use that occurs in the exploration and illegal export, mainly marked by the widespread breach of the rules and procedures of the law (MITADER, 2015).

Current forestry legislation clearly defines economic, social, ecological and institutional objectives and strategies to achieving them. All objectives are underpinned by principles of sustainable use, ecological integrity, creation of positive impact to the national economy and ensuring benefits to forest dependent communities. An interesting example of this is the GoM requiring 20% of timber royalties to return to communities for rural development purposes[22]. However, implementation of these various mechanisms is sometimes difficult as there is limited oversight of the proper delivery of the community share of royalty proceeds (IDA, 2016).

In addition, inter-institutional and sectorial collaboration is sometimes not performing enough. The coordination between the various sectors involved in REDD+ and in the implementation of the ER Program – such as environment, land, agriculture, energy, etc. - is crucial at all levels, from the national level to the provincial and district ones.

Those weaknesses indicate the need of increased transparency and the equitable application of laws is also necessary to ensure that access to opportunities and distribution of benefits is seen as fair to all stakeholder groups (IDA, 2016). **Mozambique has already been working on this issue through various means, including the creation of the MITADER.** In the same way, the legal framework associated to the management of forest in Mozambique is currently being reviewed. Indications from the first drafts are that the progressive nature of existing legislation with its focus on community rights and promoting partnerships with incoming investors is enhanced in the new law, which also introduces concepts like FPIC and clarifies the licensing and concession process.

[22] *See section 4.4 on Land Tenure Assessment and section 15 on Benefit Sharing Mechanisms for more details.*

Financial barriers

Another barrier to REDD+ in Mozambique might be the financial component, characterized by a lack of upfront financing to support the adoption of new agriculture, forestry and charcoal production methods that are expensive and not commonly adopted as business as usual in the ER Program area. Developing innovative models for forest conservation, low emissions agriculture and sustainable development requires substantial investments to generate results in the long term. Yet, credit in the country is both expensive and difficult to obtain for many local operators. These financial barriers also constrain the ability to mobilize enabling investments that are needed to increase capacity, promote knowledge exchange and attract responsible businesses from the private sector and institutions committed to sustainable forestry production and deforestation free agricultural supply chains (IDA, 2016). **Of significance for the ZILMP with regards to this barrier is the fact that most of its interventions falls under existing project (Sustenta, MozBio, MozFIP) for which the funding are already identified.**

Lack of relevant data and information sharing

Low accuracy of data on forest

For long the forest sector has faced significant challenges in the provision of information, with the lack of timely, consistent and accurate data to support sound, evidence-based policy decision making and planning; limited information flow from central level to the district or the ground; insufficient data sharing and public access to data and information to ensure transparency; and the lack of an information system that has been systematically implemented at the district or field level (IDA, 2016).

With regards to those barriers, a few measures have already been undertaken and should be underlined. Notably, a Forest Information system is currently being developed, with FAO technical support and financial backing from the MozFIP program. Its consolidating is actually part of the ER Program planned interventions, as described in section 4.3. This information system is designed to store data on forest and wildlife licensing, compliance efforts, contracts and elaborate reports.

An important module to be added to the information system is the MRV for forests, a specific tool required by the REDD+ process, for the measurement, reporting and verification of a country's forest, and associated GHG emissions and removals, including their changes over time. *This, as well as a national forest inventory, are currently being designed in Mozambique and are expected to be concluded by end-2017. They are currently funded by the FCPF.*

Insufficient information sharing with agents of deforestation

In the same way, there used to be few platforms and consistent information sources in Mozambique enabling the involvement of civil society on policy implementation, lessons and challenges. The challenge is to improve timely availability of information to give opportunity for an informed response by communities. Several case studies (e.g. Nhantumbo and Salomao, 2009) have documented that this process is often not implemented according to regulations and some parties might use it to further their interests. Better information systems and better dissemination would enable stakeholders to participate in improving the

responsiveness of GoM institutions and create more incentive for greater compliance (IDA, 2016).

On that matter, it is worth noticing that **the ER Program includes the creation, updating and continuous improvement of an interactive platform (GIS platform), relating all projects, activities and relevant data for forest conservation in the ER Program area -** see section 5. This platform will be managed by the GoM thanks to data and information collected on the ground, with the support of the Zambézia Multi-Stakeholders Landscape Forum who will help provide part of the information, of the PIU who will help process the information for Zambézia. The creation and functioning of the Zambézia Multi-Stakeholders Landscape Forum actually is another meaningful initiative with regards to information sharing and stakeholders' involvement - *see section 5 for more details*. The ER Program will also support it.

Weakness in land zoning and tenure rights

Community land delimitation is a key instrument to reduce land conflicts and increase communities' land tenure security. It is also important to create a base of community management of land and natural resources, and set the stage for local agreements with investors and new programs such as the ER Program. Despite recent and significant progress, with initiatives led by civil society organizations in cooperation with the GoM, land zoning and tenure right are not fully operational yet. Land zoning and secured tenure rights are believed to be essential for reducing deforestation as they enable stakeholders to invest in other practices on their own lands, and to assess performance with regards to emissions reduction - *see section 4.4 on Land Tenure Assessment and section 15 on Benefit Sharing Mechanisms for more details.*

This is a critical point that will be addressed in the ER Program and, especially, through the Sustenta and MozFIP projects.

Barriers linked to the agents of deforestation

With regards to the barriers to REDD+ linked to the agents of deforestation themselves, as stated earlier, the main barriers remain poverty and the lack of alternative sources of income for rural population who is highly dependent on forest resources for their day-to-day life from an economic and social point of view – *see section 3*. Poor professional and economic opportunities linked to a limited access to credit may undermine the adoption of any other practices based on the reduction of forest exploitation, if this is not proven as economically beneficial for rural communities living in the ER Program area. This is also intensified by the difficulty to achieve compliance, at local scale, with forest law, as well as by the lack of strong community-based organizations, which undermines coordination of planned activities on the field.

Economic and financial viability of production, transformation and use of goods and the integration of actions that lead to reduced deforestation and forest degradation that are socially and culturally adapted to the local context are therefore meaningful components of Mozambique REDD+ Strategy and the ER Program.

4.3 Description and justification of the planned actions and interventions under the ER Program that will lead to emission reductions and/or removals

The ER Program is composed of four main projects (Sustenta, MozBio, MozFIP and MozDGM): their activities represent the totality of the planned interventions and enabling activities of the ER Program.

ER Program planned interventions and enabling activities

Enabling Activities (EA)

The ER Program builds on and is composed of World Bank portfolio projects, namely: MozBio, Sustenta, MozFIP and MozDGM. **Consequently, the ER Program interventions and enabling activities, described hereafter, were defined in the projects' respective Program Appraisal Documents (PAD)**. They are all scaled throughout the 9 districts (according to the projects in which they are implemented) and are financed by, Sustenta, MozFIP, MozDGM and MozBio. The mapping of those projects was provided in Figure 9, (*section 4.1*) and the financial planning of the ER program is details in section 6.2. However, as the ER Program goes on, it will be possible to upscale some of the ER Program interventions to larger areas.

Along land-based investments aiming to generate ERs, enabling activities are needed to create the necessary conditions for the ER interventions to be successful. Although those activities may not directly generate ERs, they aim at producing behavior change and livelihoods strategy changes that are essential to achieve ERs. As such, these changes themselves do not produce ERs, but are an essential element of the strategic framework within which ERs will be achieved. For instance, community delimitation, is a pre-requisite for most of the interventions. As explained in section 11, improved accountability and sense of « ownership » on forest areas through collaborative management and participatory forest monitoring is key to the ER Program success. In the same way, cross-sectorial coordination, law enforcement and the improvement of forest governance are essential to guarantee the value-added of land-based investments in the reduction of deforestation on the long run.

Those enabling activities are described below. They are summarized in three categories: (i) enabling activities for development, coordination and monitoring of the ER Program (EA-A); (ii) enabling activities related to land planning (EA-B); (iii) enabling activities related to law enforcement and forest governance and management (EA-C).

ER Interventions (ERI)

Besides enabling activities, concrete land-based investments aiming to actually reduce deforestation and forest degradation are scaled throughout the 9 districts that cover 6 million ha, with the help of various extension agents, especially for conservation agriculture activities. They were gathered into one category: ER interventions for sustainable production, livelihood and income generation (ERI-D). Those land-based investments encompass: conservation and climate smart agricultural production, including with the establishment of agroforestry systems; sustainable production of key cash-crops; plantations and restoration

of degraded lands through assisted natural regeneration (ANR) and enrichment planting; sustainable production of charcoal; valorization of key NTPF products around the GNR, as detailed below:

(i) **The promotion of conservation and climate smart agriculture, including agroforestry systems (ERI-D1)**, with: technical assistance based on extension services; provision of inputs; distribution of fruit trees; assistance to targeted nurseries; and monitoring of smallholders' activities;

(ii) **The structuring of key sustainable supply chains for cash crops production (ERI-D2)**, with: technical assistance based on extension services and training on quality standards and on the maintenance of orchards for smallholders; provision of inputs; implementation of a market information platform to support cash-crops producers, with the diffusion of information on markets dynamics and prices through SMS; training on the structuring of business plans to small emerging commercial farmers (SMC) and other key rural micro, small and medium enterprise agribusiness; agribusiness finance to value chains actors, including support to access credit and financing schemes for agribusinesses (matching grant and partial credit guarantee); improvement of key selected rural infrastructures for commercialization of cash crops;

(iii) **The development of multi-purpose plantations and restoration of degraded lands (ERI-D3)**, with: plantations of selected tree species; assisted natural regeneration (ANR); and enrichment planting;

(iv) **The improvement of charcoal production (ERI-D4),** with: training to local producers for the operationalization of improved kilns; technical assistance for the elaboration and implementation of forest management plans and for the creation of partnerships with private operators;

(v) **The valorization the income generating potential and sustainable livelihood around the GNR (ERI-D5),** with: technical assistance for the sustainable use of NTFP.

For now, **the total land area brought under sustainable landscape management by the ER Program is expected to reach 472,433 ha (including the GNR and its buffer zone)**[23]. A more precise estimation of the areas that will benefit from each kind of investment-based activity is provided in Table 14; however, of crucial importance is the fact that many ER Program interventions were not assessed in terms of land areas but according to other indicators, such as the number of beneficiaries, and cannot as such fuel the table below.

With regards to financing and the estimation of ERs, **all land-based investment planned within the ER Program are already financed by the Sustenta, MozFIP and MozBio projects**, as explained in section 6.2 of the ER-PD. **They should be responsible for the totality of the forecasted ERs of the ER Program**. Consequently, **the carbon benefits generated by the sell of ER will not be used to finance the ER Program interventions or any land-based investment**, but will be used according to the BSP currently being developed, most probably to finance additional community projects in the ER Program area and/or to allow the ER Program interventions to be scaled-up in the future.

[23] *Including the Buffer Zone (152,799 ha) of the GNR (core area 283,584 ha)*

Table 14: Estimation of areas that will benefit from land-based investments

In hectares (ha)	MozFIP	MozBio	Sustenta	TOTAL
Land area under sustainable landscape management - outside of conservation areas (ha)	30,250		5,800	**36,050**
Conservation areas under improved management in the landscapes – GNR (ha)		436,383[24]		**436,383**
Restoration of natural habitats through Assisted Natural Regeneration (ANR) and enrichment planting (ha)	500	200	800	**1,500**
Conservation agriculture, incl. Agro forestry (ha)	750	500	5000	**7,050**
Area of planted forests established (ha)	3,000			**3,000**
Area under forest management for sustainable charcoal production (ha)	1,000			**1,000**
Area of forest concessions under sustainable forest management (ha)	25,000			**25,000**
Land area supported by community land-use plans (ha)	120,000		202,500	**322,500**

The data in this table is only for information purposes and were taken from the results framework of the pads of the projects. The total area of project initiatives should not be estimated by adding up the values in this table.

At this stage, it should be reminded that this ER Program doesn't account for forest degradation, but only for the reduction of deforestation – *see sections 7 and 8 for more details on justification.* As such, and because it is the main driver of deforestation, small-scale agriculture is an important sector for the ER Program interventions. However, the ER Program is composed of four WB projects, and those have a broader approach on land management: their activities extend beyond the agricultural sector *per se*. Admittedly, although an important share of the activities comprised in the Sustenta, MozBio, MozFIP and MozDGM projects are focusing on agriculture, not all of the ER Program interventions are directly applying to sustainable agricultural production.

Although this can, at first, make it difficult to see how the ER Program will actually achieve ERs, it is actually coherent with the overall scheme of the ER Program, based on an integrated land management approach: while only deforestation is accounted for in the ER Program, the interventions of the ZILMP were defined according to a comprehensive

[24] *Including the Buffer Zone (152,799 ha) of the GNR (core area 283,584 ha)*

approach in which all the activities may impact on one another. In other words, some of the measures that seem out of the agricultural scope will actually have an impact on it. For instance, the activities focusing on the sustainable production of charcoal (ERI-D4) are related to small-scale agriculture, as charcoal production in the ER Program area actually is a by-product of agriculture; land tenure regularization (EA-B1) may contribute to delimitate agricultural parcels; the valorization of cash-crops (ERI-D2) will also influence agricultural production, etc.

This integrated approach therefore recognizes the link between agricultural development, natural resources management and governance, both in terms of institutional management and practical implementation. It will aim to address the drivers of deforestation and degradation while generating rural development benefits by combining land-based economic activities with the management and conservation of natural resources, as shown in the crosscutting interventions described in Figure 10.

This approach is fully aligned with Mozambique's national REDD+ Strategy, which aims to promote integrated cross-cutting interventions to reduce carbon emissions associated with land use and land use change through adherence to the principles of sustainable management of forest, contributing to global mitigation and adaptation efforts to an integrated rural development.

Engagement of smallholders into the adoption of ER Program interventions

Granted, in order for this approach to be efficient, it is primordial to effectively and efficiently engage smallholders into those activities and in adopting sustainable behavior on the long run. As explained in section 11 of this ER-PD, the risks of (i) a lack of broad and sustained stakeholders' support to the ER Program and of (ii) a lack of long term effectiveness in addressing the underlying drivers of deforestation were actually identified as a Reversal risks for the ER Program; a range of mitigation measures are described in section 11 and summarized below.

Adaptation of promoted sustainable practices to local constraints and needs, including with the deployments of efficient and committed extension-agents - First, it should be noted that the ER Program interventions promoting conservation agriculture (ERI-D1) are based on extension services, meaning that they will rely on a wide range of extension agents, who are part of local communities. This approach is useful to (i) enable the wide dissemination of sustainable practices throughout the ER Program area and extends beyond direct beneficiaries; (ii) ensure that the need of local communities, including in terms of agricultural production, are well understood and that the ER Program interventions are not conflicting with those. The individual commitment of the extension agents and knowledge of local habits are therefore essential: the promoted techniques will always be adapted to local constraints in order to facilitate their adoption. This is also coherent with the fact that the ER Program will not prohibit any agricultural practices but will provide incentives for sustainable practices that will enable the agricultural production to increase while reducing deforestation, so that local populations' needs are met at longer term. Agricultural productivity will be increased in order to reduce shifting agriculture and the net impact on agricultural production is actually expected to be positive.

Existence of consultative forums, platforms and mechanism involving stakeholders and local smallholders, including the existence of a Feedback and Grievance Redress Mechanism (FGRM) – Second, smallholders' engagement in the ER Program will be

facilitated by the existence of efficient platforms and tools for them to express any potential concerns and grievances, so that the ER Program interventions can quickly be adapted to answer their queries. This will especially be ensured though the functioning of the Zambézia MSLF (see section 5) and with the operationalization of a transparent, clear and well-known FGRM (see section 14), open and available to all the people living in the ER Program area. As stated in section 11, this is a key element that, at short term, will enable the ever-on-going definition of the ER Program so as to be as coherent as possible with stakeholders' needs and, consequently, maximize their chance of commitment to the Program.

Increase of income – Third, it should be reminded that the ER Program interventions promoting conservation agriculture (ERI-D1) are closely linked with the activities promoting the valorization of key cash-crops with agro-forestry systems (ERI-D2) in the ER Program area. As explained in Table 15, this will come along better access to market, which is expected to provide them with other sources of income: securing farmers' incomes and diversifying their sources of revenues in the ER Program area is expected to facilitate risk taking and the adoption of new agro-ecological practices. Since this measure will only focus on cash crops that are already being harvested in the ER Program area (no new cultures will be introduced), stallholders' commitment is expected to be facilitated by the knowledge that they already have of the products.

Carbon and non-carbon benefits and existence of a transparent Benefit Sharing Mechanism – In addition, smallholders' revenues will also be increased, during the terms of the ERPA, by the ER payments generated by the Program. Such ER payments, through the existence of an efficient and transparent Benefit Sharing Plan (see section 15), will be channeled back to the smallholders in the ER Program area, enabling concrete and immediate perception of benefits linked to the adoption of sustainable practices. However, although carbon payments may help to initiate their change of behavior, the non-carbon benefits are expected to contribute to the maintaining of sustainable practices way after the application of ERPA and carbon payments. Non-carbon benefits will therefore be crucial to ensure smallholders' commitment on the long run. They will have to be clearly presented to local communities to ensure the clear perception of non-carbon benefits for stakeholders at long term and especially beyond the terms of the ERPA.

Implementation of an efficient and large enough land titling and delimitation process to ensure stability of land rights in the long run – Finally, as explained in sections 4.4 and 11, land tenure is a key element to ensure communities' involvement in the ER Program: stronger community land rights are expected to increase incentives for investments in long-term land use and for the adoption of sustainable land use practices. It is also likely to lead to greater benefits for local communities, including through win-win partnerships with the private sector. Accordingly, the ER Program provides for a significant component based on an integrated landscape management through securing land tenure regularization at the community and individual levels.

Overview of the prioritization of the ER Program activities

The prioritization of the ER Program activities depends on various factors, including their implementation risks and potential benefits. Most of the implementation risks of the ER Program interventions can actually be assessed through Reversal risks – *see section 11 for more details on those risks and their assessment*.

First, for the reasons explained above, the priority activities are those necessary to create a fertile ground for the ER Program to be successful and generate expected ERs. They may address cross-sectorial coordination challenge as well as the risks associated the lack of long-term effectiveness in addressing the underlying drivers of deforestation and forest degradation – which are, as explained in section 11, key risks associated with the ER Program. The top priority ER Program activities will therefore be those designated as "enabling activities".

Second, **the priority activities are those already funded through existing projects and initiatives that were listed in section 4.1.** Those activities will all be implemented at the same time, considering the fact that their degree of implementation success – especially with regards to the adoption of sustainable practices based on behavior change for local population – depend on various factors: most of the ER Program interventions are mutually supporting and, eventually, reinforcing. This view is coherent with the comprehensive approach of the ER Program.

Planned actions and interventions

The Table 15 summarizes the main strategic objectives and associated planned interventions of the ER Program, including enabling activities (EAs). They are linked to the six Strategic Objectives (SO) of the National REDD+ Strategy, which were followed and translated into concrete operational ER Interventions (ERI). Table 18, 19, 20 and 21 provide for more details on the various actions to be implemented under the ER Program. Because many of the actions are crosscutting interventions, they could actually fit in various topics within the four pillars that were defined.

Drivers of deforestation/forest degradation and barriers to REDD+	•ER Program planned activities
Poor inter-institutional and sectorial collaboration, lack of organized process for recognizing land tenure, lack of community organization	•**A. Coordination and Monitoring: C**oordination and management of activities; institutional development and strengthening and intersectoral communication; community awareness and capacity building. •**B. Land planning**: Regularization of land tenure; improvement of districts land use planning and promotion of community level land use planning.
Lack of efficient control of licensing and management plans, non-sustainable exploitation practices in licensed areas, lack of effficient control of conservation areas, illegal logging	•**C. Law enforcement and forest governance and management:** Protection of conservation areas; strengthening of forest governance, transparency and forest management; improvement of national monitoring, detection and land information systems.
Shifting cultivation and subsistence farming, low access to energy and non-sustainable production of charcoal, illegal logging, lack of alternative sources of income for forest resources dependent rural population, poor access to markets for smallholders, limited exploitation of the revenue potential of conservation areas	•**D. Sustainable production, livelihood and income generation:** Promotion of conservation agriculture and agroforestry systems; structuring of key sustainable value chains for cash crops; promotion of multipurpose plantations, including for energy purpose; promotion of sustainable charcoal production; restoration of degraded land; valorization of the income generating potential of the GNR.

Figure 10: Cross-cutting interventions and topics to be covered in the ER Program

Table 15: Summary of strategic objectives (SOs) and planned interventions (ERIs) of the ER Program

Strategic objectives (SO) of the National REDD+ Strategy	**Strategic objectives broken down into ER Program enabling activities (EA) and planned Interventions (ERI)**		**Drivers/underlying causes of deforestation and forest degradation and/or barriers to REDD+ that are addressed**
EA- A. Enabling activities for development, coordination and monitoring			
Cross cutting actions and inter-institutional coordination (SO1): institutional and legal platform for inter-agency coordination to ensure the reduction of deforestation	**EA - A1: Coordination and management of activities**	*Coordination and management of the ER Program (implementation of a grievance redress mechanism, oversight of field activities, fiduciary and safeguards management and communications, monitoring, evaluation and reporting, etc.) and support to the FNDS*	- Lack of community organization and engagement; - Poor inter-institutional and sectorial collaboration.
	EA – A2: Institutional development and strengthening and intersectoral communication	*Financing of the additional costs of FNDS related to project management, including the costs of the Program Implementation Unit (PIU) at the provincial level*	

		Strengthening of ANAC, Biofund and CITES secretariat	
	EA – A3: Community awareness and capacity building – ensuring stakeholders' involvement and participation in the ER Program	*Capacity building for local communities and CGRNs (decision-making, accountability, transparency, local governance, business planning and management, use and management of funds, partnerships with the private sector, use of information technology, etc.)*	
		Workshops, trainings, meetings, communication and consultation about ER Program and REDD+, including through the consolidating of Multi-Stakeholders Landscape Forum in Zambézia (MSLF)	
B. Enabling activities related to land planning			
Cross cutting actions and inter-institutional coordination (SO1): institutional and legal platform for inter-agency coordination to ensure the reduction of	**EA – B1: Regularizing land tenure**	*Community land delimitation with community delimitation certificates, community land use plans and strengthening of community-based organizations (CBOs)*	- Lack of organized process for recognizing land tenure and zoning, including for communities;
		Issuance of individual DUATs	- Lack of community organization and

deforestation		*Provision of technical advisory services and equipment to conduct land demarcations, natural resource mappings and legal registration*	engagement.
		Availability of grants for implementing subprojects, including micro-zoning for territorial management plans	
	EA - B2: Improvement of districts land use planning & promotion of community level land use planning	*Strengthening of land administration services and upgrading of the land administration system*	
		Implementation of geospatial tools at the provincial and district levels to improve land-use planning, including with the operationalization of a GIS platform	
		Development of the National Land Use Plan	
C. Enabling activities related to law enforcement and forest governance and management			
Conservation areas (SO4): Strengthening the system of protected areas and finding safe ways of generating income	**EA – C1: Enhanced protection of conservation areas**	*Improvement of the management regime of the Gilé National Reserve*	- Lack of effective control of conservation areas and of their boundaries (illegal logging, small scale agriculture);
Sustainable Forest Management (SO5):		*Law enforcement and protection of biodiversity around the GNR*	- Poor benefits of conservation areas for

Promoting the system of forest concessions and community management and strengthening forest governance **Restoration of degraded forests and planting trees (SO6):** Establishing a favorable environment for the increase of plantations areas, forestry businesses, restoration of natural forests and planting of trees for various purposes	**EA – C2: Strengthening of forest governance, transparency and forest management**	*Support to the government's forest law enforcement institutions (particularly AQUA and ANAC)* *Improvement of national monitoring, detection and land information systems, including with support to a forest information system* *Support to the National Forest Forum* *Training to forest operators and to forest administration* *Support to small-scale forest businesses*	local communities; - Illegal logging on selected species of precious timber and limited cost of "being illegal"; - Lack of efficient control of licensing and management plans; - Non-sustainable exploitation practices in licensed areas.

D. Land based investment for sustainable production, livelihood and income generation			
Agriculture (SO2): Promoting alternative technique to shifting agriculture to ensure increased productivity of subsistence and cash crops	**ERI-D1: Promotion of conservation agriculture and agroforestry system**	*Trainings to conservation agriculture with extension services, support and monitoring of smallholders' activities* *Support to agroforestry systems through technical assistance, provision of inputs, distribution of fruit trees and assistance to targeted nurseries*	- Small scale agriculture based on "slash and burn" practices and uncontrolled wildfires; - Poor soil fertility associated with labor constraint; - Low income and poor social conditions; - Growing demography and increase of urban population;
	ERI-D2: Structuring of key sustainable value chains (forestry-based value chains) for cash crops and support to the establishment of commercial agriculture in	*Study and analysis of the commercial potential of various cash-crops around the GNR* *Technical assistance for cash crops production, training on quality standards and on the maintenance of orchards, provision of inputs for*	- Lack of alternative source of income for forest resources dependent rural population; - Poor access to markets

	areas with no forest cover	*smallholders around the GNR*	for smallholders with limited information and infrastructure; - Low income and poor social conditions. - Growing demography and increase of urban population;
		Technical assistance to small emerging commercial farmers and other key rural micro, small and medium enterprise agribusiness, including on business plans	
		Improvement of key selected rural infrastructures for commercialization of cash crops	
		Implementation of a market information platform to support cash-crops producers, with the diffusion of information on markets dynamics and prices through SMS around the GNR	
		Agribusiness finance to value chains actors, including support to access credit and financing schemes for agribusinesses (matching grant and partial credit guarantee)	
Restoration of degraded forests and planting trees (SO6): Establishing a favorable environment for the increase of plantations areas, forestry businesses, restoration of natural forests and planting of trees for various purposes	**ERI-D3: Promotion of multipurpose plantations and restoration of natural habitats**	*Implementation of a planted Forests Grant Scheme and support to community out grower schemes*	- Lack of accessible alternative source of energy; - Lack of alternative source of income for forest resources dependent rural population;

		Restoration of natural habitats through Assisted Natural Regeneration (ANR) and enrichment planting	
Energy (SO3): increasing access to alternative sources of biomass in urban areas and increasing the efficiency of production and use of biomass energy	**ERI-D4: Promotion of sustainable charcoal production**	*Plantation of fast growing trees for energy purpose*	- Lack of accessible alternative source of energy; - Wild production of charcoal to respond to high demand through informal market; - Low yields of charcoal production techniques; - Low income and poor social conditions; - Growing demography and increase of urban population;
		Support to local producers for the creation of improved kilns for charcoal production	
		Training of producers for the elaboration and implementation of forest management plans and for the creation of partnerships with private operators	
		Training to Assisted Natural Regeneration (ANR) techniques to limit the negative impact of charcoal production	
Conservation areas (SO4): Strengthening the system of protected areas and finding safe ways of generating income	**ERI – D5: Valorization of the income generating potential of the GNR and sustainable livelihood around the GNR**	*Improvement of sustainable tourism in the GNR with support to a community sport hunting area*	- Poor benefits of conservation areas for local communities; - Limited exploitation of the revenue potential of conservation areas.
		Sustainable use of NTPF	

Table 16: EAs for development, coordination and monitoring

A- Development, coordination and monitoring *(SO1): institutional and legal platform for inter-agency coordination to ensure the reduction of deforestation* EA - A1: Coordination and management of activities EA – A2: Institutional development and strengthening and intersectoral communication EA – A3: Community awareness and capacity building – ensuring stakeholders' involvement and participation in the ER Program	
Drivers and underlying causes of deforestation and forest degradation and/or barriers to REDD+ that are addressed	Poor inter-institutional and sectorial collaboration Lack of community organization and engagement
Description	The good implementation of the ER Program, with **efficient coordination and management (EA-A1),** will require good relay at local scale, through improving both national and provincial government capacity and structures. Admittedly, **institutional development and strengthening and intersectoral communication (EA-A2)** is a core necessity for the ER Program. At local scale, capacity building will also be oriented towards communities, through participatory mechanisms. Community awareness is crucial to **ensure stakeholders' involvement and participation in the ER Program (EA-A3)**. ▪ The actions comprised in the EA-A1 are related to the coordination and management of the ER Program. They are expected to enhance intersectoral communication and coordination with and within the government and agencies. They include the management and monitoring of contracts, oversight of field activities that service providers, technical assistants, and consultants may implement along the ER Program lifetime, oversight of compliance with the safeguards policies and the implementation of a grievance redress mechanism – *see section 14*. As part of EA-A1 actions, support will also be given to the FNDS to coordinate and monitor the activities and manage financial and human resources in an efficient, results-oriented manner. The additional costs of FNDS related to activities management will especially be guaranteed by the MozFIP program. This includes support for project coordination and management, including fiduciary and safeguards management and communications. The EA-A1 also encompasses support for monitoring, evaluation and reporting, including collecting baseline data, contracting service providers for data collection and reporting on indicators and conducting analyses when needed for supervision and evaluation. Financing of necessary audits and other studies according to the work plans and budgets, and any quality oversight needed through independent financial and technical audits, will be financed through the EA-A1 component.

- Strongly linked to EA-A1 are the actions related to institutional strengthening (EA-A2). To ensure the sustainability of the ER Program interventions, institutional development among relevant institutions is planned, for key public and private sector entities and in various aspects. As previously stated, this includes the establishment and operationalization of the PIU in Zambézia, but not only: the MozBio project focuses on the improvement of the capacities of ANAC, Biofund and CITES Secretariat.

  Support to ANAC is based on the provision of equipment, technical assistance and training to improve the management of conservation areas and nature-based tourism development, in terms of staffing (including with the development of competitive human resources procedures and the provision of trainings), of administrative and internal management issues (planning, procurement, financial management, monitoring and evaluation, auditing and communication), for the elaboration and application of relevant regulations and policies and for its activities of awareness-raising (communication strategy, materials, events, etc.);

  Support to Biofund is based on, *inter alia*: (a) the capitalization of the endowment fund for conservation areas (including the GNR, located in the ER Program area); and (b) the operationalization of Biofund with the provision of equipment, financing of operating costs and technical assistance, including the design and implementation of a fundraising strategy.

  Support to CITES secretariat aims to adequate implementation of the CITES Convention in Mozambique, which is fundamental to improve wildlife management and has a direct impact on promoting tourism, especially for sport hunting - which is an important conservation-based income-generating activity (*see ERI-D6*).

- In order to ensure stakeholders' involvement and participation in the ER Program, various elements are planned, including land tenure regularization activities – *see EA-B1*. The actions comprises in the EA-A3 are more related to local capacity building and consultation processes. Those are important element of MozFIP, which supports governance reforms at national level - including improved efforts on communication and consultations. In this way, support will be provided to the Government to develop a broad and strategic communication plan that focuses on strategic communication approaches, improving existing communication channels and capacities in the Government while improving and targeting communication materials aimed at the range of stakeholders involved. One of the main objectives of the communication efforts is to build trust and learning between government and national stakeholders, in particular local communities.

  This will also be achieved through the support to the Multi-Stakeholders Landscape Forum (MSLF) in Zambézia, which offers a platform for communication and transparency between the various stakeholders, including at provincial level.

  At local scale, capacity building will also be based on the communities living around conservation areas – in this case, around the GNR – and, especially, on the Natural Resources Management Committees (*Comité de Gestão de Recursos Naturais*, CGRNs) including through the MozBio and the MozDGM projects. Associated actions comprise the training of local communities on decision-making, accountability, transparency, local governance, business planning and management, use and management of funds, partnerships with

	the private sector and use of information technology. MozBio will also support the carrying out of capacity building programs for the design and implementation of subprojects. MozDGM will support capacity-building and institutional-strengthening activities for communities and civil society organizations. The activities to be financed aim to strengthen communities' knowledge and technical capacity on matters related to climate change and forest and land management, as well as their managerial and grant-making competencies.
Activities	▪ **EAA1**: Coordination and management of the ER Program (implementation of a grievance redress mechanism, oversight of field activities, fiduciary and safeguards management and communications, monitoring, evaluation and reporting, etc.); ▪ **EA-A2**: Financing the additional costs of FNDS related to project management, including the costs of the PIUs at the provincial level; ▪ **EA-A2**: Strengthening of ANAC, Biofund and CITES secretariat; ▪ **EA-A3**: Capacity building for local communities and CGRNs (decision-making, accountability, transparency, local governance, business planning and management, use and management of funds, partnerships with the private sector and use of information technology); ▪ **EA-A3**: Workshops, trainings, meetings, communication and consultation about ER Program and REDD+, including through the consolidating of Multi-Stakeholders Landscape Forum in Zambézia.

Table 17: EAs related to land planning

B - Land Planning ***(SO1): Institutional and legal platform for inter-agency coordination to ensure the reduction of deforestation*** EA – B1: Regularization of land tenure EA - B2: Improvement of districts land use planning & promotion of community level land use planning	
Drivers and underlying causes of deforestation and forest degradation and/or barriers to REDD+ that are addressed	Lack of organized process for recognizing land tenure and zoning, including for communities Lack of community organization and engagement
Description	Land planning through **land tenure regularization (EA-B1)** and the improvement of **districts and community level land use planning (EA-B2)** - including the promotion of integrated landscape management tools – are critical conditions for the ER Program. As explained in sections 4.4 and 11, land tenure is a key element to ensure communities' involvement in the ER Program: stronger community land rights are expected to increase incentives for investments in long-term land use and for the

adoption of sustainable land use practices. It is also likely to lead to greater benefits for local communities, including through win-win partnerships with the private sector[25]. Accordingly, the ER Program provides for a significant component based on an integrated landscape management through securing land tenure regularization at the community and individual levels.

- EA-B1 is supported by both the "*Sustenta*" and the MozFIP projects, which provide for the issuance of individual DUATs and for community land delimitation: in the ER Program area, the "*Sustenta*" project coud secure land tenure rights of 135 rural communities and issue 156,450 individual DUATs, while the MozFIP project is expected to delimitate 80 communities and issue 3,550 individual DUATs to small and medium landholders engaged in forest plantations and agroforestry[26].

  It should be noted that linking the delimitation process to business-oriented strengthening of CGRNs and CBOs actually is a key aspect of the "*Sustenta*" project approach, in line with the ER Program. Capacity building will have a dual goal, related to strengthening their management skills and capacity to (a) transform the sustainable management of natural resources into benefits to communities — for example, through activities such as nature-based tourism and forest-based value-chains development (*see D – Sustainable production, livelihood and income generation*) and (b) negotiate and implement mutually beneficial partnerships with investors interested in land or other resources available in the area. The delimitation identifies where local land rights exist (the collective ones of the local communities and/or the more individualized DUATs held by households or associations) and ensure these rights are officially registered. All in all, land tenure regularization will improve local communities' capacity to plan the use of natural resources over which they have rights and to enhance the capacity of local actors on land-use planning and on multi-stakeholder planning, including micro-zoning for territorial management plans.

  In the ER Program area, this action is reinforced by (i) the MozBio project that includes the provision of technical advisory services and equipment to conduct land demarcations, natural resource mappings and legal registration in order for communities to be able to engage in sustainable management of natural resources; (ii) MozDGM, which supports local communities and community-based organizations through grants for implementing subprojects, and strengthening the community capacities.

- The ER Program also provides for the improvement of districts and community level land use planning (EA-B2). This is partly based on the strengthening of land administration services. With this regard, the "*Sustenta*" project comprises the strengthening of the capacity of provincial and district offices with the following

25 Such private sector actors will mostly be forest operators and actors already engaged or willing to engage in activities related to the valorization of cash crops (such as cashew nuts) and NTPF in the ER Program area. NTPF and cash-crops will be produced by local smallholders, supported by the ER Program, and could be subject to interesting market partnership with the private sector for their processing and/or commercialization.

[26] Those figures are estimations of the FNDS based on the projects' objectives at landscape and national levels, and assuming a fair division of their objectives in the areas of interventions. The Sustenta projects aims to delimitate 270 rural communities and issue 312,900 individual DUATS in the two provinces of Zambézia and Cabo-Delgado; the MozFIP project aims to delimitate 160 rural communities and issue 7,100 individual DUATS at national level. These figures may be changed after evaluation by the projects' service providers, and according to population discrepancies and already delimited communities in the various districts. In particular, the number of community delimitations in Zambézia may be increased given the existence of the GNR and its buffer zone (conservation area where individual DUAT cannot apply).

	objectives: (a) to improve the competencies of the provincial and district cadastral officers and national-level DINAT staff and (b) to strengthen the capacity in land administration services to issue community delimitation certificates and DUATs. This will be based on the provision of trainings to relevant staff at the recipient's district and provincial level. The promotion of the use of spatial tools that can inform land-use planning is also relevant, as spatial planning allows trade-offs over land allocation to be discussed among stakeholders in a transparent manner. Spatial tools include new technologies (use of geographic information systems, for instance) and participatory approaches. Precisely, the "*Sustenta*" project and the MozFIP project will finance capacity-strengthening interventions, and equipment for Sustenta in particularly. Efforts will also be devoted to the development of spatial planning capacity (including GIS). In the same way, the MSFL, supported by the "*Sustenta*" project (*see A – Development, coordination and monitoring*), will be a useful means to foster a common vision for management of the landscape across stakeholders. Another important tool provided for the ER Program is Mozambique's National Land Use Plan (NLUP). Supported by MozFIP, it will enable national land use plan aiming to promote long-term sustainable land use decisions, including in the ER Program area. The NLUP will include a dynamic modeling platform for evaluating interventions for improved land-use management[27].
Activities	▪ **EA-B1:** Community land delimitation with community delimitation certificates, community land use plans and strengthening of community-based organizations (MozFIP: 80 in the ER Program area (expected); "*Sustenta*": 135 in the ER Program area)[26] ▪ **EA-B1:** Issuance of individual DUATs (MozFIP: 3,550 in the ER Program area; Sustenta: 156,450 in the ER Program area) [26] ▪ **EA-B1:** Provision of technical advisory services and equipment to conduct land demarcations, natural resource mappings and legal registration (for communities to be able to engage in sustainable management of natural resources); ▪ **EA-B1:** Availability of grants for implementing subprojects, including micro-zoning for territorial management plans; ▪ **EA-B2:** Strengthening of land administration services and upgrading of the land administration system (training, equipment); ▪ **EA-B2:** Implementation of geospatial tools at the provincial and district levels to improve land-use planning (equipment acquisition and training), including the operationalization of a GIS platform; ▪ **EA-B2:** Developing the National Land Use Plan (NLUP) to promote more sustainable long-term land-use decisions.

[27] The Spatial Planning Directorate (DINOTER) of the MITADER, in charge of developing the NLUP, is currently hiring consultants and the contracts will be signed in early 2018.

Table 18: EAs related to law enforcement and governance in the forest sector

C- Law enforcement and governance in forest sector and forest areas *(SO4): Strengthening the system of protected areas and finding safe ways of generating income* *(SO6): Establishing a favorable environment for the increase of plantations areas, forestry businesses, restoration of natural forests and planting of trees for various purposes* *(SO5): Promoting the system of forest concessions and community management and strengthening forest governance* EA – C1: Enhanced protection of conservation areas EA – C2: Strengthening of forest governance, transparency and forest management	
Drivers and underlying causes of deforestation and forest degradation and/or barriers to REDD+ that are addressed	Lack of effective control of conservation areas and of their boundaries (illegal logging, small scale agriculture) Poor benefits of conservation areas for local communities Illegal logging on selected species of precious timber and limited cost of "being illegal" Lack of efficient control of licensing and management plans Non sustainable exploitation practices in licensed areas
Description	▪ The enhanced **protection of conservation areas (EA-C1)** in the ER Program is based the improvement of the management of the GNR (conservation area). Institutional strengthening for conservation area and for the GNR management is an important issue for the ER Program, which will be supported by the MozBio project[28]. This component has been subdivided into two sub-components: i) improved management of the conservation area and ii) wildlife surveys and monitoring. Planned activities in the ER Program and supported by MozBio comprise local measures such as the provision of specific training and field and office equipment (including communication hardware and software) and operating costs. Support to wildlife survey and monitoring will be provided to ANAC, responsible for monitoring key wildlife populations, especially those in the hunting areas. This subcomponent will develop various survey techniques and includes conventional stratified aerial surveys, road strip count surveys and abundance index techniques, and community-based monitoring systems. In addition, the MozBio project is also supporting activities of law enforcement and protection of biodiversity around the GNR by strengthening rangers' capacities to reduce illegal activities such as logging and poaching. Wildfires, triggered for agricultural or hunting purpose around the GNR, will also be subject to specific measures. ▪ The protection of conservation area also depends on the **strengthening of**

[28] *With this regards, it should be noted that an assessment was undertaken during preparation to establish the management needs of all conservation areas in Mozambique. Needs were also prioritized, using selection criteria through a participatory process with key conservation stakeholders in the country. The main needs of the GNR are: operating costs, game translocation, staff accommodation, check points and outposts, electrification, game fence construction, new tourism facilities, communication (radios, etc.), rehabilitation of roads, construction of bridges, building of drifts/river crossing, construction of airstrips.*

forest governance, transparency and forest management (EA-C2), both at local and national scale. Forest governance and forest management are strongly linked, especially with regards to benefits associated to the use of forest resources, which also plays a key role in the protection of conservation areas and of forest in general. Admittedly, the maintenance of illegal logging in the GNR and the possible spread of "slash and burn" agriculture from outside to inside of the GNR can be explained by various factors, among which the poor benefits associated to conservation areas for local population. The ER program has to offer incentives for local communities, who are used to engage in activities responsible for deforestation and forest degradation, to change their behavior and respect conservation area protection status. ER Program activities related to the sustainable use of forest resources and income-generating activities is addressed in table D, but, in addition to those, forest governance should rely on transparent mechanisms and efficient forest management, described below:

- *Forest governance and transparency*. Improved forest governance is crucial to reduce forest-related crimes and illegal activities in the sector, to increase benefits to government and local communities from forest management and to ensure compliance with sustainable forest management practices. The improvement of forest governance and transparency at the national scale is a key component of the ER Program, as the control of illegal activities in the ER Program area is strongly linked to better management of the forestry sector at broader scale. In the case of the GNR for instance, this issue is very relevant: although the GNR staff has been working hard on limiting illegal logging in the GNR, it is still prevalent on specific rare species such as pau-ferro (*Swartzia madagascariensis*). Beyond local difficulties to prevent poachers from entering the GNR, illegal logging is eased by management weaknesses at provincial and national level. Accordingly, and as previously explained, the MozBio project includes institutional strengthening at national scale, including the strengthening of the ANAC that is in charge of the GNR management (*see A – development, coordination and monitoring*).

  In the same way, MozFIP aims to support enabling and governance reforms in the forest sector, including through: (i) legal and institutional reform (technical assistance on the reform process); (ii) improvement of legality and transparency in the forest sector (better performance of national monitoring and detection systems, increase of the functionality of forest, environment and land information and monitoring systems, better coordination mechanisms amongst relevant institutions); and (iii) supporting enabling conditions for sustainability in the private sector (sustainable management of forests and promotion of planted forests).

  Actually the ER Program, through MozFIP, will address the main forest governance constraints in the forest sector by improving information management, monitoring and law enforcement in the forest sector, increasing institutional transparency and accountability across relevant institutions, creating the mechanisms for improving participatory decision-making in the sector and building the skills base and capacity of forest stakeholders around sustainability principles. Planned activities include support to the newly created National Agency for Environmental Quality and Control (AQUA) at the national level and in Zambézia. This

will also comprise forest patrolling and increased surveillance, training and technical assistance on planning and monitoring for AQUA and, especially, establishment of AQUA's provincial delegations in Zambezia (equipment, staff financing and training and operational costs).

Transparency will also be enhanced with support to the National Forest Forum[29] and regular and participatory evaluations of the forest sector, promoted by MozFIP in order to improve decision-making in the forest sector by promoting citizen engagement. In addition to support to the Forum, support will also be provided for a forest information system (equipment, data management infrastructure acquisition, capacity building) to increase transparency and accountability in the sector system by providing updated geo-referenced information on forest licensing, forest management plan implementation, inspection, and law enforcement.

From a more general point of view, it should be noted that transparency and the accountability to the law by private sector entities and government officials is an important topic for the ER Program, but this component is primarily handled at governmental level, including independently from the ER Program. Currently, there is a strong political will to reform the forest sector, with the recent endorsement of a new policy package including law enforcement elements, *inter alia*:

- Review of all forest operators in Mozambique;
- Moratorium from the 1st of January 2016 on the attribution of new concessions and licenses;
- Moratorium from the 1st of January 2016 on *pau-ferro* harvesting;
- Moratorium from the 1st of January 2016 on exportation of unprocessed logs, whatever the wood type.

- *Forest management*. The ER Program also promotes the strengthening of natural forest management to ensure sustainable use of forest resources, to increase benefits to local communities and government and to add value to forest products. Section 4.1 already set the underlying causes of deforestation linked to the forestry sector that need to be addressed in the ER Program area. Through the MozFIP project, the ER Program will support forest operators who are committed to sustainable forest management in obtaining forest certification and in adding value to forest products.

It will also support the forest administration, particularly at the provincial level, on different aspects of forest management, including forest management plan implementation and piloting new forest concession allocation systems. Planned activities comprise the improvement of forest concessions and the promotion of small scale forest business and of community enterprises and micro, small and medium enterprises (MSMEs) involved in sustainable forest management and forest products

[29] The National Forest Forum is an entity formally created and steered by DINAF. It is composed of different forest stakeholders, including government, private sector, CSOs and academia. It has the objective to facilitate policy dialogue amongst stakeholders to reach consensus and serve as a national consultative platform on key forest-related issues.

	transformation (timber and non-timber) – through training and technical assistance on sustainable forest management practices and timber processing, equipment, consultancy and operational costs for selected small-scale sustainable forest businesses.
Activities	▪ **EA-C1**: Improvement of the management regime of the Gilé National Reserve (improved management of the conservation area and wildlife surveys and monitoring); ▪ **EA-C1**: Law enforcement and protection of biodiversity around the GNR ▪ **EA-C2:** Support to the government's forest law enforcement institutions (particularly AQUA and ANAC); ▪ **EA-C2**: Improvement of national monitoring, detection and land information systems, including with support to a forest information system; ▪ **EA-C2**: Support to the National Forest Forum; ▪ **EA-C2**: Training to forest operators and to forest administration; ▪ **EA-C2**: Support to small-scale forest businesses.

Table 19: ERIs related to sustainable production, livelihood and income generation

D - Sustainable production, livelihood and income generation *(SO2): Promoting alternative technique to shifting agriculture to ensure increased productivity of subsistence and cash crops* *(SO6): Establishing a favorable environment for the increase of plantations areas, forestry businesses, restoration of natural forests and planting of trees for various purposes* *(SO3): Increasing access to alternative sources of biomass in urban areas and increasing the efficiency of production and use of biomass energy* *(SO4): Strengthening the system of protected areas and finding safe ways of generating income* ***Agriculture value chains and Agroforestry*** ERI-D1: Promotion of conservation agriculture and agroforestry system ERI-D2: Structuring of key sustainable supply chains (forestry-based value chains) for cash crops and support to the establishment of commercial agriculture in areas with no forest cover ***Plantations and charcoal production*** ERI-D3: Promotion of multipurpose forest plantations and restoration of degraded lands ERI-D4: Promotion of sustainable charcoal production ***Conservation areas*** ERI-D5: Valorization of the income generating potential of the GNR and sustainable livelihood around the GNR	
Drivers and underlying causes of deforestation and forest	Low income and poor social and infrastructures conditions Growing demography and increase of urban population Poor soil fertility associated with labor constraint Small scale agriculture based on "slash and burn" practices and uncontrolled

degradation and/or barriers to REDD+ that are addressed	wildfires Lack of alternative source of income for forest resources dependent rural population Poor access to markets for smallholders with limited information and infrastructure Lack of accessible alternative source of energy Wild production of charcoal to respond to high demand through informal market Low yields of charcoal production techniques Poor benefits of conservation areas for local communities Limited exploitation of the revenue potential of conservation areas
Description	▪ **The promotion of conservation agriculture and agroforestry system (ERI-D1)** should be considered as one of the core components of the ER Program. As stated before, the increase of maize and cassava cultivation - and the subsequent increase of land use - is the main driver of deforestation at national scale and in the ER Program area - *see section 4.1*. Given their strategic role in the population's diet, improving agricultural practices, on the basis of agro-ecology and taking into account the constraints related to low labor productivity, is one of the most strategic options to reduce deforestation in the ER Program area. Classic options to overcome fertility and weeding issues in a labor-constraint smallholding are the use of external inputs for fertility (from livestock and/or mineral fertilizers) and for weeding (chemical control or mechanic control of weeds). As shown in Mercier et al. (2016): (i) cattle cannot be introduced in the ER Program area due to trypanosomiasis prevalence; (ii) mineral fertilizer in Mozambique are only imported and, therefore, very expensive for smallholders and (iii) chemical control of weeds is difficult due to the high cost of chemical inputs and the environmental risk (loss of biodiversity, loss of nutrients cycles, toxicity). **With no access to external inputs, intensification with the dissemination of agro-ecological practices for food production is the only response to fertility needs and weeding problems.** The FAO defines three broad principles that make up conservation agriculture: minimum or reduced soil disturbance, maintaining a permanent soil residue or vegetative cover, and crop rotations or intercropping with legumes (FAO, 2002). Conservation agriculture results in a reduction in labor needed for land preparation, improved soil fertility and a reduction in water stress, making it especially important to Mozambique in the context of regional impacts of climate change - which is marked by increased temperatures and increasingly erratic rainfall (*see section 3*) – and with regards to the previous explanation of the role of labor constraint in the appeal of "slash and burn" practices (*see section 4.1*). It should nevertheless be noted that in the case of agro-ecology, to date, there is no "one size fits all" solution. Progressive adoption of "good practices" by rural households requires the operators to adopt a pragmatic approach, close to households' concerns, while integrating local and international economic dimensions. Refinements will be added according to the demographic and agro-ecological contexts of the various areas of the ER Program. Those actions are especially supported by the MozFIP project, which is promoting climate smart agriculture and conservation agriculture in order to

increase productivity and income and to reduce the need for clearing new land. Extension services will be provided alongside financing. MozFIP comprises the promotion of agro-forestry systems on approximately 1,500 ha by smallholders. Implemented as a pilot, this activity targets individual smallholder producers and informal and formal producer groups – including associations and cooperatives – with an initial goal of reaching approximately 3,000 producers[30]. The project will finance agroforestry system inputs (seeds, tree seedlings, tools, fuel) and technical assistance to the targeted beneficiaries. A small number of nurseries identified near agroforestry system clusters will receive technical assistance to ensure that they meet the needs of agroforestry beneficiaries.

In the same way, the MozBio project includes activities for sustainable forest management through the carrying out of activities related to agroforestry and conservation agriculture around the GNR, with direct support and training of 300 smallholders and indirect support of 900 smallholders (through the diffusion of the techniques by the 300 directly supported smallholders) for the adoption of agro-ecology techniques around the GNR and the distribution of 45,000 fruit trees to support agro-forestry systems.

- Among them, cashew trees hold a significant place that is enhanced in the ER Program set of activities aiming at **structuring key sustainable value chains for cash crops (ERI-D2)**. Admittedly, the promotion of specific cash crops in the ER Program area is key to the ER Program activities: securing farmers' incomes in the ER Program area is expected to facilitate risk taking and the adoption of new agro-ecological practices. The planned activities of the ER Program with regards to cash crops and value chains valorization aim to address the constraints that currently prevent value chains from further developing and expanding. This includes the need to (i) strengthen technical capacity and skills among farmers to produce improved quality and increased quantity of selected commodities and to aggregate production for onward marketing; (ii) facilitate knowledge flow and the adoption of new technologies; (iii) strengthen other important value chains functions, such as financial services and risk management mechanisms; and (iv) invest in critical infrastructure to enhance market access and improve yields.

  Those activities are supported by MozFIP, as well as the MozBio and "*Sustenta*" projects.

  With this regards, the MozBio project will, notably - and around the GNR: (i) provide for the training of 5,000 cashew producers on quality issues for their cashew nuts to meet specific quality standards and on the maintenance of orchards in combination with other crops; (ii) support the creation of a platform to inform producers on a weekly basis on the cashew market dynamics and prices (see description of the Kohiwa system below).

  The "*Sustenta*" project also aims to increase smallholders and Small Emerging Commercial Farmers' (SECF) participation in key agriculture and forest-based value chains. The agriculture value chains that have been identified include poultry, maize, soya, sesame, cashew nuts, beans, oilseeds, horticulture, and non-timber forest products (honey). The natural and planted forest value chains include honey, natural oils, and planted forest products such as timber and pulp. In average, in the "*Sustenta*" project, 10 SECFs per district will be

[30] *Those objectives apply at national level.*

supported – that is, 50 in the ER Program area. Planned activities for the ER Program include:

(i) *Training and technical assistance to SECFs and key rural micro, small, and medium enterprise in agribusiness*: value chains actors will be trained to on good agronomic practices and business and marketing skills. It should be noted that in the Climate Smart Agriculture (CSA) principles of mitigation, enhanced productivity, and adaptation/resilience will be mainstreamed in extension services provided by SECFs. These practices will include, among others, the promotion of locally adapted drought-tolerant and short-maturing crop varieties, more efficient and effective fertilizer products, conservation agriculture techniques such as agroforestry, contour farming, mulching, reduced tillage, crop rotation, integrated pest management, and water management. SECFs will also be trained and supported to develop business plans and are expected to facilitate market linkages between rural households and larger agribusinesses in key commodities. In addition, support will be given to the growth of Micro, Small, and Medium Enterprise (MSME) agribusinesses, including SECFs, particularly in processing agricultural commodities, providing logistic services to smallholders (for example, storage, sorting, grading, and transport) and the provision of inputs. SECFs and MSME agribusinesses are the critical link between the large number of smallholder farmers and the few large agribusinesses. SECFs and MSME agribusinesses thus become the critical missing middle in Mozambique's agricultural value chains system.

(ii) *Agribusiness finance to value chains actors* with support to access credit, support to lowering the risk of exposure for participating financial institutions, implementing a weather-based agricultural index insurance scheme ("Index Insurance") for the purpose of providing weather-based insurance coverage in respect of weather-based risks impacting farmers' production. The activities comprise support for acquisition of assets, working capital to SECFs and MSME agribusinesses that will enable the financing of additional and improved inputs and operating costs of machinery, and the availability of specific financing schemes for agribusinesses (matching grant and partial credit guarantee).

(iii) *Improving rural infrastructure* including through feasibility and design studies for irrigation and feeder roads, rehabilitation of irrigation schemes and rehabilitation and maintenance of rural roads. The objective of this activity is to improve agriculture and forest-based value chains by enabling factors related to key rural roads and irrigation infrastructure.

At this stage, it should be noted that the current under-valorization of cash crops in the ER Program area is mainly explained by producers' commercial strategies being based on minimum risk taking, due to significant prices volatility, depending on global market and of the local structure of the value chain: they sale the majority of their products immediately after harvesting, in the numerous outlets on the roads that serve the area. This strategy is coherent with local constraints: limited market information and limited time for selling in certain parts of the ER Program area, which can quickly be landlocked during the rainy season (Mercier et al, 2016).

As a consequence, one could argue that willingness of producers to engage into activities aiming at valorizing cash-crops production and establishing value supply chains may be limited, representing a risk for the ER Program

effectiveness. **However, this risk is considered as low and there are already concrete evidence showing that smallholders in the ER Program area have been responding positively to early activities incentivizing cash-crops production**: a real infatuation for cashew-nuts production was observed in the ER Program area, with an increase of prices, production, and number of plants distributed.

First, one of the main challenge for producers to actively engage in ERI-D2 may be prices volatility. **However, the four main cash-crops of the ER Program area (cashew nut, pigeon peas, sesame and groundnuts) have been benefiting those last few years from high international demand that is expected to be maintained in the future**, meaning that the current market will absorb increases in acreage or productivity. This high demand is likely to push traders and exporters towards a supply strategy focused on quantity (Griffon, 2016), therefore leading smallholders to increase their production.

Given this, one of the remaining reasons that may hinder smallholders' commitment to sustainable cash-crops production may be the perceived (as opposed to the real) limited market opportunities, linked to their lack of information on market trend: "Since producers do not have the elements to anticipate market trends, it is particularly risky to store. Moreover, as local buyers are the unique market information providers, information could easily be biased to traders' benefits. This situation curbs any new marketing initiatives as information on market trends and opportunities are not easily available" (Griffon, 216). **In order to overcome this challenge, a market information service (called Kohiwa) was created as a pilot in the ER Program area**, as part of the MozBio project around the GNR. It is, for now, focusing on pigeon peas and cashew-nuts markets, but should be extended in the future to other commodities. The general objective of the market information system is to provide essential market information (market trends and advises) to value chains local stakeholders (from producers to export companies) in order to help them in their decision-making process towards marketing issues (sales, buys, storage and investment decisions), through the collection of both quantitative and qualitative data[31]. The information is disseminated to beneficiaries through: cellphone (text messages); community radio (with messages in both Portuguese and local languages); newsletters; human resources, via MozBio field team and INCAJU's districts officers and service providers, receiving market information through text message and then sharing it with community members. **Early results on the ground show that there is a real interest from smallholders to receive such information**. In one year, the list of smallholders receiving Kohiwa text messages has reached 357 people in the two districts of Gile and Pebane, while 90 people are receiving the weekly Kohiwa newsletter.

In the same way, the cashew-nuts processing sector significantly increased between 2004 and 2010. Although it has been stable in output since 2011,

[31] Minimum and maximum prices practiced during the week, quantities of RCN exchanged and stored, any events affecting RCN production, trade and processing and policies affecting the cashew sector, issues faced by producers, traders, exporters and processors, opinions, feelings and analysis of cashew sector stakeholders, etc.

processing companies are now currently investing to increase their cashew kernel output[32] (Griffon, 2016), showing **a real change in favor of increased production**. According to INCAJU, during the 2016-2017 campaign, **the production of cashew in Zambézia province increased by 92,3%** compared to the 2015-2016 campaign (from 10,435 tones to 16,809 tones), and the average purchase price increase by 75% (from 30.75 Mt/kg to 53.97 MT/kg). Accordingly, first results on the ground show that **smallholders in the MozBio project in the ER Program area demonstrated a real interest in engaging in agro-forestry systems with cashew-trees:** in Zambézia province, 299,730 and 300,561 grafted cashew-trees were distributed to smallholders in, respectively, 2016 and 2017 (INCAJU data).

- Forest plantations are increasingly recognized for their important role in supplying the growing global demand for wood and wood products, including hardwood timber for furniture, general purpose and construction timber, transmission poles, and other products such as sustainable charcoal**. Multipurpose forest plantations (ERI-D3)**, established by local communities and small and medium landholders, will be supported by the ER Program (sawn wood, poles, wood chips, charcoal). In addition to contributing to restoring degraded areas and promoting agroforestry systems among small landholders (*see ERI-D1*) plantations are expected to contribute to the sustainable production of charcoal (*ERI-D4*). Plantations will especially be supported by the MozFIP project with a dedicated planting forest grant schemes of which the objective is, precisely, to generate economic opportunities by promoting commercial tree plantations, to restore degraded areas and to link wood producers and markets. Within MozFIP, the scheme aims to establish, in total, approximately 3,000 hectares of sustainable, multipurpose plantations and to restore around 500 hectares of degraded land through a performance-based grants scheme, technical assistance to small and medium landholders and inputs to communities[33]. All in all, multi-purpose forest interventions will focus on supporting community out grower schemes in partnerships with the private sector and tree-planting to meet commercial, energy, conservation, restoration and community livelihoods needs. Notably, energetic plantations with high growing rate species, in order to ensure the sustainable production of charcoal and reduce the pressure on natural forest, will be part of this intervention.

  In addition, the **development of Assisted Natural Regeneration (ANR)** techniques on deforested or degraded areas is crucial, as it enables to restore natural forest cover after ancient or recent cut. Given the regenerative capacity of Miombo forest, it is well suited for the ER Program area and will be applied in specific, targeted, zones of the ER Program area.

  At this stage, it should be reminded that ER Program builds on and is composed of World Bank portfolio projects; as such, even if they could be scaled-up in the future, the ANR activities of the ER Program are, for now, only comprised in and financed by the existing MozBio, MozFIP and Sustenta projects.

  Regeneration activities are first comprised in the MozBio project, in which it is

[32] Condor plans to increase its processing capacity up to 15,000 MT/year (+5,000 MT/year compared to present setup). ETG wants to start processing cashew (they trade from 10,000 to 20,000 MT of RCN per year) and has invested in 2 plants to process a total of 15,000 MT (one in Nampula and one in Chiure)

[33] Those objectives apply at national level.

linked to the promotion of sustainable techniques for charcoal production (*see ERI-D4*) around conservation areas (in this case, around the GNR). The MozBio project entails: (i) the promotion of ANR on 200 ha of degraded areas around the GNR; (ii) the management of 300 ha of forested fallows around the GNR with improved techniques for regeneration and (iii) the creation of 10 nurseries around the GNR for the production of Miombo autochthone trees plants to enrich forested fallows or to restore degraded areas. Local communities' and community-based organizations' projects linked to the restoration of degraded area could also be financed by MozDGM within the ER Program area.

Regeneration will also be supported by the MozFIP project, on 500 ha of degraded land in the high conservation value areas and by the "*Sustenta*" project, which includes the restoration of 800 ha of degraded areas that are critical for specific value chains in the ER Program area[34]. The restoration of degraded land is expected to protect the productivity of topsoil, reduce erosion, and provide biological corridors for biodiversity. Critical areas for restoration will be identified through spatial analysis and participatory tools in order to select the most viable and effective areas. It should be noted that in the "*Sustenta*" project, restoration of degraded land includes ANR but also active enrichment planting with native and exotic species for conservation and domestic and commercial uses. Especially, enrichment planting is needed in highly degraded areas or to ensure that certain species are part of the new emerging forests.

All in all, ANR activities in the ER Program area are focusing on small areas, which were identified as critical hotspots as part of the national Forest Landscape Restoration (FLR) process and through the Restoration Opportunities Assessment Methodology (ROAM) developed by the International Union for Conservation of Nature (IUCN). ROAM is currently used by the GoM to help identify restoration opportunities in Mozambique and select feasible interventions, including for the Sustenta, MozFIP and MozBio projects.

To sum up, **a total of 1,500 ha will benefit from ANR activities in the ER Program area**, including: 200 ha in the districts of Gilé and Pebane, around the GNR, as part of the MozBio project; 800 ha as part of the Sustenta project; and 500 ha as part of the MozFIP project.

- Admittedly, the **promotion of sustainable charcoal production (ERI-D4)** is significant in the ER Program and is based on the increase of wood transformation efficiency and the reduction of the overall use of wood for biomass fuel. The ER Program provides for specific actions in order to reduce the impact of charcoal production and consumption on forests.

  With MozFIP support, the ER Program will promote charcoal producers organizations to adopt forest management plans**,** promote higher efficiency in charcoal production, and build partnerships between producers and private operators in the forest sector to integrate charcoal production into forest operations. As the majority of producers also have another economic activity, they are settled in their area of production. Consequently, it is easier to identify them and to work with them on the adoption of sustainable practices. In order to meet market demand and achieve the same level of production for the use of less wood, the ER Program provides for the improvement of traditional kilns,

[34] *1,200 ha are for the entire areas cover by the program, in Zambézia and Cabo Delgado.*

currently characterized by low yields, without any additional investment and thanks to various techniques - management of humidity rate, temperature, duration of the pyrolysis, shape of the oven (Mercier et al., 2016). These kilns would be constructed of materials that are accessible in the area and need very low investment from producers. In the same way, with support of the MozBio project, around the GNR, the ER Program will comprise the training of 165 charcoal producers to improved charcoal production techniques in the districts of Gilé and Pebane. 10ha of plantations for energy purpose are also planned.

One could argue that the risk of more efficient charcoal production practices leading to increased charcoal production (because of increased profitability) cannot be ignored. This might further lead to increased forest degradation in the ER Program area. However, as explained in sections 10 (risk of displacement) and 11 (risk of reversal), this is not expected to happen.

Indeed, the ER Program intervention to support sustainable charcoal production is part of an integrated landscape approach. As such: (i) it will help to supervise and regulate the production of charcoal (rather than leaving it as a non-addressed driver) so as to limit as much as possible the impact of this production on forest cover; (ii) it is not an isolated measure but comes as part of a conjunction of ER Program interventions that are, altogether, contributing to reducing any risk of reversal linked to charcoal production, such as, as explained above, the support to charcoal producers organizations creation and the adoption of forest management plans, or the establishment of plantations for energy purpose, with fast growing species, which will be used for charcoal production; (iii) it will consequently be based on law enforcement: as we have just explained, producers will clearly be identified and monitored by the Program.

- Finally, the Program entails a component aiming at **valorizing the income generating potential of the GNR and sustainable livelihood around the GNR (ERI-D5)**. This set of activities will mainly be supported by the MozBio project, which includes a component aiming to increase revenues and the number of beneficiaries from tourism-related economic activities in conservation areas in Mozambique by addressing several barriers to nature-based tourism development, including: i) policy and regulations; ii) institutional challenges; iii) weak marketing; iv) inadequate planning; and v) lack of investments in tourism infrastructure. In addition to support to ANAC (*see table A – Development, coordination and monitoring*), planned activities in MozBio include the provision of technical assistance for the establishment of a management system for the revenues collected by the conservation areas and for tourism and sport hunting statistics; the marketing and promotion of activities; the development of hunting areas plans; the organization of public-private partnership to manage and coordinate tourism and sport hunting.

  Although tourism is not expected to be very significant in the GNR, the promotion of sport hunting is relevant for the ER Program and the creation of a sport hunting area is already ongoing. With this regards, planned activities include: (i) the strengthening of the relationships with communities (implementation of a continued dialogue and strengthening of community associations, identification of potential benefits and options available to communities to utilize the revenue generated from the use of wildlife resources in the hunting area, etc.); (ii) support to regulatory framework (review of existing hunting contracts to establish the responsibilities of both parties, assessment of

	the revenue sharing modalities, support for drafting new/revised contracts that incorporate safeguards for all stakeholders, etc.); (iii) institutional and human capacity strengthening (development of standards for professional hunter licenses and of best practice standards, setting of sustainable quotas linked to monitoring and evaluation systems, development of a database on trophy hunting data, etc.). The income generating potential of the GNR will also be valorized through the promotion of sustainable community livelihoods around the GNR. The objective of this component is to improve and strengthen natural resource-based livelihoods of communities around the GNR. It includes the promotion of non-timber forest products for local communities to diversify their use of forest resources, with the development of community management plans for non-timber products, such as mushrooms, to be implemented by the CGRNs around the GNR. *The interventions to be promoted will cut across different sectors such as agriculture, forestry and energy, and will promote inter-sectorial coordination at the local level. They are therefore fully integrated in the previous ER Program planned interventions related to the sustainable production of charcoal (see ERI-D4), conservation agriculture (see ERI-D1) and the strengthening of key value chains (such as cashew nuts – see ERI-D2).*It should be noted that these initiatives also contribute to the overall management of the GNR and are therefore also linked to EA-C1 and EA-C2.
Activities	***Promotion of conservation and climate smart agriculture including***: ▪ **ERI-D1**: Trainings with extension services, support and monitoring of smallholders' activities; ▪ **ERI-D1**: Support to agroforestry systems through technical assistance, provision of inputs, distribution of fruit trees and assistance to targeted nurseries; ***Structuring of key sustainable supply chains for cash crops, from production to transformation, selling and marketing with***: ▪ **ERI-D2**: Study and analysis of the commercial potential of various cash-crops around the GNR; ▪ **ERI-D2**: Provision of technical assistance for cash crops production, training on quality standards and on the maintenance of orchards, provision of inputs for smallholders around the GNR; ▪ **ERI-D2**: Provision and training of technical assistance to small emerging commercial farmers and other key rural micro, small and medium enterprise agribusiness, including on business plans; ▪ **ERI-D2**: Implementation of a market information platform to support cash-crops producers, with the diffusion of information on markets dynamics and prices through SMS around the GNR; ▪ **ERI-D2**: Agribusiness finance to value chains actors, including support to access credit and financing schemes for agribusinesses (matching grant and partial credit guarantee); ▪ **ERI-D2**: Improvement of key selected rural infrastructures for commercialization of cash crops; ***Development of multi-purpose plantations and restoration of degraded land***

with:

- **ERI-D3**: Implementation of a planted Forests Grant Scheme and support to community out grower schemes for multi-purpose (energy, timber and paper);
- **ERI-D3**: Restoration of natural habitats through Assisted Natural Regeneration (ANR) activities and enrichment planting

Improvement of charcoal production through:

- **ERI-D4**: Trainings of and assistance to local producers for the creation of improved kilns for charcoal production;
- **ERI-D4**: Training of producers for the elaboration and implementation of forest management plans and for the creation of partnerships with private operators;
- **ERI-D4 (& ERI-D3)**: Training to assisted natural regeneration techniques to limit the negative impact of charcoal production;

Valorizing the income generating potential and sustainable livelihood around the GNR with:

- **ERI-D5**: Improvement of sustainable tourism in the GNR with support to a community sport hunting area;
- **ERI-D5:** Sustainable use of NTFP.

4.4 Land and resource tenure in the Accounting Area

This sub-section aims at presenting the land and resource tenure regimes in the ER Program Accounting Area. It is based on the assessment carried out during the Readiness phase, including in (i) the legal and institutional study done by (Nemus and Beta, 2015); (ii) the Strategic Environment and Social Assessment; and (iii) the ER-PIN (UT REDD+, 2015a).

As required by the FCPF MF, an additional assessment was led by Tanner (2017a) for the purpose of this ER-PD. This assessment was based on literature review (including of Readiness documents related to land tenure and of the main legal texts regulating land tenure in Mozambique) as well as on consultation with relevant stakeholders in Maputo and in the ER Program area (including potential rights-holders present in the Accounting Area and relevant entities in charge of land and resource administration or registration).[35] Although it has still not been publicly vetted, it will be, after translation into Portuguese, posted on Mozambique FCPF webpage and on Mozambique national REDD+ website..

Legal framework of land tenure in Mozambique and relevance for the ER Program

An overview of the existing legal texts covering land issues in Mozambique is provided in section 4.5 – **Table 23***.*

[35] *Two missions were organized for the Expert in Mozambique. The list of stakeholders consulted by the experts is available as an Annex of the Land Tenure Assessment (Tanner, 2017a).*

The defining parameter of the policy and legal framework is that since Independence, and right through to the most recent 2004 Constitution of the Republic of Mozambique (CRM), land is the property of the State and cannot be bought and sold, mortgaged or otherwise alienated. In its Article 110 however, the CRM confers a land use and benefit right (DUAT) to all who want to use land, "taking into account their social or economic purpose". Furthermore, Article 111 of the CRM states that already acquired rights must be taken into account when new rights are being allocated - to investors for example.

The DUAT in fact dates back to the original post-Independence 1975 constitution. The big advance in turning it into a stronger private right took place in the 1990 revision, which ushered in the major shift to a market economy and political pluralism. Later research into local land use systems established a much broader understanding of "occupation" than a simple analysis of visible plots and other active evidence of use (deforested areas, fenced in grazing, etc.) and established that customary structures were still largely responsible for managing the land rights and use of the majority of the rural population (Tanner, 2002). This resulted in the formulation of a new National Land Policy (NLP) in 1995 and a new Land Law in 1997, which gave full recognition to rights acquired through these customary systems. Both instruments are still in place.

The 1995 National Land Policy - The 1995 NLP addressed the key challenge of securing largely customarily acquired land rights, while also promoting the entry of new investment into the countryside. It did this not by identifying separate areas for each kind of land user, but by providing a policy framework that integrates customary and formal land rights and land use within a single and shared territory - or landscape. The key principles established by the NLP are: (i) Maintain land as the property of the State; (ii) Guarantee the access to and use of land for the population as well as for investors - in this context the customary rights of access and management of land by the population are recognized, promoting social justice in the countryside; (iii) Guarantee the right of access to and use of land for women; (iv) Promote national and foreign private investment without prejudice to the resident population and ensuring benefits for this [population] and the national treasury; (v) Active participation of nationals as partners in private enterprises [that use land]**;** (vi) Definition and regulation of basic principles and guidelines for the transfer of use and benefit rights (DUATs) between citizens and or national enterprises, whenever investments have been made on the land**;** (vii) Sustainable use of natural resources in such a way as to guarantee the quality of life of future generations (Resolution 10/95 of 17 October, paragraph 17).

The NLP also provides for a process of negotiated access to local land by investors and others who want land for new projects – "the agrarian use of land". This process involves two steps: (i) a "cadastral identification, demarcation and registration" process of the areas that may fall, under customary law and cultural rules, under the management of a Local Community and (ii) a negotiation process with the Local Community who can enter as a partner in the investment.

This principle underpins the later mandatory requirement in the 1997 Land Law that any new land access by a private investor or by the State (for public projects) must be preceded by a community consultation. It was then extended to new environmental legislation in 1997, to the new Forests and Wildlife Law in 1999 and to all subsequent laws that deal with natural resources in one form or another.

The idea of establishing partnerships between local land rights holders and other actors appears in many places in the 1997 Land Law and in the regulatory instruments to

implement it. The terms of partnership are to be established by the mandatory community consultation process established by Article 13 of the Land Law and Article 27 of its Regulations. Resolution 70/2008 of 30 December, which sets out the requirements for investors seeking large areas of land (defined as over 10,000 hectares) – see **Table 23** – also requires them to include the partnership terms with the "holders of the DUAT by occupation" with their submissions. This principle of partnership is most recently developed in the 2014 Law for Conserving Biodiversity, which opens the way for the State "celebrating contracts with the private sector and the local communities for the generation of income" (Beta and Nemus, 2015). The approved National REDD+ Strategy also makes reference to the need for the State to work closely with local communities in developing and implementing REDD+ programs.

These fundamental features of the 1995 land policy framework remain in place and provide a powerful platform for the ER Program that is participatory and inclusive, and which can work closely with local communities for improved natural resources management techniques and triggering ER payments as a result. Together with provision in other legislation, they also have implications for how the GoM addresses the question of negotiating the sale of ERs with third parties such as the World Bank - *see section 17.2*.

The 1997 Land Law – The 1997 Land Law defines how to acquire a State-allocated DUAT. According to its article 12, this can be done in three ways: (i) through customary occupation according to customary norms and practices; (ii) through **"**Good faith" occupation over ten years (uncontested use of land which the occupant settles on and begins to use); (iii) through formal application to the State through its land agencies at provincial and central level, and municipalities. The right that results in each case is precisely the same in legal terms although, in the case of rights by occupation, it is likely that the vast majority will be unrecorded. The law makes it clear however that the lack of registration of a right by occupation does not prejudice that right (Article 14).

There are differences in the conditions attached to DUATs that are acquired by occupation or by request. The most important of these is that a DUAT by occupation, which is for subsistence and household production purposes, is indefinite, whilst a DUAT by request has a fixed term of 50 years. This fixed term is however renewable for a further 50 years, making the DUAT a very long state lease that is easily enough for investing and securing a return. Moreover, the DUAT is inheritable in either circumstance, whether acquired by occupation or by request.

The 1997 Land Law also created the concept of Local Community, also serving as the basic unit of natural resource occupation and use in the 1999 Forest and Wildlife Law. The "Local Community" is defined in Article 1(1) of the Land Law as follows:

"A grouping of families and individuals, living in a circumscribed territorial area at the level of a locality [the lowest official unit of local government in Mozambique] or below, which has as its objective the safeguarding of common interests through the protection of areas of habitation, agricultural areas, whether cultivated or in fallow, forests, sites of socio-cultural importance, grazing lands, water sources and areas for expansion".

The definition derives from an understanding of occupation as a land use system that includes not just currently used resources – fields of crops and fenced in grazing for example – but also the extensive other resources that are essential for a sustainable land use strategy. These might include forests as well, used and managed on a collective basis by a

group of households or villages, and extensive areas reserved for future use as current field lose their fertility. Such a definition with its various elements of common interest centered around a coherent resource use strategy and system, provides an ideal vehicle through which to implement REDD+ initiatives. **These include the ER Program with its focus on altering the system to make it more sustainable, with behavioral change, new income sources and appeals to common interests.**

The law and its regulations lay out how to identify the extent of Local Community "occupation" and establish limits around the territory so defined. The land rights delimitation methodology is well summarized in (World Bank, 2016) and (Tanner, Norfolk and de Wit, 2009). It should be noted that delimitation is community-driven – local people who occupy and use land do it with *support from* external technical teams trained in the methods employed. Community delimitation is not mandatory, but is "a priority" in certain contexts where there are conflicts over land, when an investment project is proposed and when the community itself requests it.

Individual rights at sub-community level – In the ER Program Accounting Area, it is expected that the majority of individual land rights at the sub-community level will be DUATs acquired by occupation, either through customary norms and practices, or by so-called "good faith" occupation. From article 12(a) of the Land Law it can be inferred that all sub-community rights that are acquired and managed through the prevailing system of the particular community – see below – are also equivalent to DUATs in law.

Like the collective DUAT, this more individual DUAT is very unlikely to have any form of documentation attached to it. "Records" of occupation and possession of land by a specific person or household will be held (i) in the verbal or collective memory of the customary leaders and land chiefs and (ii) in the shared "social register" of neighbors and others, who can verify and support any land claim and intervene in small disputes over boundaries, etc. - this form of proof is provided for in Article 14 of the Land Law.

"Good faith" occupation refers to instances where someone has occupied a piece of land without seeking formal approval from anyone, and has lived on and used the land for more than ten years. If they have done this without any other person contesting the occupation, then after 10 years have passed the occupant also has a DUAT by occupation. Such occupation will also likely depend upon verification by local structures and neighbors.

It is highly likely that in the accounting area of the ER program, all individual DUATs will be derived from one of these two channels.

Community land use plan (CLUP) - The CLUP does not yet exist in formal terms, although it is now firmly established as a key output of the delimitation process. In the course of the delimitation, local community members are encouraged to analyze how they use their land resources, and to consider their long-term needs and priorities. This may result in some areas being identified as available for investors through properly negotiated agreements, and others being clearly set aside as conservation areas or reserves.

The result of this process is the CLUP, which then provides a platform for attracting new investment in a more orderly and negotiated fashion, for developing more sustainable and productive local agriculture, and for developing a program of community-based natural resources management and conservation – see the next figure. When linked to the rights securing and empowerment impact of delimitation, the CLUP can create the conditions for a shared and equitable use of a particular landscape. This can also include the development

and implementation of conservation activities as part of the ER Program. This is shown in the next figure - extracted from (Tanner, 2017a). Several local communities are delimited in a given landscape; the CLUP identifies areas for fixed, improved agriculture, incoming private investment with negotiated partnerships, and for natural resources management activities.

Linking land rights to natural resources and the issue of "DUAF" – Although the possession of a DUAT does not give an automatic right of ownership over the resources found on a given piece of land, various elements of the legal framework do give local people – organized and recognized as Local Communities – significant use rights over "their" natural resources, and a say in how these resources are used by others.

The Local Community as defined in the 1997 Land Law – a land holding unit based around the customary use of a range of natural resources - is replicated exactly not only in the 1999 Forest and Wildlife Law, but in all other natural resources legislation. Local Community delimitation establishes the spatial dimension of the *right of use and benefit of land (i.e. the DUAT).* Through the NLP and specific articles in the Land Law (Article 24) and elsewhere, this right extends over the natural resources that are found on the land covered by the DUAT. Therefore, while there is no legal equivalent to the DUAT when it comes to forests – a "DUAF", the Legal rights to use and benefit from land and forests – the right to use and benefit from forests and other natural resources within the area of a Local Community is clear in all the relevant sectorial laws. The DUAF is there in all but name only. And as with land, if the community wants to move out of subsistence-based production into more commercial activities, the approval of the land-owner (the State) must be sought. Licenses are granted, and the community can proceed to exploit the resources commercially.

The Readiness phase studies note that it is difficult for local communities to do this in practice. However, this is not principally due to legal constraints, but to practical problems to do with capacity, documentation (most rural people do not have ID documents for example), and material constraints. Evidently, communities need support to navigate through the process; working with experienced NGOs can overcome these obstacles.

Further affirmation of the basic rights that local communities have over the natural resources in their areas is obvious in all the natural resources laws requiring that a community consultation be carried out between commercial enterprises seeking to extract timber and the Local Community. As with the Land Law, the objective here is not merely to get a local "no-objection" so that the investment can proceed; it is to secure an agreement between the two sides which in principle will allow the community to gain from the commercial exploitation of "its" resources by an external third party.

Implementing the basket of laws that are currently available in Mozambique, with the starting point being the link between delimited acquired land rights and the accompanying management and jurisdictional right that communities have over "their" natural resources, is the best way at the present time to give concrete meaning to the implicit "DUAF" that exists in the forest and other relevant natural resources legislation.

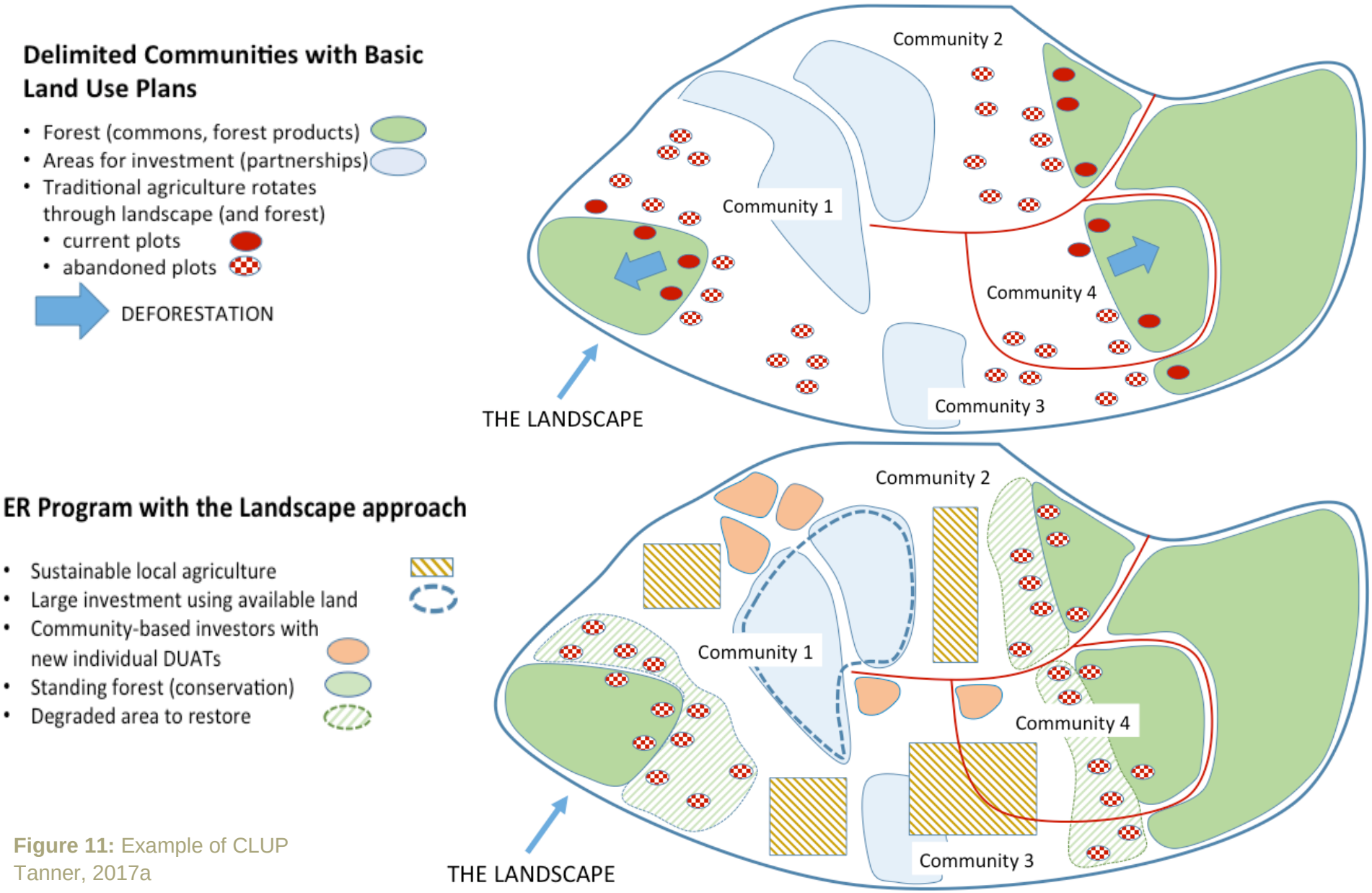


Figure 11: Example of CLUP
Tanner, 2017a

Range of land and resources tenure rights in the ER Program area

Legal and customary rights - As stated above, legally, there is just one land right in Mozambique, the DUAT, allocated by the State to all land users irrespective of how they have acquired this right. This is the case in the ER Program accounting area and it would be incorrect to think in terms of "customary rights" being distinct or different from "private rights" over land. The key distinction is over *how* the right (DUAT) is acquired, taking into consideration the three ways detailed above and in the 1997 Land Law. In the case of natural resources, ownership is retained by the State, as is the case with land. And as with land, Local Communities and their members enjoy automatic subsistence use rights over all natural resources - subject to various regulations on protected species, hunting seasons, etc. Local Communities and their members are free to apply to the State for permission to use the natural resources in their area for commercial purposes, through a system of licenses that are issued by the provincial authorities, as explained above.

The issue of DUAT harmonization in the ER Program – In the context of the ER Program, land tenure regularization is being addressed by the land component of the "*Sustenta*" and of the MozFIP projects, which are both part of the ER Program – *see section 4.1*.

Categories of right holders present in the Accounting Area – Officially, there are no indigenous peoples in Mozambique using the official guidelines provided by the UN Permanent Forum on Indigenous Issues (United Nations) - *see Tanner (2017a) for land tenure assessment.* Accordingly, there are no indigenous people in Mozambique that fall under the definition of World Bank OP/BP 4.10 and, as such, the ER Program does not trigger OP/BP 4.10, as explained the ESMF prepared for the ER Program - *see section 14 for more details on safeguard plans*.

The extent and location of rights acquired by occupation or by formal request in the ER Program Accounting Area

All delimitation work carried out to date underlines the fact that most Local Communities have contiguous boundaries. It is also clear that DUATs acquired by formal request exist and are registered *inside* and/or *between* different Local Communities.

According to Tanner (2017a), up to the end of 2014, a total of 223 Local Community delimitations had been carried out in Zambézia, with a total area of 4,776,351 hectares (Tanner, 2016). This gives an average area per Local Community of just under 21,500 hectares. Other data from the ITC project in Zambézia suggests that the average population per delimited community is just over 3,200 (Tanner, 2016) – see **Table 23** and **Table 22**.

As show in

Table 20, within the nine districts composing the Accounting Area of the ER Program, a total of 102 Local Communities have been delimited up to November 2016, covering a total area of 3,254,663 hectares. This gives a much higher average size of just over 31,900 hectares, which could reflect the remoteness and population density of many of the communities

delimited.

Table 20: number of delimited local communities in the ER Program area

ZILMP Districts	Communities Delimited Up to November 2016 [1]	Area in hectares
Alto-Molocué	27	259,847
Gilé	4	666,773
Ilé [2]	6	38,909
Maganja da Costa [2]	13	135,185
Pebane	11	837,500
Mocuba	14	1,169,198
Gurue	27	147,251
TOTAL	**102**	**3,254,663**

[1] Official data show that all of these communities have completed processes with Certificates of Delimitation issued

[2] Ilé includes Mulevala, Maganja da Costa includes Mocubela; these two new districts were created from Administrative Posts upgraded in 2013; official land data does not yet reflect this change

Source: MITADER/DNAT

Legal status of rights and potential ambiguities or gaps

All rights acquired by occupation – customary and "good faith" – are formally recognized in law by the 1997 Land Law, and enjoy strong Constitutional guarantees as well - for example, when new land rights are being issued. All new rights, such as those given to new private enterprises, are also formally recognized and protected by the same Land Law, and in legal terms are no different to the DUATs acquired by occupation. There are no ambiguities in the legal framework in this context.

Legal recognition of community land rights - Zambézia province has been the focus of significant bilateral support for community land rights delimitation since the early 2000s, and the GoM enhanced this trends through including delimitation in its key "Terra Segura" project - *see section 4.1*.. Accordingly with the methodology being developed by DINAT, community delimitation will precede all individual land titling.

As stated in Tanner (2017a), with World Bank support, the ER program addresses the insufficient implementation of community land rights recognition through the Sustenta and MozFIP projects. Sustenta will delimit 135 rural communities in the ER Program area and generate individual DUAT title documents for 156,450 farmers who mainly hold their land under customary norms and practices; these farmers will engage in the value chain investment side of the project. MozFIP will delimit approximately 80 communities in the ER

Program area and generate approximately 3,550 DUATs for small and medium landholders in Zambézia Province[36] who are engaged in forest plantations and agroforestry.

[36] *Those figures are estimations of the FNDS based on the projects' objectives at landscape and national levels, and assuming a fair division of their objectives in the areas of interventions. The Sustenta projects aims to delimitate 270 rural communities and issue 312,900 individual DUATS in the two provinces of Zambézia and Cabo-Delgado; the MozFIP project aims to delimitate 160 rural communities and issue 7,100 individual DUATS at national level. These figures may be changed after evaluation by the projects' service providers, and according to population discrepancies and already delimited communities in the various districts. In particular, the number of community delimitations in Zambézia may be increased given the existence of the GNR and its buffer zone (conservation area where individual DUAT cannot apply).*

Table 21: Community delimitations up to 2014
(Tanner, 2016)

PROVINCE	To end 2008		2009		2010		2011		2012		2013		2014		Total	
	#	Area	#	Area	#	Area	#	Area	#	Area	#	Area	#	Area	#	Area
Maputo	22	154,123.00	0	0.00	1	18,000.00	4	36,473.52	0	0.00	3	3,000.00	0	0.00	30	211,596.52
Gaza	20	472,484.00	4	27,658.73	16	3,824.60	23	51,869.47	16	58,202.17	0	0.00	27	852,030.00	106	1,466,068.97
Inhambane	11	575,712.00	0	0.00	5	5,238.55	5	80,739.94	2	11,443.55	0	0.00	1	6,158.00	24	679,292.04
Sofala	14	1,426,987.00	5	1,040,801.35	7	130,358.04	17	1,018,058.97	4	119,041.99	12	223,402.45	3	127,313.21	62	4,085,963.01
Manica	14	780,030.00	6	223,451.80	4	132,384.70	3	70,849.13	1	14,406.00	18	118,021.43	6	26,870.08	52	1,366,013.14
Tete	27	3,928,912.00	1	105.43	0	0.00	0	0.00	0	0.00	8	38,790.00	17	62,412.24	53	4,030,219.67
Zambézia	**91**	**4,205,012.00**	**9**	**2,241.06**	**10**	**26,954.48**	**13**	**6,824.85**	**27**	**61,234.20**	**63**	**416,036.00**	**10**	**58,048.00**	**223**	**4,776,350.59**
Nampula	95	747,936.00	2	36,765.75	1	44,461.00	18	89,649.42	6	87,433.17	23	141,509.34	0	0.00	145	1,147,754.68
Cabo Delgado	0	0.00	4	112,648.78	7	54,626.45	9	42,360.00	4	29865.7	24	167273.2	18	216607.95	66	623,382.08
Niassa	9	357.23	0	0.00	0	0.00	12	671,029.10	48	1,217,081.66	75	725,084.00	10	218,296.93	154	2,831,848.92
Total	**303**	**12,291,553.23**	**31**	**1,443,672.90**	**51**	**415,847.82**	**104**	**2,067,854.40**	**108**	**1,598,708.44**	**226**	**1,833,116.42**	**92**	**1,567,736.41**	**915**	**21,218,489.62**

Table 22: Community delimitations funded by ITC since 2006

(Tanner, 2016)

Province	# communities	Area delimited	% area total	Sum of Pop^{n} (Total)	% of total Pop^{n}
Cabo Delgado	50	461,832.87	8.50%	148,376	9.94%
Gaza	18	69,852.39	1.29%	15,454	1.04%
Manica	53	788,023.09	14.51%	170,300	11.41%
Nampula	111	587,066.35	10.81%	359,103	24.06%
Niassa	123	2,456,104.94	45.21%	179,332	12.02%
Sofala	12	227,560.41	4.19%	135,389	9.07%
Tete	34	104,620.36	1.93%	91,727	6.15%
Zambézia	**122**	**737,315.48**	**13.57%**	**392,857**	**26.32%**
Grand Total	**523**	**5,432,375.89**	**100.00%**	**1,492,538**	**100.00%**

Such community delimitation appears as a logical mechanism for a) identifying and registering the acquired collective DUATs that exist in the area and the local structures that manage them; and b) developing land use and local development plans that can include a range of ER-related activities (Tanner, 2017a). All the more so as land use and local development plans are, precisely, produced during the DUAT delimitation process. They will therefore be available when the delimitations are undertaken and completed by project-supported teams.

It is important to note however that what is being referred to here are community land use plans (CLUPs), and not the District Land Use Plan (or PDUT, Portuguese) which currently is the lowest level of planning instrument prescribed in the Physical Planning Law. As explained before, the CLUPs are intended to be an additional outcome of the community delimitation process. At the present moment, there is no legal framework in place for these "CLUPs" and no legal definition exist in the Land Law or any related documents.

However various NGO delimitation projects have adopted the practice of including a CLUP as a practical outcome of the delimitation process, which fits into their wider brief to promote new economic activity including partnerships with private investors, in a post-delimitation phase of their work. This innovation should be included in a revised version of the Technical Annex to the Land Law Regulations, which lays out the steps and requirements of delimitation. The clear implication is that the CLUP is therefore usually undertaken by NGOs or other entity that is responsible for carrying out the delimitation exercise with the communities. This is different to the PDUTs, which are carried out by the National Directorate for Territorial Planning and Resettlement (DINOTER) and District governments. The process of doing a CLUP does not add hugely to the overall time it takes to do a delimitation, as fits into the earlier process of community preparation (developing a community development agenda ahead of the delimitation), and emerges out of several existing elements of the process (participatory mapping, land use analysis, etc.).

In this context, it is entirely realistic and essential that the delimitation, land use and development plan process be arranged to align operationally and functionally with the ER Program implementation. This is actually implied, those activities being part of the very ER Program enabling activities (EA-B2), which will create the land rights platform and related local governance structures for the ER program.

Disputes related to contested claims or rights and resolution mechanisms

Conflicts between neighbors always occur and are typically resolved by customary tribunals and resolution mechanisms (Trindade and dos Santos, 2004). NGOs report many cases of conflict between local communities and private investors of various sizes and types. Field evidence and research shows that consultations with communities are usually cursory and held only with traditional leaders who can be corrupted by the land requestor. Disputes are usually taken first to the local District Administrator, who then calls in the technical teams for land and any other sector that might be involved. If this does not work, the dispute passes up to provincial level, where the Governor frequently assumes a quasi-judicial role as representative of the State.

An increasing number of land and related disputes are finding their way into the formal tribunal structure, which begins at District level. Land and natural resources issues are now included in the formal professional training for judges and public counsels at the Ministry of Justice Center for Legal and Judicial Training (CFJJ), after a FAO supported program to train

provincial and district level judicial officers in the new Land, Environment, and Forest and Wildlife laws. Indeed, a corps of paralegals has been created though a training program developed and implemented by the CFJJ with FAO support (Tanner and Bicchieri, 2014). The paralegal program was expanded in Zambézia with funding from the ITC program, and many paralegals now work in organizations and CBOs in Zambézia province. Part of their training includes mediation skills and taking on a role as go-between in relations between local communities and new investors seeking local land and resources. Anecdotal evidence suggests that many have become effective resources for conflict resolution in the complex context of community-external actor relations. The nature of their work also makes them effective educators and communicators, a useful resource for the ER Program, which seeks to change un-sustainable local behaviors.

With regards to the ER Program, as explained and detailed in section 14 of this ER-PD, a revised Feedback and Grievance Redress Mechanism (FGRM) was designed with support from the World Bank for REDD+ projects. This FGMR will apply to the ER Program, including for any potential conflicts related to land tenure rights. In addition to the provisions detailed above and to the Grievance Redress Mechanism for the ER Program, the Zambézia Multi-Stakeholders Landscape Forum is also expected to help address grievances that cannot be resolved at District level, in accordance with its mediation-based functions - *see section 5.*

Potential impact of ER Program on land and resource tenure

There are no identifiable negative impacts of the ER Program on existing land and resource tenure rights in the Accounting Area; there should be a positive impact that will enhance local rights if the land tenure element of the ER program is fully implemented, in conjunction with land activities in the Sustenta and MozFIP projects.

4.5 Analysis of law, statutes and other regulatory frameworks

Since the Rio Conference on Sustainable Development in 1992, the GoM has been undertaking a significant legal and institutional reform movement to improve the country ability to manage the environmental issue (MITADER, 2016d). Those efforts can be observed in local, regional and national laws and regulatory framework as well as in the GoM's commitment to international treaties and conventions.

The very 2004 Constitution of Mozambique includes two fundamental environmental pylons, namely (i) the right of every citizen to live in a clean environment and the responsibility to protect this right and (ii) the recognition of environmental protection as a public interest. It contains a series of general legal provisions aimed at: (i) preventing and controlling pollution and erosion; (ii) integrating environmental concerns into sectorial policies; (iii) promoting the integration of environmental values in educational policies and programs and (iv) ensuring the rational use of natural resources while maintaining their capacity for renewal, ecological stability and human rights of future generations.

It is also concerned with the promotion of land use planning with a view to ensure an adequate location of activities and a sensible socio-economic development (MITADER, 2016d).

A complete analysis of the legal framework related to REDD+ has been provided in (Beta and Nemus, 2015) during Readiness phase. It is also a significant component of the SESA and ESMF documents. This section provides an overview of the most important acts with regards to the ER Program design and implementation but does not pretend to offer an exhaustive analysis of the Mozambican legal framework. For more details please refer to (Beta and Nemus, 2015 and MITADER, 2016d).

Relevant local, regional and national laws, statutes and regulatory frameworks

The main legislation with regards to REDD+ in Mozambique is now the recently approved new REDD+ Decree (April 2018), which regulates and define all principles and standards for the implementations of REDD+ projects and programs in the country. In addition, the most important legal acts with regards to land and forest management in Mozambique are the Law on Forests and Wildlife (1999) and the Land Law (1997). MITADER is the lead agency for the implementation of these two laws and has dedicated National Directorates focusing on these legal mandates. The laws are implemented through regulations and ministerial decrees, which provide some leeway for adjustment and improvement without further legislative action. This is coherent with MITADER being also responsible for the overall National REDD+ Strategy.

Table 23: Summary of the main national regulatory acts relevant for the ER Program

Acts	Description and relevance for ER Program
	Environment and biodiversity
The Environmental Law (nº 20/97)	The Environmental Law acts like a framework law, establishing the pillars of the system of legal protection of the environment. It aims at defining the legal basis for the improved use and management of the environment and its components to achieve a system of sustainable development in the country. The legislation prohibits the pollution of all environmental components (air, soil and water) as well as practices that may accelerate erosion, desertification and deforestation. *Article 4 is especially meaningful with regard to the ER Program. It establishes a range of basic legal principles, including the principle of rational use and management of natural resources, with a view to further improve the quality of life of the population and the maintenance of biodiversity and ecosystems. It also provides for the participation of local communities in the formulation of policies and laws related to natural resource management and the management of protected areas.*
Pesticides Regulation (Ministerial Diploma nº 153/2002)	This is a joint regulation between the ministries of agriculture, health and environment that aim at regulating the importation, distribution, production, disposal and use of agrarian pesticides for the protection of animal and public health purposes. It requires all operators active in the importation, distribution, and production of pesticides to be registered and classifies the various pesticides in three major categories according to their estimated danger. *Although the ER Program does not provide for the introduction of any*

	pesticide in the ER Program area, agriculture is one of its core components; should any product be introduced later on, this regulation will have to be fully considered.
Regulation for the Control of Invasive Alien Species (Decree N°25/2008)	This regulation provides for: (i) the protection of vulnerable and threatened species and ecosystems; (ii) the impeding of unauthorized introduction and dissemination of alien species and invasive alien species; (iii) the management and control of invasive alien species in order to prevent or minimize their damage to the environment and biodiversity; (iv) the eradication of alien species and invasive alien species that may damage ecosystems and habitats; (v) the carrying out of environmental impact studies under Decree No 45/2004 of 29 September prior to the introduction of exotic species. *Although the ER Program does not provide for the introduction of any invasive species in the ER Program area, plantations are part of the ER Intervention and should, if necessary, respect this regulation.*
The Environmental Impacts Assessment (EIA) Regulation (Decree n°54/2015)	Mozambique has developed a comprehensive regulation to cover the EIA process, which is included in the Regulation of the Process for Environmental Impact Assessment. The regulations are in line with the international environmental and social management best practices, including World Bank recommendations and procedures. The regulation details the procedures and criteria for ESIA and ESMP and implies the categorization of projects and subprojects (A+, A, B or C). Although the MITADER is responsible for regulating the EIA in Mozambique, it is the project proponent's responsibility to ensure that standards and identified mitigation measures are met. *In the design of the ER Program, safeguard plans were accordingly developed, including SESA and ESMF – see section 14 for more details..*
The Physical Planning Law and its regulations (nº 19/2007)	The Physical Planning Law establishes key principles for environmental protection in the context of regional planning and establishes hierarchical responsibilities among central, provincial, district and local governments in land use planning processes. It also stipulates that expropriation for public interest will give rise to the payment of fairly calculated compensation in order to compensate for the loss of tangible and intangible goods and productive assets as well as the disruption of social cohesion.
Forest	
The Forests and Wildlife Law (nº 10/99) **and its regulations**	The objectives to be pursued under this act are to protect, conserve, develop and rationally use sustainable forest and wildlife resources for the economic, social and ecological benefit of current and future generations of Mozambicans. It promotes, *inter alia*, the protection and conservation of specific biodiversity components as well as specific flora and fauna species found in certain places. The law also identifies the principles of local community participation in sustainable natural resources management in and outside protected areas. It introduces Local Participatory Management Councils (COGEPs). The ER Program is fully aligned with this key Law and has been designed in full

	knowledge of it.
Requirements for Simple License Regimes, and the terms, conditions and incentives for the establishment of Planted Forests (Decree 30/2012)	Definition of the requirements for logging including the scheme, terms, conditions and incentives for the establishment of forest plantations, which are part of the ER Program interventions.
Land[37]	
National Land Policy (Resolution n°10/95)	The Land National Policy defines the Land as the property of the State in compliance with the guarantee of access and use for population and investors, in full recognition of customary rights of access and management of land for rural population.
The Land Law (nº 19/97) **and its regulation**	The Land Law defined the regulatory procedures for land management. It provides the basis to define access rights, land use rights and procedures for the acquisition and use of land title by communities and individuals. The same law and its regulation embody key aspects defined in the Constitution in relation to the land, such as the maintenance of the land as state property, which cannot be sold. It introduces *Direitos de Uso e Aproveitamento da Terra* (DUATs), which can be acquired by occupation according to customary norms and practices, the uncontested occupation of a land over a period of ten years or the attribution of discretionary concessions by the State. The law allows local communities to hold a collective DUAT over the area within which they have jurisdiction. *The Land Law is an important component for the ER Program to take into account as it can have an impact on the way the ER interventions are implemented, on the involvement of stakeholders in the ER Program and on the benefit sharing mechanisms. It is fully analyzed in section 4.4.*
Technical Annex to the Regulation of the Land Law (Ministerial Diploma n°29-A/2000)	This Annex defines the requirements for the delimitation of the areas that are occupied by Local Communities and individuals in “good faith”, as well as for land demarcation in the context of the issuance of titles related to the right to use and benefit from the land.
Procedures for the Presentation and Appreciation of Projects involving more than 10 000 hectares (Resolution	Theses procedures define the approval mechanisms for the presentation and assessment of private investment projects involving land extensions of more than 10,000 hectares.

[37] *The legal framework associated to Land management is analyzed in section 4.4.*

n°70/2008)	
Specific procedures for the Community consultation (Ministerial Diploma n°158/2011)	This act provides for the adoption of specific procedures for consultation with local communities for the use of lands, recognizing their rights, in accordance with Regulation of the Land Law. These procedures qualify the basic provisions in the 1998 Land Law Regulations (Article 27, Clauses 2 and 3), which require a "joint work" to be "undertaken involving the Cadastral Services, the District Administrator (DA) or his representative and the local communities'" This gives rise to a set of Minutes (Acta) which accompanies a written opinion by the District Administrator about whether or not there are DUATs acquired by occupation in the area requested, and if there are, what the terms should be "by which the partnership between the title holders of the DUAT acquired by occupation, and the land claimant, will be regulated". The 2011 Diploma provides more detail about the "joint work". It is mandatory to have at least two phases: the first to inform the community about the request for land and identifying the limits of the area(s) requested; the second, up to 30 days after the first, to allow the community to give its opinion about the availability of this land for the proposed project (more meetings can be held whenever there is more information to be given to the community). The Diploma also requires the participation of '"he members of the Consultative Councils of the Village and of the Locality [the two lowest tiers of local government]", and that the minutes of the consultation be signed by these council members. A copy of these minutes, once the opinion of the DA is issued, will be handed to the local community. Lastly, the Diploma gives the Consultative Councils of the Administrative Post and the District a say with regard to the application for land, in the case of requests for more than 100 hectares, "indicating the pros and cons for authorizing the request'"
Creation of the Consultative Forum on Lands (Decree n°42/2010)	This acts establishes the Consultative Forum on Land as a consultation mechanism for the GoM to discuss land and related matters.
Channeling revenues from natural resources	
Ministerial Diploma 93/2005	This key ministerial diploma established the mechanisms for channeling the 20% revenues from wildlife and forestry exploration, towards the benefits of communities that inhabit the areas where the exploration of such resources is taking place. It stipulates that beneficiaries can only receive money if their community is organized in a legalized association with a bank account.
Conservation areas	
Conservation Areas Law (n°16/2014)	The 2014 Law on Conservation Areas provides for the legal establishment of Conservation Area Management Boards (CGAC), which advisory bodies covering one or more CA composed of representatives of local

	communities, the private sector, associations and local state bodies for the protection, conservation and promotion of sustainable development and use of biological diversity. It also legalizes public-private partnerships for CA management and for concession contracts and defined specific criteria and principles for CAs' management plans. It promotes the involvement of communities legally living inside CAs and their buffer zones, in income generating activities that promote biodiversity conservation. *The effects of this law are likely to be felt in various components of the ER Project*. *The communities living around the GNR will be engaged in the ER Program that promotes new income-generating activities. The Process Framework (see section 14 on safeguards) will deal with the consequences related with restrictions to access and use of natural resources in and around the GNR.*
REDD+	
New REDD+ Decree *(Approved: April 2018)*	Although the first Regulation on REDD+ in Mozambique occured in 2013 with the Decree 70/2013, which established the procedure for the approval of REDD+ projects and studies in the country, those are now defined by the new REDD+ Decree, approved by the Council of Ministers in April 2018. The Decree provides for all the principles and procedures to be respected for the design and implementation of the ER Program. It deals with, *inter alia*: (i) the institutional framework, which is greatly clarified; (ii) the process for the approval and issuing of licenses for projects involving carbon credits and the procedures for the approval of REDD+ projects, putting great emphasis on community consultations; (iii) establishes the uncontested ownership of ER titles to the State of Mozambique; details administrative procedures for the management of the ER Transactions Registry and the REDD+ Project and Data Management Registry More importantly, the REDD+ Regulation states that the REDD+ projects should clearly contain measures to promote and support compliance with the safeguards guidelines and should provide for the distribution of benefits, including to local communities, with the submission of a clear and transparant Benefit Sharing Plan to the FNDS before project approval.

International conventions and agreements

Mozambique has also ratified various international conventions and regional protocols related to the management of the environment. It should be noted that, under line 2 of article 18 of the GoM's Constitution, the rules of international law have the same value in domestic law and once ratified by the Parliament and Government they become constitutional normative acts. As per point 1 of article 18 of the Constitution, the "*treaties and international agreements duly approved and ratified, are enacted in the Mozambican legal order*" (MITADER, 2016d). The most important acts are summarized in the table below.

Table 24: Summary of the main international agreements relevant for the ER Program

Acts	Description and relevance for ER Program
Ramsar Convention on Wetlands, 1971 - ratified by Resolution No. 45/2003 of 5 November	The Convention on Wetlands of International Importance, called the Ramsar Convention, is an intergovernmental treaty that provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources. In this Convention, party countries, including Mozambique, commit themselves to the protection of pre-identified Wetland of International Importance within their territory, including through effective management of such areas. Although it is not directly part of the ER Program area, it should be noted that the Zambezi Delta is a Wet Land of International Importance under the Ramsar Convention ratified by the GoM[38].
International Convention on International Trade in Endangered Species (CITES, 1979)	CITES is a multilateral treaty to protect endangered plants and animals, aiming to ensure that international trade in specimens of wild animals and plants does not threaten the survival of the species in the wild. It accords varying degrees of protection to more than 34,000 species of animals and plants, several of which can be found in Mozambique.
African Convention on Nature and Natural Resources Conservation - ratified by the Parliament's Steering Committee through Resolution nº 18/81, of 30 December	The Convention aims at ensuring the conservation, use and development of land, water, forest and wildlife resources of SADC Member States, bearing in mind not only the general principles of nature conservation, but also the best interests of the communities themselves.
United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol, 1992 (amended 1997)	The Kyoto Protocol (1997) is an international agreement linked to the United Nations Framework Convention on Climate Change (UNFCCC, 1992). It is binding for countries that have ratified the protocol to reduce and ultimately cap their greenhouse gas emissions (GHGs). Mozambique signed the UNFCCC on 3 November 1992, and ratified the Kyoto Protocol on 18 January 2005, and entered the protocol into force on 18 April 2005. It should be noted that Mozambique being a developing country, those acts are not biding for the country to reduce GHGs. It nevertheless demonstrates the GoM's political commitment to the reduction of carbon emissions.

[38] *The other important Ramsar site in Mozambique is the Lake Niassa, in Niassa province.*

UN Convention on Biodiversity - ratified by Resolution nº 2/94, of 24 of August	This international instrument advocates the conservation of ecosystems and natural habitats and the maintenance and recovery of viable populations of species in their natural surroundings. It is an essential foundation for the creation, development and protection of conservation areas in Mozambique. It is significant for the ER Program, given that forests in Mozambique and elsewhere are the most biologically diverse systems. Forest biodiversity is increasingly threatened as a result of deforestation and forest degradation.
Protocol related to Wildlife Conservation and its application in the SADC - Ratified by Resolution nº 14/2002, of 5 of March	This protocol establishes common approaches to conservation and sustainable use of wildlife resources relating to the effective enforcement of laws in the region and within the domestic laws of each Party State.
United Nations Convention to Combat Desertification (UNCCD), 1994	The objective of this Convention is to combat desertification and mitigate the effects of drought in countries experiencing serious drought and/or desertification. Achieving this objective will involve long-term integrated strategies that focus simultaneously, in affected areas, on improved productivity of land, and the rehabilitation, conservation and sustainable management of land and water resources, leading to improved living conditions, in particular at the community level.
COP 21 Paris Agreement on Climate – Ratified in November 2017	Mozambique is one of the 196 countries that signed and ratified the agreement to reduce greenhouse gas emissions to contain global warming to 2°C.

Identification of potential gaps

No meaningful legal and regulatory gap has been identified for the implementation of the ER Program. It should be noted that the above set of legislation and agreements, as stated earlier, is not exhaustive. The GoM is committed to other regulatory texts and statutes at national and international level that are detailed in (Beta and Nemus, 2015). In addition, the GoM's commitment to REDD+ and to the reduction of carbon emissions can be observed in non-regulatory initiatives, which were described in section 2. They include Mozambique's Intended Nationally Determined Contribution (INDC) that was presented to the UNFCCC in 2015 and in which the GoM had pledged for the reduction of 76.5 $MtCO_2e$ between 2020 and 2030, with 23.0 $MtCO_2e$ by 2024 and 53.4 $MtCO_2e$ from 2025 to 2030 (MITADER, 2015; IDA, 2017)[39].

39 The GoM ratified the Paris Agreement on November 8th, 2017 and is currenlt preparing its revised NDC.

Mozambique has also developed a number of relevant policies, strategies, plans and projects with the vision of aligning the development of the country with economic, social and environmental benefits. Some of these have significant weight in guiding the country towards a reduction in deforestation and forest degradation rates. Of note is Mozambique's National Climate Change Adaptation and Mitigation Strategy approved in 2012, which integrates disaster risk management actions and consolidates priorities and targets for action on climate change into national socio-economic planning - *for more details, see section 2*.

4.6 Expected lifetime of the proposed ER Program

Between 2018 and 2024, the ER Program is expected to generate the equivalent of 10.7 MtCO2e of emission reductions, of which 10.0 MtCO2e will be offered to the FCPF, depending on the final terms of the ERPA[40]. Although the ERPA and FCPF payments are expected to cover a 6,5 years period and to run until December 2024**, the lifetime of the ER Program is expected to extend beyond these dates** if the activities implemented are to generate a long-term sustainable and durable transformation of the use of forest and forest resources**: it will be developed with a long-term perspective of at least 20 years.** Its implementation will be consistent with the action plan of Mozambique's REDD+ strategy, in which it fully fits, as a broader frame.

[40] According to the terms of the LOI that was signed in December 2015 between the GoM and the World Bank, it was initially decided that 8,724,732 tCO_2e would be provided to the FCPF. However, following a re-evaluation of the total of ERs that could be achieved by the ER Program, the GoM is willing to offer more to the FCPF. The Maximum Contract Volume could therefore be updated in the future ER-PA.

5. STAKEHOLDER CONSULTATION AND PARTICIPATION

5.1 Description of stakeholder consultation process

In Mozambique, the necessity to consult with stakeholders is embedded in its very legal framework: both the Mozambican Constitution and Environment Law establish the rights of citizens to have information about and to participate in decision-making about activities which may affect them and the environment; as stated in the ESMF (MITADER, 2016d), when it comes to land issues, local people and communities as well as their representatives need to be continuously involved in the decision-making process. One of the objectives of the Forestry and Wildlife Law (1999) actually is to increase the participation of rural communities in integrated management, fire protection, use and conservation of forest and wildlife resources. In the same way, according to the Land Law (1997) and its regulations (1998), local communities shall participate in the management of natural resources, conflict resolution and land lilting processes.

Behind this principle is the underlying assumption that, despite belonging constitutionally to the State, the land is genuinely also considered as communities' property: the 1997 Land Law and the 2004 Constitution of Mozambique recognized the necessity to integrate customary rights in land legislation and the Land Law actually recognizes as land property title (DUAT) any occupation and use rights over lands that are acquired through any normative systems that do not contradict the Constitution. It also created the "Local Community" body, which is the titleholder of DUAT attributed by the State to all land users within a given area. *For more details about land tenure in Mozambique, see section 4.4.*

As a consequence of this framework, local communities' representation for issues over the land and, subsequently, for the design and implementation of REDD+ initiatives, is best embodied in (i) the Participatory Management Committees (*Comité de Gestão Participativa* – COGEP), created in the 1999 Forest and Wildlife legislation and composed of representatives of the local community, the private sector, the government and NGOs at local scale – *see section 6*; and (ii) the Natural Resources Management Committees (*Comité de Gestão dos Recursos Naturais* – CGRN), created by decree in 2005 and composed of member from the Local Community – they were fully integrated to the ER Program consultation process.

Since the ZILMP is fully aligned with Mozambique REDD+ National Strategy, the information sharing and consultation and participation mechanisms that have been used in the design of the ER Program are interlinked with the consultation structures and mechanisms that were used for the evaluation and validation of the REDD+ National Strategy, its safeguards instruments and related projects, including MozFIP, MozBio, and "*Sustenta*" Project. They include two components:

(i) A consultative and participatory process, relying on (i) extensive public consultations, workshops and interviews at national scale and on (ii) the creation of the Zambézia Multi-Stakeholders Landscape Forum (MSLF);

(ii) An information-sharing process, relying on (i) the automatizing of REDD+ information dissemination on social media, website and mails; (ii) the diffusion of didactic documents and (iii) other innovative communication events in local languages.

Consultation process in the design of the ER Program

In the design phase of the ER Program, consultations were led by UT-REDD+ in coordination with provincial and district governments, the CGRNs, local association and civil society organizations. It was implemented according to the international and national principles concerning REDD+: FCPF guidelines as well as the Mozambican legal and regulatory frameworks (Ministerial Diploma 158/2011 and Decree 70/2013 – *see section 4.5*) were used as guiding documents to ensure the transparent and effective participation of local and forest dependent communities.

Since the Readiness phase, consultations have covered a wide range of issues, from general information on REDD+ process, reference level scenarios and MRV system, legal and institutional framework for REDD+, drivers of deforestation and degradation to the identification of potential pilot projects. From 2013, consultations increasingly focused on the content of the REDD+ initiatives and associated projects – such as MozFIP, MozDGM and MozBio (*see section 4.1*) - and, from 2015 onwards, consultations on the ER Program were intensified in the ER Program area. They also focused on the recently designed REDD+ safeguards documents (SESA, ESMF and PF).

Figure 12: Mains objectives of the consultation process

The overall objective of this process was to ensure acceptance and interest in the program, as well as to build the trust of stakeholders and support their capacity to participate in REDD+ initiatives in a meaningful and effective way (UT REDD+, 2015a). More importantly, public consultations contributed to gathering and assessing community feedback and opinions on REDD+ and associated projects and programs. They focused on the identification and promotion of potential non-carbon benefits and the implementation of necessary safeguards. Most notably, at longer term, this process ought to maintaining a

constructive relationship with the stakeholders during the implementation of the activities to ensure inclusive, transparent and accountable decision-making of locally impacted people throughout the program.

The methodology for the consultations relied on (FNDS, 2016): (i) the identification and mapping of relevant stakeholders in government institutions, civil society organizations (CSOs), formal and informal forest operators (private sector), local communities and other forest dependent communities; (ii) the organization of public consultations, workshops and interviews at central (Maputo), provincial (Zambézia) and community levels in areas where REDD+ initiatives are planned to be or are already being implemented.

Intensification of consultation for the ER Program - In Zambézia, the consultation process was intensified from early 2015 in order to precise the content and scope of the ER Program. Representatives from UT-REDD+ conducted a range of meetings at district and provincial levels in the ER Program area. Visits were also organized to meet key stakeholders such as local producers, cashew nurseries and farm schools, in order to discuss and get feedback on their perception on the causes of deforestation and on potential opportunities for REDD+ activities. In addition, interviews were organized with governmental stakeholders[41] in order to enter into more technical discussions on the importance of planning for the ER Program – see Box 5. This process was completed from May 2015 by additional consultations, various workshops and interviews with specific stakeholders[42] on the REDD+ safeguards documents – SESA, ESMF and PF.

They included discussions on the drivers of deforestation and forest degradation, land use and land tenure, social and environmental protection and sustainable forest management. In the same way, the workshops aimed to undertake a joint assessment of potential socioeconomic and environmental impacts of REDD+ and preliminary identifications of mitigation measures and strategies. Preliminary field visits were organized to understand the situation of the forest sector and the potential implications arising from the implementation of future REDD+ projects for communities.

The main issues addressed during the consultation process and the comments received are summarized in **Table 28***.*

Box 5: Key figures on consultation process

Key numbers on stakeholders' consultations (FNDS, 2016) **-** During Readiness phase, an extensive consultation process was undertaken at national level. Between February 2010 and July 2011, more than **1,500 participants** took part in consultations and training workshop. From March 2013 to November 2016, **61 public consultation meetings** on REDD+ and associated projects were organized. 10 of them were community consultations. Along those consultation, **3,370 participants** were recorded, 29% of which were women. Those consultations were organized throughout the country, including in the ER Program area.A summary of all consultation held so far can be found here.

[41] *Provincial Director of Environmental Affairs; head of the Provincial Services of Forestry and Wildlife; Provincial Director of Agriculture; Provincial Delegate of the National Statistics Institute (INE); Deputy Chief of Rural Extension Services.*

[42] *District Administration; Courts; Police; District Services for Economic Activities (SDAE); Environmental Provincial Directorate; Forest Provincial Directorate; Private sector (Anadarko, ENI and Forest Operators) and Forest and Environmental NGOs.*

Platforms to enhance the full, effective and ongoing stakeholders' participation

The implementation of the ER Program will build up on this consultation process and intensify it in order to ensure the long-term full, effective and on-going participation of all stakeholders in ER Program's implementation. As part of this consultation process, multi-stakeholders platforms have also been created, both at national level for the general REDD+ initiative in Mozambique and at provincial scale for the specific REDD+ activities in Zambézia, including the ER Program.

The National REDD+ Steering Committee (NSC)

In 2013, the REDD+ Decree 70/2013 created the REDD+ Technical Committee (CT) as a means of consultation and supervision of all REDD+ activities in Mozambique.The REDD+ CT was completed in 2015 by the MozFIP National Steering Committee (NSC), created to complete the activities of the REDD+ CT and to oversee the implementation of the MozFIP and MozDGM activities.

In order to ease cross-sectorial coordination for REDD+ subjects and for the ER Program, the REDD+ CT has now merged with the NSC, to become the REDD+ National Steering Committee, confirmed by the adoption of the new REDD+ Decree (April 2018). Its objective is to act as an overarching consultative and supervising organ, with the aim of piloting inter-institutional coordination among all the sectors and stakeholders involved in REDD+, for the good implementation of the Action Plan of the National REDD+ Strategy. It comprises government organizations, the private sector, research institutions and civil society organizations. It meets twice a year and can organize extraordinary meetings on specific issues related to REDD+ project when deemed necessary by the FNDS – *see section 6 for more details.*

The Zambézia Multi-Stakeholders Landscape Forum (MSLF)

In August 2015, a Zambézia Provincial Forum was created in order to coordinate REDD+ projects in Zambézia and promote integrated landscape management. In order to amplify its of action and include more stakeholders; it has since then evolved into the Zambézia Multi-Stakeholders Landscape Forum (MSLF - *Plataforma de Desenvolvimento Integrado da Zambézia*).

The Zambézia MSLF was created on April 6, 2017 in Quelimane, during the fifth (and last) meeting of the REDD+ provincial forum, in order to address the transition between the two structures. The fifth meeting culminated in the presentation, appreciation and approval of the Terms of Reference of the Zambézia MSLF, which was created as a multi-sectoral organization dedicated to promoting interactions between stakeholders for the integrated sustainable development into Zambézia (Encosta Sul, 2017). *The MoU and the Terms of Reference of the Platform are available in, respectively,* Annex 4: MoU between the Installer Commission of the Zambezia MSLF and the Forum of ONGs, private sector and academies *and in* Annex 5: Terms of Reference of the Zambézia MSLF

Created as a consultative body, the MSLF aims to create synergies of dialogue and sharing of information and knowledge between the actors involving in the broader context of natural resource management and sustainable development in Zambézia. Its main objectives are to foster debates on topics relevant for the development of Zambézia province, especially with

regard to REDD+ initiatives; to promote sustainable practices and the integrated management of natural resources, including forests; to promote the valorization and integration of local communities and their leaders in this process; to increase awareness and ease the dissemination of information (study, experience, etc.) in this area; to ease the relationship between the various actors involved in landscape management in Zambézia province.

In this sense, it brings together government institutions, district services, private sector, civil society organizations, representatives of the communities and education institutes in Zambézia province working in the area of sustainable development. It is functioning according to three components (Encosta Sul, 2017):

- Plenary Session: semiannual meetings of all Platform members to share information and approve decisions;
- Thematic Groups: designated plenary working groups that organize debates, studies and research, promote liaison with local communities and facilitate the sharing of information among members; the frequency of meetings is trimestral;
- Coordination Group: decision-making body of the Platform, designated in a Plenary Session, which adopts strategic guidelines and approves the plan of activities; the frequency of meetings is trimestral.

In order to facilitate discussions and operational working sessions, specific thematic groups, composed of specialist institutions in each area, have been created within the MSLF: (i) sustainable agriculture; (ii) forests and conservation areas; (iii) land, water resources and energy; (iv) governance, gender issues and climate change (see Annex 6: Thematic groups of the Zambezia MSLF).

Each thematic group works on topics related to its area, promoting information sharing and aiming to facilitate decision-making and harmonize the activities implemented by the different stakeholders in Zambézia in regard to the MSLF's focus. The thematic groups meet at least four times a year. A coordination group, composed of 17 members, was also created to represent civil society organizations, the public and private sector, communities, academies and coordinators of strategic projects and reference organizations. The coordination group meets at least four times a year.

Based on a transversal approach, the MSLF is therefore devoted to the promotion and diffusion of local knowledge, which are represented by the communities as reference actors, as a basis for the sustainable integrated development of the Zambézia province, especially with regard to REDD+ initiatives - including the ER Program.

Precisely, the MSLF is expected to highly contribute to the full and transparent participation of the stakeholders in the day-to-day implementation of the ER Program activities in Zambézia. During its implementation phase, the MSLF will have to guarantee and support the effective integration of institutions involved and to help facilitating discussion between them, especially on the Benefit Sharing Plan and the feedback and grievance redress mechanism - *see next section*. It will also strengthen communication on REDD+ activities in the ER Program area, with regular collect of information and systematization of dissemination.

Table 25: Meetings of the Zambézia Provincial Forum for REDD+ (and of the Zambézia Multi-Stakeholders Landscape Forum which succeeded to it)

Forum	Place & date & number of participants	Key topics
1st Zambézia Provincial Forum for REDD+	Quelimane 01/08/2015	Launching of the provincial REDD+ forum; presentation of the forum and its objectives; discussion on inter-sectorial and integrated cooperation; presentation and discussion on REDD+ pilot project in Zambézia (ER Program).
2nd Zambézia Provincial Forum for REDD+	Pebane 06/01 – 07/01/2016	Discussion on the management of the Gilé National Reserve (GNR) and on the activities of the implementing partners.
3rd Zambézia Provincial Forum for REDD+	Quelimane 09/02/2016	Discussion on the concrete activities to be implemented by the ER Program; debate on current REDD+ activities in the area; sharing on similar practices in Zambézia and in the rest of the country.
4th Zambézia Provincial Forum for REDD+	Quelimane 20/04– 22/04/2016	Design the action plan for the reduction of deforestation at provincial scale with coordination between the ER Program and MozBio, MozFIP, and "*Sustenta*" projects; discuss the activities to be implemented for ER Program; find ways to institutionalize the Forum; discussion on safeguards documents.
Extraordinary Zambézia Provincial Forum for REDD+	Quelimane 30/06/2016	This extraordinary forum was also the first meeting of the Sustainable Development for Zambézia / Zambézia Multi-Stakeholders Landscape Forum – *see below.* Discussion on thematic groups to be set up in the Forum; discussion on the internal rule of the Forum; drafting of the Statutes of the Forum.
5th Zambézia Provincial Forum for REDD+ & 1st Plenary Session of the MSLF	Quelimane 05/04 - 06/04/2017	Summary of previous actions of the Zambézia Provincial Forum; Discussion and approval of the final Terms of Reference of the MSLF; election of the members of the Platform Coordination Group, under the coordination of the Electoral Commission, and creation of thematic groups; presentation of the action plan for the year 2017.
1st meeting of the MSLF Coordination Group	Quelimane 02/06/2017	Presentation and approval of the budget and activity plans, including 17 activities the 2017/2018 financial year; reduction of the thematic groups number.
Coordination group meeting	Quelimane 06/06/2017	Final approval of the composition of the thematic groups of the MSLF
Coordination group meeting	Quelimane 29/09/2017	Trimestral meeting of the coordination group: approval of GIS formation for thematic groups.
2nd plenary session of the MSLF	Quelimane 02/10/017	Revision of budget and presentation of the data sharing system for the MSLF members

The MSLF newsletter – In order to enhance the participation and awareness of stakeholders in Zambézia, the MSLF created a newsletter, as significant a channel for sharing information among the MSLF members, partners and all stakeholders. It presents activities undertaken by all members and relevant partners in the field of sustainable development in Zambézia and related initiatives developed outside of Zambézia province. The MSLF produced, to dates, two newsletters, in June and September 2017.

Table 26: Content of MSLF newsletter

General information and next steps	Contextual information on the activities of the MSLF carried out recently and / or relevant information on the topics of interest and planned activities
Activities	Activities carried out by the members and partners of the MSLF to improve knowledge about a specific topic, inform the activities developed in Zambézia, share a working methodology
Research and studies	Summaries of studies and scientific research carried out by the members and partners of the MSLF (or in collaboration) increasing knowledge about a specific theme

The role of the MSLF in GIS platforms for REDD+ - Admittedly, geospatial data sharing is a key issue for the monitoring of activities implemented under the REDD+ strategy in Mozambique. Currently, the FNDS is developing a national GIS platform[43] to integrate all geospatial information on activities related to sustainable development and REDD+ activities in the country. It will be based on the signature of Memorandum of Understanding for the sharing of geospatial data with other public institutions and actors (NGOs, private sector), etc.

In the same way, at provincial level, the PIU also developed a Zambézia Geospatial Platform (acessible here) to include spatial information on the projects and activities implemented in Zambézia as part of the ER Program.

Admittedly, there is an opportunity for the MSLF to be a reference player in Zambezia for the production, valorization and sharing of information relevant for the geo-referencing of REDD+ activities in Zambézia, relying on the collection field data to produce spatial information map of the activities implemented by the members of the MSLF. Recently, the MSLF Coordination Group approved the training of members of the Thematic Groups on field data collection and GIS techniques. A proposed Terms of Reference was submitted to the Secretary of the Platform and approved. Based on simple and free tool, this training will strengthen the capacity of the members of the Thematic Groups to gather geospatial data, facilitating the monitoring of their own activities and their contribution to the coordination of activities at the level of the Province. It will enable them to use tools for mapping and spatial analysis. This formation is therefore expected to enable the thematic groups of the MSLF to support the production of relevant information and to contribute to the sharing of information and data fueling the Zambezia Geospatial Platform, as shown in Figure 13. This formation has still not happened, but should be effective in the coming weeks (Encosta Sul, 2017).

[43] *Login: convidado; Password: convidado*

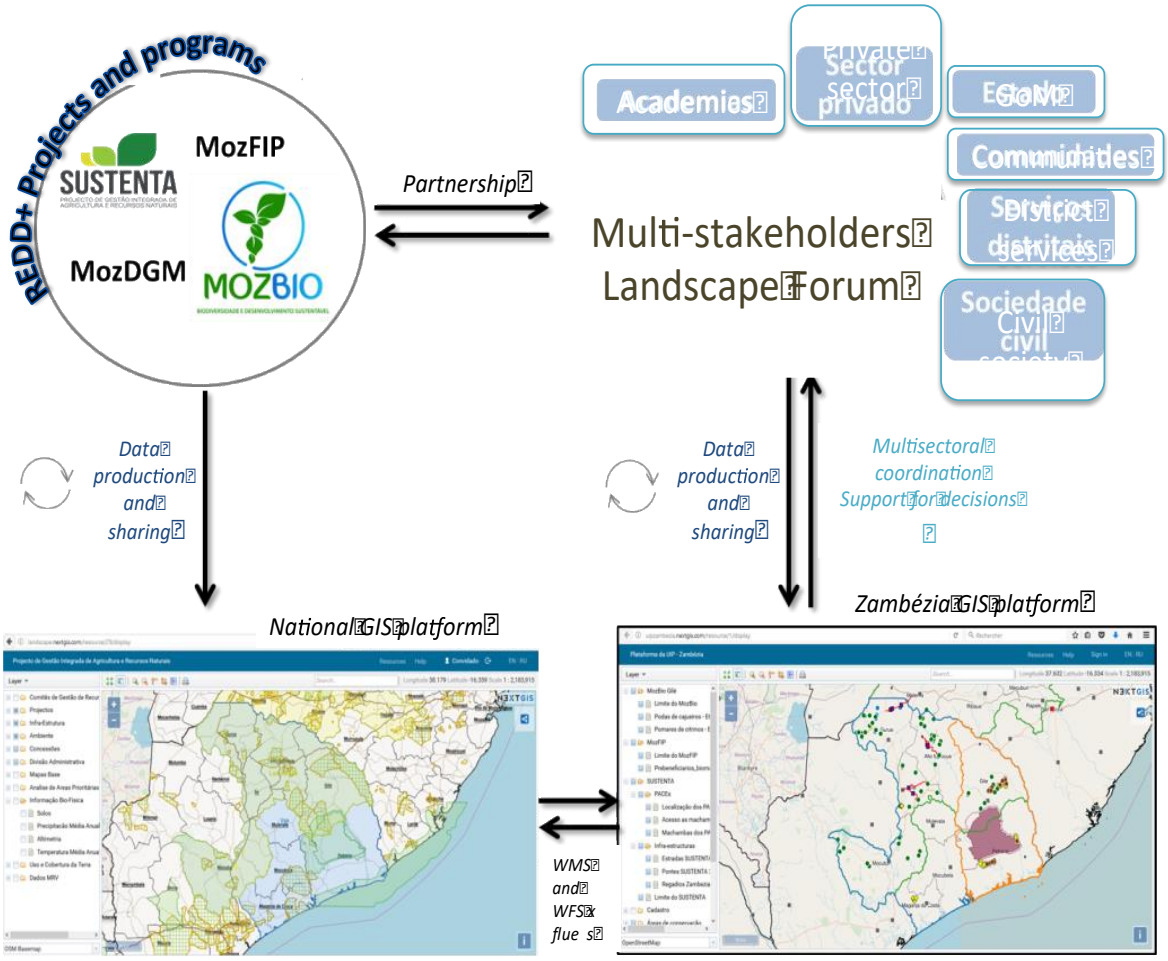


Figure 13: Support of MSLF thematic groups to the Zambézia and National GIS platform *Encosta Sul (2017)*

Dissemination of information and consultation on ER Program and REDD+

As stated before, stakeholders' consultation and participation in the design of the ER Program also relied on an extensive information-sharing process. Some of those tools are Internet based, such as the REDD+ website, the REDD+ Facebook page and the REDD+ mailing lists[44], and regular updates on the main events linked to REDD+ are regularly relayed through those channels. The REDD+ website also encompass the totality of the consultation reports and list of participants. A public Drop Box was also created to gather and disseminate all the documents related to the consultation process.

However, in order to make sure that all stakeholders can have access to these information, including when they do not have access to the internet network, the dissemination of information is also based more classic media including the radio, television and newspapers. Admittedly, while pre-consultation information, announcements and invitations are automatically posted on both the REDD+ website and Facebook page, they are also widely shared on local radio stations and television. In addition, regular communication events and

[44] *The e-mail forum of discussion on REDD+ that was created in 2016 now comprises 119 members from different institutions within the Government, NGO's, donors, private sector and academy.*

consultations are organized with direct contact with stakeholders and, during consultation, information is also made available to all participants through the production and distribution of didactic material, such as pamphlets, policy briefings, posters or cartoons. They synthetize the main issues related to REDD+ in a concise and clear manner, easily understandable and illustrated with meaningful pictures. The pamphlets are thematic and cover various topics such as agricultural practices or charcoal production.

Table 27: Main information sharing tools for stakeholders' consultation and participation

Tool & access	Main content
Website for REDD+ in Mozambique and FNDS website	Reports from the consultations with accompanying participants' lists; information on ongoing activities and project; updated news on REDD+ process in Mozambique; main contact of REDD+ initiative in Mozambique.
Facebook page for REDD+ in Mozambique	Information on ongoing activities and project; updated news on REDD+ process in Mozambique; main contact of REDD+ initiative in Mozambique; article related to REDD+ and forest in Mozambique; photos of REDD+ events.
REDD+ in Mozambique mailing lists	Mailing lists to diffuse information, invitations, reports and documents to stakeholders that registered.
REDD+ in Mozambique consultations dropbox	Reports from the consultations with accompanying participants lists.
Radio announcements	Announcement of the date, place and subjects of events related to REDD+ in Zambézia (local radio) and Maputo (national radio). Example here.
TV announcement	Announcement of the date, place and subjects of events related to REDD+ in Zambézia (local radio) and Maputo (national radio).
Films and videos	Presentation of REDD+ activities and projects in Mozambique; community consultation; theatrical workshop.

Finally, stakeholders' participation can also be encouraged through more innovative and punctual initiatives, such as the organization of theatrical events. In March 2016, the Program Implementation Unit (PIU) organized a theatrical workshop in collaboration with the local theatre company Kassoria, who already is a member of the Zambézia Provincial Forum. They performed, in local languages, 8 small sketches on the main issues related to deforestation and forest degradation in Zambézia. This kind of initiative, which was filmed and disseminated on Internet, is expected to repeat in the future.

5.2 Summary of the comments received and how these views have been taken into account in the design and implementation of the ER Program

Table 28: Summary of comments received during stakeholders' consultations

Topics and stakeholders involved		Main comments received from consulted stakeholders	Solutions for ER Program design and implementation
Exploitation of natural resources	Local population, civil society and communities	*Many issues raised during consultations were related to the understanding of the drivers of deforestation, the potential of mitigation measures and their pros and cons.*	
		The over-exploitation of forest resources by rural population is linked to poverty and the lack of job opportunities. They are necessary to their subsistence. How to reconcile the reduction of deforestation and the question of subsistence of communities?	The benefits for communities is the result of the goods and services that a healthy forest produces. The aim of the ER Program is to support the process of optimizing these goods and services for current users as well as for future generations. The ER Program will generate new benefits for local population to change their habits, diminish their dependence on forest resources and contribute to deforestation reduction; this will be achieved through specific ER Program activities aiming at diversifying their sources of revenues and proposing alternative way of subsistence – *see section 16 on non-carbon benefits, section 15 on benefit-sharing mechanisms and section 4 on ER program activities.*
		The use of forest by local communities is strongly embedded in their life habits and culture. Forest resources are used intensively for market purposes and in some instances with lucrative illegal logging, but also for food, firewood, production of charcoal, furniture production, and building fences and home and medicinal purposes. Changing those habits may be difficult.	The ER Program will not prohibit the use of forest resources but will be based on a reasoned use of them, in a sustainable way, so that local populations' needs are met at longer term. Those non-carbon benefits will have to be clearly presented to local communities and their feedbacks should be taken into account at all times of ER Program implementation – *see section 4 for ER Program interventions and justification.*

		How will REDD+ be compatible with agricultural and charcoal production?	The ER Program will not prohibit any agricultural practices but will provide incentives for sustainable practices that will enable the agricultural production to increase while reducing deforestation. Agricultural productivity will be increased in order to reduce shifting agriculture and the net impact on agricultural production is expected to be positive. The production of charcoal will be subject to specific measure to reduce the quantity of wood necessary to meet the demand, with improved techniques of production (improved kilns with better yields).
REDD+ Benefits	Local population, civil society and communities	*Significant issues raised during consultations also were about the understanding of economic and social impacts of REDD+ and mitigation measures proposed to mitigate any potential negative impact.*	
		The potential financial benefits induced by REDD+ activities may be lower than those induced by illegal logging.	The ER Program will have to rely on an effective benefit-sharing plan and should generate sufficient non-carbon benefits to cover any real or perceived revenue difference – *see section 16 on non-carbon benefits.* Those non-carbon benefits are crucial and represent long-term investment in rural development that should last long after ER payments.
		The benefits sharing from REDD+ for local communities are not clear and sometimes not trusted, with complaints about corruption, grabbing of revenues and inefficient redistribution (including with regards to the "20% mechanism").	The question of Benefit-Sharing has been central to the preparation of the ER-PD for the implementation of the ER Program and was partly based on the analysis of land tenure rights in the ER Program area – *see section 4.4 and 15.* The ER Program was designed taking into consideration this crucial question that is perceived to be key to its success. The ER Program will have to rely on a defined clear and efficient mechanism to distribute carbon benefits to the communities and ensure that the communities also perceive non-carbon benefits – *see section 15.* The distribution of carbon benefits should rely on transparent and efficient institutional arrangements and monitored.
REDD+ strategy and interventions	All stakeholders	*The understanding the current economic, social and environmental value of forest and the implications for future generations has been regularly addressed during consultations.*	
		It is necessary to address uncontrolled fires that are a major cause of deforestation	Burn-reduction activities are under development and the awareness raising and training on better management of fires is included in various interventions of the proposed ER Program. In addition, the ER Program interventions activities seek to increase the value of forest products to rural communities, thereby reducing incentives for fires

		and forest degradation.	(triggered for hunting and agricultural purposes) – *see section 4 on ER Program interventions.*
		REDD+ pilot projects have contributed to increasing awareness concerning on the need for sustainable use of forest and conservation but this awareness has not changed the patterns of forest use enough.	Under the existing REDD+ pilot projects, conservation agriculture is being introduced by external sources. The concepts and ways of farming are new to the people in the region, and may clash with local land use/forest use traditions. It will take time to raise awareness for the need for change, and to get people to accept the conservation programs and adopt them. The ER Program will therefore rely on a wide range of extension agents who are part of local communities. Consultation with communities will be crucial to understand their needs and promote coherent practices that do not clash with their cultural beliefs but which provide incentives for changes towards sustainable use of forest resources. This is partly ensured by the Zambézia Multi-Stakeholders Landscape Forum. Communication on benefits will be important.
		What is the sustainability of the REDD+ Strategy? What will happen when the incomes generated by the selling of carbon credits run out?	The REDD+ Strategy is not only based on receiving money and income from the selling of carbon credits. Conversely, it aims at initiating long-term changes in the use of forest resources so as to ensure their sustainable use for local communities. Carbon payments will help to initiate this change but, assuming that the REDD+ strategy succeeds, the non-carbon benefits are expected to contribute to the maintaining of sustainable practices way after the application of ERPA and carbon payments, fueling a "win-win" environment – *see section 16 on non-carbon benefits.*
	Local population, civil society and communities	In addition to reforestation projects, it would be beneficial if individuals could participate in commercial agriculture.	The valorization of cash crops for the increase of sustainable commercial agricultural activities is an important component of the ER Program. This will come along better access to market through various measures, including increasing smallholders' knowledge about markets trends and prices. Small scale commercial agriculture is key to the ER Program and will also be supported by the "*Sustenta*" project - *see section 4 on ER Program interventions.*

		It is necessary to empower communities with entrepreneurship and income generating skills.	The ER Program seeks to generate long term additional revenues for smallholders through activities linked to the commercialization of cash-crops with improved value-chains, also strengthened by the formation of smallholders' groups to be able to negotiate together and increased their business power. Complementary to the ER Program in which they fit, the "*Sustenta*" project, MozFIP and especially MozDGM will help to finance private initiatives of local communities and smallholders who wish to engage in entrepreneurial activities – *see section 4.*
	Government and donors	It is crucial to integrate REDD+ into the governance agenda of the GoM, so as it is addressed as a rural development strategy and not simply a carbon credits mechanism.	The ER Program is fully integrated in the GoM commitment for reducing rural poverty. Various initiatives have been taken at governmental level to create a positive environment for the application of REDD+ and the ER Program which are part of the national development plan in general, and of rural development in particular – *see section 2.*
		There should be a joint effort between government, private sector, civil society organizations and communities to reverse the current negative trends in the forest sector.	The ER Program relies on various mechanisms that enable the full cooperation of the wide range of stakeholders in the design and implementation of its activities. Participatory mechanism such as provincial forum (such as the Zambézia Multi-Stakeholders Landscape Forum), inter-intuitional and cross-sectorial bodies (such the as the REDD+ CT and the NSC – see section 6.1) will be key in ensuring this joint effort and in the ER Program success. In addition, a forest governance assessment has been conducted in 2016 and will be replicated every 2 year in order to guide the changes in the forest sector.
Conservation area	Local population, civil society and communities	Complaints were raised about job opportunities in the protected areas. Communities want priority in receiving job opportunities in the protected areas, for positions such as rangers in order to supplement income while protecting their traditional land.	With regards to conservation area, the ER Program will partly rely on the MozBio project that will help generate new revenues for the communities living around the GNR. Job opportunities are also expected to be increased by ER Program interventions related to the commercialization of cash-crops and the potential local transformation of cashew – *see section 4.*
	Government and donors	Inspection fails in conservation areas, including in Gilé for the GNR.	With regards to conservation area, the ER Program will partly rely on the MozBio project that includes a component linked to the better management of protected are – see section 4.1 In addition, through reducing the appeal of deforestation and forest degradation, the ER Program is expected to reduce the overall risk of "invasions" of protected forests. The MozFIP will also support AQUA on enhancing the law enforcement in the program area.

M& MRV	Government and donors	The Government should improve monitoring of forest operators to ensure that forest legislation is adhered to in practical terms.	The GoM has launched a review of the Forest law framework that should also benefit REDD+ application. The ER Program will be based on an efficient MRV system that is currently being defined by a dedicated team, as well as on a forest information system, established at DINAF/AQUA. It will also support forest law enforcement. The ER Program, of which some interventions are dedicated to better management of forestry practices, will target forest operators.
	All stakeholders	Communities should actively participate in the monitoring of forests	The ER Program comprises a Participatory MRV (PMRV) system to ensure local communities involvement in this component – *see section 14.*
Land issues	All stakeholders	*Many issues raised during consultations were related to the understanding of the potential impact of REDD+ on land use and land tenure, in the ER implementation risks and possible adjustments linked to land tenure.*	
	All stakeholders	It is crucial to engage in forest and land delimitation process.	In the ER Program, support is provided for community delimitation process as well as for the issuance of DUAT. Those ER Program interventions are supported by the MozFIP and "*Sustenta*" projects and are considered as key for the success of the ER Program implementation. The MozBio project will also contribute to it with micro-zoning activities within delimited communities. This is considered as crucial to ensure the long-term rational use of natural resources and for benefit-sharing mechanism – *see section 4.3 on ER program interventions, section 4.4 and the assessment of land tenure and section 15 for the benefit sharing mechanisms.*
	Local population, civil society and communities	Civil society and NGOs should be engaged in land zoning process.	The ER Program recognizes that civil society organizations should support communities in the delimitation of community lands to strengthen them. Those are complex issues for which communities need assistance to work on them adequately. The ER Program will rely on a wide range of civil society and NGOs partners such as ITC and ORAM who already engaged in such initiatives. MozFIP is supporting o *Plano Nacional de Ordenamento Territorial*, and this activity will also take place in the project area.

	Government and donors	It is necessary to clearly delimit the area of application REDD+ interventions.	The ER Program has a specific area of application that is clearly delimited by the borders of the districts that composes the accounting area – *see section 3.*
Communication	Civil society, government and donors	There is a need for better communication strategy at the community level, with better use of community radios, which have a lot of influence on communities.	Communication is a significant part of REDD+ and of the ER Program and important efforts have been made in this sense. The dissemination of information rely on technical communication of UT-REDD+, which ranges from mass communication techniques through media including community radio but also television and newspapers as well as more specific tools such as the utilization of social media (Facebook) and the UT-REDD+ web page – see section 5.
	All stakeholders	REDD+ messages should be translated into several local languages in order to be more accessible to communities.	The ER Program is planning the dissemination of information in various languages including Portuguese and local languages – *see section 5.*
		Communities should be aware of existing forest resources and their importance to be able to protect them	This is an important component of the ER Program that is addressed in the consultation process in which communities are associated. Various tools and mechanisms have been developed to ensure awareness rising – *see section 5.*
Stakeholders' involvement	Local population, civil society and communities	How will the comments raised during consultations be taken into account?	All record of consultations are posted on the Internet and made available to public. MITADER is responsible for gathering and managing them. They are taken into account for the design and implementation of the ER Program.
		Civil society organizations should fully be involved in the REDD+ process.	Civil society organizations are invited to participate in all activities of the REDD+ process, including public consultations and workshops throughout the country. This is also true for all the consultations related to the ER Program design and implementation. This should also be a way of listening and answering to any parties that is not in favor of REDD+, in order to understand their concerns and address them. In order to fully institutionalize stakeholders' participation in the ER Program the Zambézia Sustainable Development Platform, which is succeeding to the Zambézia REDD+ Provincial Forum (also called the Zambézia Multi-Stakeholders Landscape Forum – MSLF) is currently being formalized. This Platform is composed of Civil Society Organizations (CSO) among other stakeholders (academia, private sectors, etc.).

	Government and donors	The involvement of women in the consultation process should be ensured and monitored.	The participation of women during the consultation process is already promising, 29% of consultations participants being women (see box 5). Along the ER Program implementation, their participation will continue to be strongly encouraged. The records of all the consultations, including the list of participants, are available online – *see section 5.*
	All stakeholders	It is necessary to represent all stakeholders in REDD+ strategy implementation.	The GoM if fully aware that REDD+ strategy and the ER Program are cross-sectorial initiatives. In order to ensure the on-going participation of all stakeholders and the integration of their different views, various mechanisms have been created. The most important tool with this regard is the creation of the MSLF, which should ensure the long term and active participation of a significant variety of stakeholders, including civil society, in the design and implementation of the ER Program. In addition, the REDD+ CT, which includes the NSC and representatives of several sectors of activity, aims to establish the procedure for approving projects related to REDD+, as well as establishing the institutional framework – *see section 2 on cross-sectorial commitment and section 6 on institutional arrangements.*
		A need was identified for greater outreach and greater involvement of communities in designing the Legal and Institutional Framework for the National REDD + Strategy.	The overall participation of communities in the design and implementation of the ER Program is ensured through various mechanism that are detailed in section 5 and 6. Those also apply for the designing the Legal and Institutional Framework for the National REDD + Strategy.
	Private sector	What will be the involvement of forestry operators?	Forestry operators should always be part of every public consultation process in order to collect more input on their involvement and interest in this process as well as the sensitivity of this group throughout the process. The ER Program has specific interventions related to forestry practices – *see section 4.*

6. OPERATIONAL AND FINANCING PLANNING

6.1 Institutional and implementation arrangements

Recent evolution on REDD+ institutional and implementation arrangements

Although REDD+ policies and implantation in Mozambique are dependent on properly articulated institutions whose mechanisms were primarily defined by the Decree No. 70/13 of December 20th, 2013, ("Regulation of the procedures for approval of projects for reducing emissions from deforestation and degradation"), institutional and governance weaknesses have nevertheless been identified as potential barriers to REDD+ implementation in Mozambique (see section 4). In order to overcome this challenge, institutional arrangements for REDD+ projects' implementation have been, in the past few years, largely addressed through innovative measures and concrete efforts:

1. One of the most obvious was the creation of the MITADER that, as stated in section 2, gathers into one single institution the management of cross-sectorial issues that are all very relevant to REDD+. **Today, within the MITADER, the FNDS is the key organ managing REDD+ national supervision in Mozambique**.
2. **Later on, this institutional layout was reinforced by the creation of the REDD+ National Steering Committee (NSC) by the new REDD+ Decree (April 2018), in order to ease cross-sectorial coordination for REDD+ subjects.**
3. The new REDD+ Decree, approved in April 2018, clarifies the institutional arrangements for the implementation of REDD+ projects in Mozambique and clearly specifies the responsibilities of the FNDS and other key insitutions. **The institutional arrangement for the ER Program will fully respect the layout describes in the new REDD+ Decree, as explained in the next sub-section.**

Oversight of ER Program implementation and link with national REDD+ framework

For institutional arrangements related to safeguards management and benefit sharing, please refer to sections 14 and 15. For institutional arrangements related to MRV, please refer to section 9.2.

ERPA Signature and management of ER Titles - The Ministry of Economy and Finance (MEF) will sign the Emission Reduction Payment Agreement (ERPA) with the FCPF CF. Responsible for managing ER Transactions and the ER Transactions Registry, as stated in the new REDD+ Decree, the MEF will also manage the reception of ER payments and transfer them to the FNDS (which will in turn transfer them to the appropriate beneficiaries, accordinly with the Benefit Sharing Plan - BSP).

National financing management of ER Program and carbon payment – The ER payments will be transfered from the WB to the Ministry of Finance (MEF) (as MEF is the World Bank client) and then will be transferred to the FNDS, in which the Directorate for the Mobilization of Funds (PMR) is the financial management unit for projects with major donor support, including MozFIP and Sustenta projects. It is responsible for handling administrative and technical processes related to such funding.

National supervision of the ER Program implementation - The National Fund for Sustainable Development (FNDS) will be in charge of supervising and coordinating the ER Program at central level. It should be reminded that the FNDS is part of the MITADER: it is today is the primary actor responsible for the REDD+ process in Mozambique. As such, in the new REDD+ Decree (Governo de Moçambique, 2017), the FNDS is confirmed as the entity in charge of approving all REDD+ programs and projects in Mozambique and in charge of managing REDD+ resources.

As clarified in the new REDD+ Decree (Article 10), the FNDS supports all institutions engaged in REDD+ policies. Its main responsibilities are (*non exhaustive list*):

(i) Establish, operationalize and ensure the maintenance of the components of the National MRV System;

(ii) Propose and approve standards and technical methodologies for establishing the levels of reference, the monitoring, the evaluation of emission reductions, the reporting, the verification and the validation of REDD+ programs and projects;

(iii) To receive, assess and evaluate the REDD+ projects proposals and annual monitoring reports;

(iv) To monitor the reduction of greenhouse gas emissions and the achievements of ERs objectives of REDD+ projects;

(v) To manageme of the Safeguards Information System (SIS), including the REDD+ Feedback and Grievance Mechacniem (FGRM);

(vi) To enable the dissemination of data and relevant information on REDD+ projects, which should be made public respecting the policies of intellectual property privacy established with the different actors;

(vii) To disseminate all information on the Programs and Projects and their social and environmental safeguards, Dialogue Mechanism and Complaints on existing platforms and their benefit sharing plan.

With regard to the ER Program, the FNDS will therefore play a crucial role in the monitoring of the ERs generated by the ZILMP and of the safeguard policies - *see section 14*. In addition, and importantly for the ER Propgram, as stated in the new REDD+ Decree (article 10) **the FNDS is responsible for (vi) managing the national REDD+ Programs and Projects Data Management System** and for (**vii) communicating to the entity in charge of the ER Transactions Registry all information related to ERs generated by REDD+ projects** – this is the MEF.

For the ER Program, the FNDS will also coordinate with the other relevant ministries (especially MASA and MIREME), as shown in Figure 14. Within those ministries, each agency and national directorate will appoint a focal point who will participate, including in the preparation of the annual work plans and budgets, annual progress reports, prepare terms of references (TORs) in their respective areas of expertise, and contribute to the supervision of the actions under their areas of responsibility.

Support to cross-sectorial coordination – Such cross-sectorial coordination will also be eased at national scale, by the REDD+ National Steering Committee (NSC). The NSC was created as an overarching consultative and supervising organ, with the aim of piloting inter-institutional coordination among all the sectors and stakeholders involved in REDD+, the

REDD+ CT was completed in 2015 by the MozFIP National Steering Committee (NSC), created to complete the activities of the REDD+ CT and to oversee the implementation of the MozFIP and MozDGM activities, with support to the FNDS in strategic decision-making. As stated in section 5, the NSC meets twice a year and can organize extraordinary meetings on specific issues related to REDD+ when deemed necessary by the FNDS[45].

Jurisdictional management of the ER Program - At provincial level, the Program Implementation Unit (PIU), whose team is located in the ER Program area (Mocuba), will manage the ER Program. The PIU is a regional body of the FNDS, in Zambézia. It is working in full cooperation with the provincial Government of Zambézia, and its Provincial Direction of Land, Environment and Rural Development (DPTADER). It is composed of 6 technical specialists who supervise the various areas of application of the ER Program, including land policies, value chains improvement, forest management and infrastructures, safeguards, accounting.

In particular, its role in the functioning of the FGRM of the Program is crucial. As explained in section 14, the FGRM focal points are located at two levels: (i) the FNDS safeguard team at central level; (ii) the PIU safeguard team at provincial level. However, the FGRM system respects a bottom up approach, meaning that all types of queries and complaints should always be addressed at the lowest possible level of resolution.

At local and provincial level, the PIU will therefore be responsible for receiving, processing (classification of complaints) and investigating the complaints and queries that are sent to them through specific forms, during community meetings or in person by complainant[46]. It will be in charge of monitoring the process of grievance resolution according to the procedures details in section 14, and for registering every step of the grievance resolution in the FGRM web platform – *more details are provided in section 14*.

Box 6: Focus on the Program Implementation Unit (PIU)

In Zambézia, where the ER Program is located, a specific and dedicated Program Implementation Unit (PIU) was created as a provincial REDD+ team to oversee the implementation of the ER Program. The whole team of the PIU is now gathered in Mocuba, in the ER Program area, in order to ensure full operational capacities of the team and better management of ER Program implementation on a day-to-day basis.

The main added value of the PIU is to enhance inter-sectorial and inter-institutional coordination at provincial levels, addressing one of the main REDD+ barriers in Mozambique - *see section 4.1*. It also shows the political will and sustained commitment of the GoM to efficiently implement REDD+ activities and the ER Program, strengthening local capacities to do so and showing a significant will to decentralize such responsibilities. The provincial PIU is also a means to overcome potential capacity and resources gaps, inherent to the size, level of ambition and complexity of any jurisdictional approach. It enables to concentrate on capacity building effort and gather human, technical and financial resources efforts into one single unit (UT REDD+, 2015a). The PIU is also in charge of the Zambézia

[45] For instance, due to the current revision of the REDD+ Decree, the NSC met in January 2017 and regularly from May to November 2017. Previous meetings were held July 2015, November 2015, August 2016 and March 2016.

46 While the FNDS safeguard officers will receive the complaints sent by emails or received through the green line – see section 14.

REDD+ GIS platform, which is available here - *see section 5.*

Local Implementation of ER Program activities - Generally speaking, the overall implementation of the ER Program activities will be coordinated by the PIU who will help implement the ER Program activities under consultation with multi-stakeholders through the Zambézia MSLF - *see section 5*.

The practical ER Program activities' local implementation will rely on the government as well as on service providers (private sectors, NGOs, etc.) who will therefore be critical to the successful implementation of the ER Program. Selected according to the procedures applying to each of the projects that are being implemented in Zambézia (MozFIP and MozDGM, MozBio, Sustenta), most of them have already been identified and will start in January 2018[47].

Stakeholders' commitment and capacities to implement the ER Program activities in a coordinated manner may be ensured through the planned signature of various MoUs with the implementing partners, to make sure that all of them effectively contribute to the ultimate goals of the ER Program[48]. MoUs could entail rights and duties of the implementing stakeholders, as well as associated budget. Other activities of the ER Program will rely on local administration and State entities, especially with regards to activities linked to land tenure and community delimitation. This, also, may rely when necessary on specific cooperation agreements with the provincial government of Zambézia and districts administrations.

Finally, a great deal of the ER Program activities will depend on the direct involvement of the local population and local communities and will be held within the communities who live in the ER Program area, involving the CGRNs, individual farmers and small community businesses.

Monitoring and reporting of ER for the ER Program - For the ER Program, the MRV system builds on the national MRV system, which is a Participatory MRV (PMRV). The national coordination and supervisions of the PMRV is the responsibility of the FNDS at national and program level through the PIU, in which a small MRV team composed of two specialists was incorporated.

At the lower level of the system, service providers will develop their own monitoring system to collect relevant information on their project (forest inventory, project areas, detailed mapping of LULC classes and changes) and reporting to the FNDS in a consistent manner, following the national standards established by the FNDS. The MRV processes will be also developed in close collaboration with the local communities through selected agents.

Details on institutional arrangements for MRV are provided in section 9.2.

47 A list those service providers is available at FNDS and could be shared with the FCPF if deemed necessary. For now, the identified service providers for the MozFIP project are Verde Azul and Indufor Oy, Verde Azul Lda e SSC AB (consortium); the identified service providers for the Sustenta project are: Verde Azul; Garantias Parciais de Crédito- GAPI- Sociedade de Investimento; TPF PLANEGE CENOR; CONSIFRA, LINTEL, CONSTRUMAC; EDI ECONOMIC DEVELOPMENT INITIATIVE (still in negociation); the Service provider for the MozBio project around the GNR is Etc Terra-IGF.

48 A MoU between the Zambézia Multi-Stakeholders Landscape Forum and civil society, the private sector and academic partners was signed in August 2016.

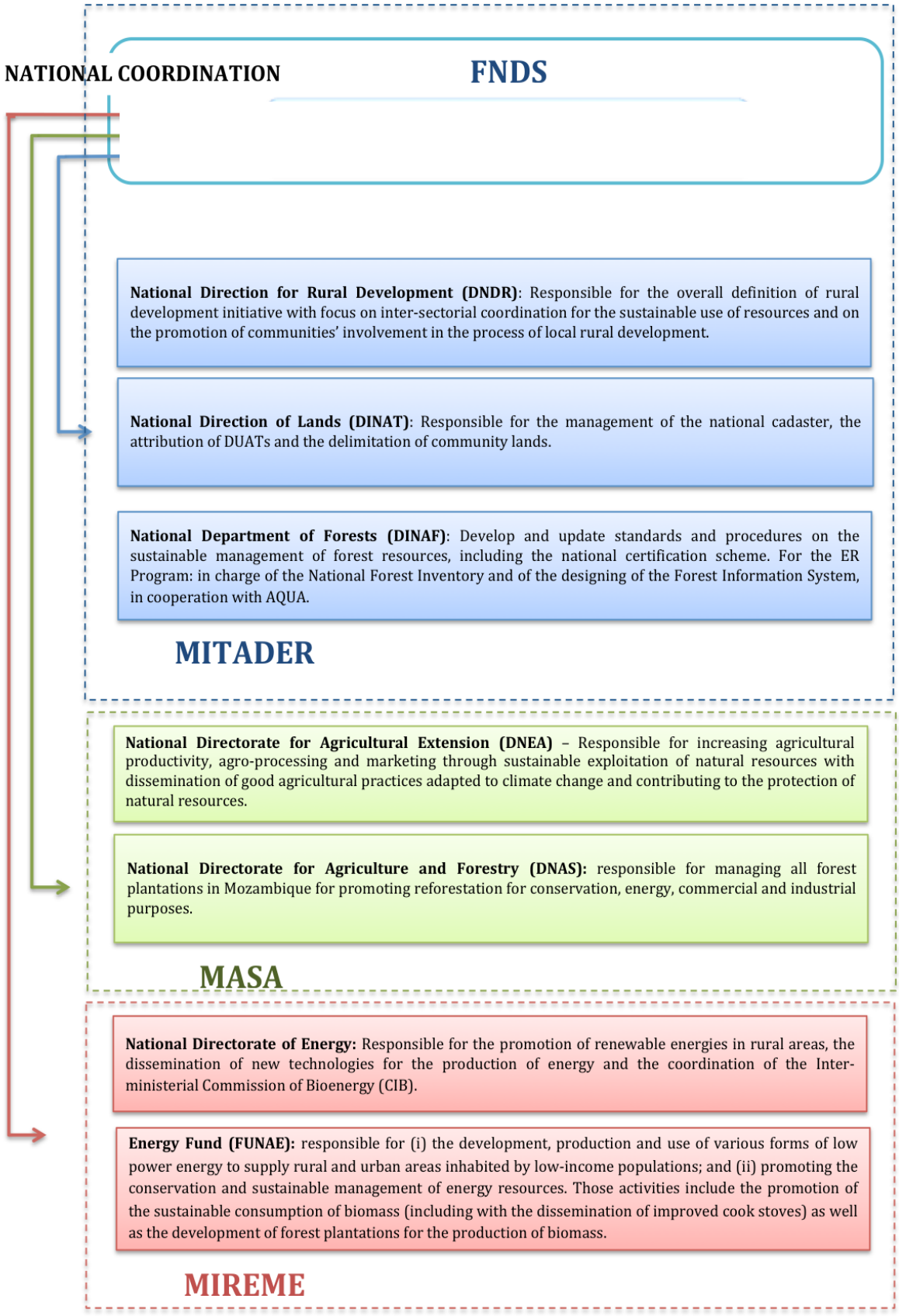


Figure 14: Coordination of the FNDS with MITADER's and other ministries' relevant directorates for REDD+

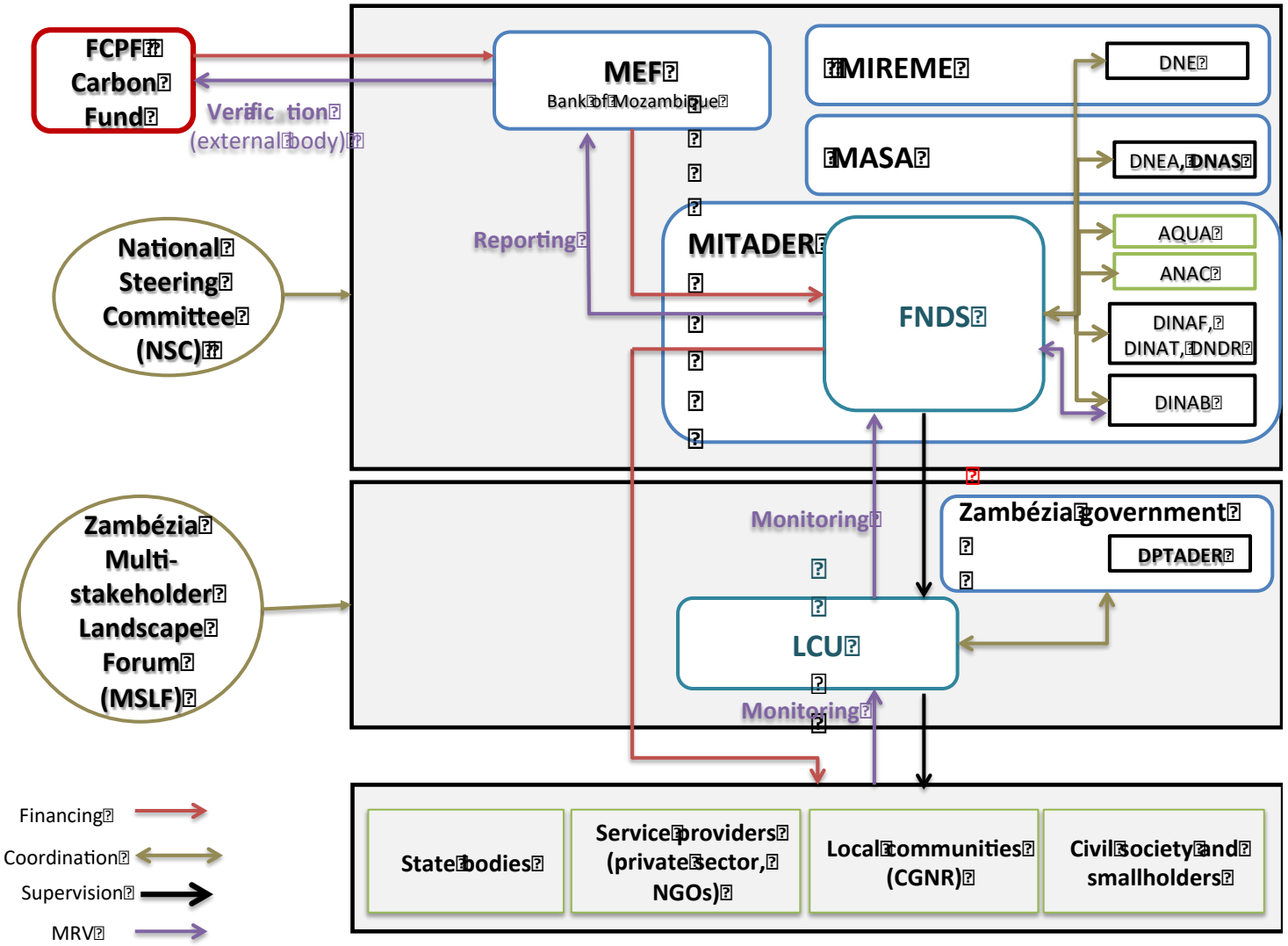


Figure 15: Implementation scheme for the ZILMP ER Program

Table 29: National management of the ER Program led by the MITADER

National management of the ER Program				
ERPA	MEF	MINISTRY OF ECONOMY AND FINANCE		
COORDINATION AND SUPERVISION	MITADER	National Fund for Sustainable Development (FNDS)	Within the MITADER, the FNDS ensures the overall strategic guidance and coordination of all REDD+ activities implementation. **The FNDS is responsible for the management of the ER Program, with technical and financial coordination**, including overall planning, quality oversight, communication, safeguards management, reporting, procurement, financial management, monitoring of activities and monitoring and reporting of progress on a regular basis. It aims to provide support to all institutions engaged in REDD+ projects and to establish, operationalize and ensure the maintenance of the components of the National MRV System. It is also responsible for managing the national REDD+ Programs and Projects Data Management System. Its role is important on issues related to the monitoring and verification of the ERs generated by the ZILMP, in collaboration with other MRV engaged entities (such as DINAB). It will also be responsible for screening and approving all projects that could contribute to ER objectives within the ER Program. It will work closely with some of MITADER's technical directorates, mainly the National Department of Forests (DINAF), the National Department of Land (DINAT), the National Direction for Rural Development (DNDR) as well as with the AQUA and ANAC (see below). The FNDS also liaises with other ministries such as MASA and MIREME and their associated Directorates and agencies, and is responsible for the development and implementation of the MRV system for REDD+.	
			Directorate for the Mobilization of Funds (PMR)	Within the FNDS, the PMR is responsible for the management of fiduciary issues. It will manage the financial management of the ER Program.

DESIGNING		**REDD+ National Steering Committee (NSC)**		Created as a result of the merger between the REDD+ CT (which was created by Decree No.70/2013) and the MozFIP NSC (2015), the REDD+ National Steering Committee (NSC) was officially cretaed by the new REDD+ Decree (April 2018) in order to ease cross-sectorial coordination for REDD+ subjects. The NSC is a means of consultation and supervision of REDD+ activities. It is now the overarching consultative and supervising organ of REDD+ activities in Mozambique, with the aim of piloting inter-institutional coordination among all the sectors and stakeholders involved. It comprises government organizations, the private sector, research institutions and civil society organizations, with the overall mandate to support the FNDS in strategic decision-making regarding REDD+ initiatives, including the ER Program. Its main functions are to assume a technical advisory role, to ensure alignment and coordination between the various government programs and liaise with relevant stakeholders.
	MITADER	**MINISTRY OF LAND, ENVIRONMENT AND RURAL DEVELOPMENT**		
		National directorates	**National Direction for the Environment (DINAB)**	The DINAB is the focal point for all relation with UNFCCC. It is especially responsible for the coordination of the registry related to the Clean Mechanisms Projects, and will work closely with FNDS for MRV issues related to the ER Program (see section 9.2) and for the updating of the national REDD+ Programs and Projects Data Management System.
			National Direction for Rural Development (DNDR)	Responsible for the overall definition of rural development initiative with focus on inter-sectorial coordination for the sustainable use of resources and on the promotion of communities' involvement in the process of local rural development.
			National Direction of Lands (DINAT)	Responsible for the management of the national cadaster, the attribution of DUATs and the delimitation of community lands.

		National agencies under the tutelage of the MITADER	**National Department of Forests (DINAF)**	Develop and update standards and procedures on the sustainable management of forest resources, including the national certification scheme. For the ER Program: in charge of the National Forest Inventory and of the designing of the Forest Information System, in cooperation with AQUA.
			National Agency for Conservation Area (ANAC)	The ANAC is under the tutelage of the MITADER and the FNDS and guarantees the effective management of all conservation areas, national parks, sport hunting areas and reserves in Mozambique, including through, *inter alia*, defining priorities for administration and sustainable use of conservation areas, ensuring the protection of biological diversity, licensing hunting and ecotourism activities in conservation areas, managing and training personnel, etc. For the ER Program, the ANAC is responsible for the management of the MozBio project and of the GNR, which is part of the ER Program area – *see section 4.1 for more details*.
			National Agency for Environmental Quality Control (AQUA)	The AQUA is a forest law enforcement agency under the tutelage of the MITADER and is currently developing a new strategy for forest law enforcement in the country. It is notably responsible for the activities of forest patrolling and inspection, prevention and detection, including through the regular assessment of forest concessions and forest operators. Within this mandate, and relevant for the ER Program, AQUA is especially working on the development and implementation of the Forest Information System, in cooperation with DINAF.
	MASA	**MINISTRY OF AGRICULTURE AND FOOD SECURITY**		

	MIREME	National Directorates	National Directorate for Agricultural Extension (DNEA)	Responsible for increasing agricultural productivity, agro-processing and marketing through sustainable exploitation of natural resources with dissemination of good agricultural practices adapted to climate change and contributing to the protection of natural resources.
			National Directorate for Agriculture and Forestry (DNAS)	Responsible for managing all forest plantations in Mozambique for promoting reforestation for conservation, energy, commercial and industrial purposes.
		MINISTRY OF MINERAL RESSOURCES AND ENERGY		
		National Directorates	National Directorate of Energy	Responsible for the promotion of renewable energies in rural areas, the dissemination of new technologies for the production of energy and the coordination of the Inter-ministerial Commission of Bioenergy (CIB).

Table 30: Provincial Management of the ER Program

Provincial Management of the ER Program			
Piloting of the ER	PROVINCIAL GOVERNEMENT OF ZAMBEZIA		
		Provincial	In charge of implementing MITADER's policies at provincial level and coordination the ER

Coordination of the ER Program		**Direction of Land, Environment and Rural Development (DPTADER)**	Program activities in Zambézia.	
			Program Implementation Unit (PIU)	Under the supervision of DPTADER, the PIU is in charge of coordinating MozFIP activities and ER Program interventions and of monitoring project implementation progress at the provincial level. The PIU reports to the FNDS and to the DPTADER and have regular meetings with the provincial governors. It also interfaces with the district authorities, especially SDAE.
	Zambézia MSLF	Also plays an important role in project coordination and in promoting integrated landscape management, through public consultation and forums, engaging the various stakeholders on decisions relating to integrated development programs and REDD+ projects. The findings of the consultation are published and serve as significant basis for the design of REDD+ projects and programs. As explained in section 5, the Zambézia MSLF is expected to enhance the coordination of projects and other initiatives in the landscape by facilitating the establishment of a common vision and knowledge exchange.		

Table 31: Local implementation of the ER Program

Local implementation ER Program activities			
Local Implementation	**PROGRAM IMPLEMENTATION UNIT (PIU)**	Overall coordination of the implementation of the ER Program activities under consultation with MSLF and especially responsible for the implementation of activities related to community awareness with the consolidating of the Zambézia MSLF (EA-A3) and to the implementation of geospatial tools (EA-B2).	
		Local administration	Implementation of ER Program activities related to local capacity building for CGRNs and communities (EA - B3); local workshop, training and consultations (EA-B3); community land delimitation, community land use plans and process of DUATs (EA-B1); the implementation of

	and State bodies	geo-spatial tools (EA-B2); the protection of conservation areas (EA-C1); the valorization of income generating potential of the GNR (ERI-D5).
	Service Providers	Implementation of all ER Program activities, and especially those related to the restoration of natural habitats through ANR and plantations (ERI-D3); the promotion of agro-forestry systems and conservation agriculture (ERI-D1); the structuring of key value chains (ERI-D2); the establishment of multi-purpose plantations (ERI-D3); the promotion of sustainable charcoal production (ERI-D4). Service providers will also support activities implemented by local administration and state bodies (see above).
	Local communities, Civil society and smallholders	Local communities, smallholders and the civil society will be directly involved in much of the activities of the ER Program whose good implementation will depend on their commitment, including those related to: community awareness and capacity building (EA-A1), trough their participation in the MSLF, workshops, training, etc.; land tenure (EA-B1), trough their participation in the application of community land use plans; the restoration of natural habitats through ANR, agro-forestry systems and conservation agriculture (ERI-D1), the structuring of key value chains (ERI-D2) and sustainable charcoal production (ERI-D4) through their adoption and application of sustainable techniques.

6.2 ER Program budget

The ER Program budget is based on associated projects' budgets

As explained before, this ER Program builds on already designed and funded World Bank programs, namely: Sustenta 1 and Sustenta 2, MozFIP, MozDGM and MozBio. As a consequence, with the exception of a few activities, all the activities comprised in the ER Program were defined in the projects' respective Program Appraisal Documents (PAD). Their costs (institutional cost or implementation cost) were assessed in the same documents. It should be noted that only part of the activities and associated investments comprised in Sustenta 1 & 2, MozFIP, MozDGM and MozBio will contribute to the ER Program, while others are implemented out of the ER Program area. **In other words, the totality of the ER Program interventions (ERIs) are part of, and financed by, Sustenta 1 & 2, MozFIP, MozDGM and MozBio - but some of those projects also extend beyond the ER Program area**. The proposed financing plan is based on the financing plans of the WB programs as presented in their PAD. The contribution of each activity of these projects to the ER Program was estimated (in percentage) and broken-down along the lifetime of the program, accordingly with the example given in Box 7.

Box 7: Example of the contribution of a MozFIP activity to the ER Program financing plan

MozFIP has a "Community land delimitation with community delimitation certificates, community land-use plans and strengthening of community-based organizations" activity for an estimated cost of 2,093,000 USD. One half of this activity is implemented in Cabo Delgado and the other half is implemented in the ER Program area, contributing to the Enabling Activity B1 (ER-B1) "Regularizing land tenure": 50% of the cost was affected to the ER Program Financing plan and broken-down along the lifetime of the MozFIP program.

No financial gap for investments until 2022

As shown in the table below, **the total costs of the ER Program amount to 51 MUSD. Currently, the total identified sources of funding represent 50 MUSD and, until 2022, there is no identified financial gap for the investments activities[49], as MozFIP is expected help cover any potential shortfall linked to institutional and transaction costs of the ER Program**. The 1 MUSD gap from 2022 onwards is mainly due to running costs of the MRV system and other institutional mechanisms linked to the FCPF carbon fund requirements. However, this gap could be reduced through additional projects forecasted, through national budget allocation or from the revenues of the sale of ERs. This revenue has not been put into the table below as no sales are contracted so far. It is important to note that the draft benefit sharing agreement foresees to use a share of the proceeds to pay for running costs of the ER Program such as the implementation of the MRV system - *see section 15*. **In order to put in place the BSM, 5MUSD will be requested as an advance payment[50].**

---

[49] For the development and implementation of the BSM, additional costs are expected, which will be defined in the coming months, before ERPA signature.

50 For now, the ER Program budget does not reflect this possible advance payment, which is yet to be discussed. If it were confirmed, the ER Program budget would be updated accordingly.

At this stage, it should also be reminded that, because the totality of ER Program interventions and enabling activities are those already defined and budgeted in the World Bank projects, no risk of double financing with ER payments from the FCPF is forecasted. Indeed, for now, no additional activities are planned under the ER Program that is not already clearly budgeted in the financial plan of the associated projects. In other words, the ER payments will not be used to finance the ER Program interventions and enabling activities described in section 4.3. However, results paid for by the FCPF will represent an additional source of income that will be used for benefit sharing purpose, according to the Benefit Sharing Plan, but also to enable a possible upscale of the ER Program to incorporate new and additional land-based activities and projects or, if relevant, to extent ER Program interventions to additional areas. ER payment will be closely monitored by the FNDS in order no to go to the same activity.

National contribution from the Government of Mozambique

Although, as shown above, financial support for the ER Program has been provided by World Bank projects, the GoM is assuming a significant part of this investment through in-kind contribution and financial involvement. First, the political commitment of the GoM to the ER Program was demonstrated in section 2 of this ER-PD. It was especially obvious in the creation of the MITADER and of the FNDS, but also in the creation and operationalization of AQUA - currently developing a new strategy for forest law enforcement in the country[51] - and in relevant actions that were undertaken by the GoM in the past two years[52] - *see section 2 for more details*. In addition, in-kind contribution will be provided via the GoM's support to the staff that will be mobilized through the ER Program implementation, may it be in terms of salaries and/or time allowance. They include the technical team at central and provincial levels (FNDS, PIU) the provincial and local governmental staff in Zambézia (DPTADER, SDAE), but also the extension agents engaged in land-based activities – *see section 4.3 for ER interventions.* Finally, with the exception of the MozBio project, the other projects that are being implemented as part of the ZILMP encompass a significant part of loan contracted by the GoM. The loan part of the MozFIP project represents 70.5% of its total budget; the loan part of the Sustenta project represents 35% of its budget. Those loans can arguably be considered as co-financing from the GoM.

Table 32: Repartition of the credit and grant parts of ER Program's projects budgets

In USD	**Total budget**	**Credit**		**Grant**	
		Volume	*Percentage*	*Volume*	*Percentage*
Sustenta	40	14	**35%**	26	65%
MozFIP	40	28.2	**70.5%**	11.8	29.5%
MozDGM	4.5	0	0%	4.5	100%
MozBio	46.3	0	0%	46.3	100%

[51] *It is notably responsible for the activities of forest patrolling and inspection, prevention and detection, including through the regular assessment of forest concessions and forest operators.*

[52] *MITADER already adopted several strategic actions to address challenges in the forest sector, including a participatory audit of all forest concessions, the suspension of new requests for exploration areas, a ban on log exports, the updating of forest policies and regulations, and an ambitious project called "Floresta em Pé" (already mentioned in 2.1), which aims to promote sustainable integrated rural development though the protection, conservation, valorization, creation and sustainable management of forests – see section 4.1*

In US Dollars

Item	Activity	2017	2018	2019	2020	2021	2022	2023	2024	2025	Total
Institutional costs	EA - A1: Coordination and management of activities	1 012 792	1 012 792	1 012 792	1 012 792	1 012 792	250 000	250 000	250 000	250 000	**6 063 960**
	EA – A2: Institutional development and strengthening and inter-sectorial communication	164 492	164 492	41 992	41 992	41 992	-	-	-	-	**454 960**
	EA – A3: Community awareness and capacity building – ensuring stakeholders' involvement and participation in the ER Program	345 000	345 000	320 000	320 000	320 000	-	-	-	-	**1 650 000**
	Implementation of Benefit Sharing Plan and Safeguard Plan	50 000	50 000	50 000	50 000	50 000	50 000	50 000	50 000	50 000	**450 000**
	Implementation of the feedback and grievance redress mechanism	50 000	50 000	50 000	50 000	50 000	50 000	50 000	50 000	50 000	**450 000**
	Sub-total - Institutional costs	**1 622 284**	**1 622 284**	**1 474 784**	**1 474 784**	**1 474 784**	**350 000**	**350 000**	**350 000**	**350 000**	**9 068 920**
Implementation costs	EA – B1: Regularizing land tenure	924 800	924 800	924 800	924 800	924 800	-	-	-	-	**4 624 000**
	EA - B2: Improvement of districts land use planning & promotion of community level land use planning	426 820	426 820	426 820	426 820	426 820	125 000	125 000	125 000	125 000	**2 634 100**
	EA– C1: Enhanced Protection of conservation areas	185 000	185 000	-	-	-	-	-	-	-	**370 000**
	EA – C2: Strengthening of forest governance, transparency and forest management	402 338	402 338	402 338	402 338	402 338	-	-	-	-	**2 011 688**

	ERI-D1: Promotion of conservation agriculture and agroforestry system	770 999	770 999	770 999	770 999	770 999	-	-	-	-	**3 854 995**
	ERI-D2: Structuring of key sustainable value chains (forestry-based value chains) for cash crops and support to the establishment of commercial agriculture in areas with no forest cover	1 200 000	1 200 000	1 200 000	1 200 000	1 200 000	3 375 000	3 375 000	3 375 000	3 375 000	**19 500 000**
	ERI-D3: Promotion of multipurpose plantations and restoration of degraded areas	1 119 405	1 119 405	1 119 405	1 119 405	1 119 405	125 000	125 000	125 000	125 000	**6 097 025**
	ERI-D4: Promotion of sustainable charcoal production	50 000	50 000	50 000	50 000	50 000	-	-	-	-	**250 000**
	ERI – D5: Valorization of the income generating potential of the GNR and sustainable livelihood around the GNR	372 000	372 000	-	-	-	-	-	-	-	**744 000**
	Sub-total - Implementation costs	**5 451 362**	**5 451 362**	**4 894 362**	**4 894 362**	**4 894 362**	**3 625 000**	**3 625 000**	**3 625 000**	**3 625 000**	**40 085 808**
Transaction costs	Costs to design REL/ RL	96 870	96 870	96 870	96 870	96 870					**484 350**
	Costs of MRV	100 000	100 000	100 000	100 000	100 000	100 000	100 000	100 000	100 000	**900 000**
	Legal and contractual costs	25 000	25 000	25 000	25 000	25 000	25 000	25 000	25 000	25 000	**225 000**
	Costs related to registry	25 000	25 000	25 000	25 000	25 000	25 000	25 000	25 000	25 000	**225 000**
	Sub-total - Transaction costs	**246 870**	**246 870**	**246 870**	**246 870**	**246 870**	**150 000**	**150 000**	**150 000**	**150 000**	**1 834 350**
	Total costs	**7 320 516**	**7 320 516**	**6 616 016**	**6 616 016**	**6 616 016**	**4 125 000**	**4 125 000**	**4 125 000**	**4 125 000**	**50 989 078**

Sources of finance - National	National budget	-	-	-	-	-	-	-	-	-	**-**
Sources of finance - International	Multilateral Sustenta 1	3 100 000	3 100 000	3 100 000	3 100 000	3 100 000	-	-	-	-	**15 500 000**
	Multilateral Sustenta 2	-	-	-	-	-	3 875 000	3 875 000	3 875 000	3 875 000	**15 500 000**
	Multilateral MozBio	704 500	704 500	-	-	-	-	-	-	-	**1 409 000**
	Multilateral MozDGM	320 000	320 000	320 000	320 000	320 000	-	-	-	-	**1 600 000**
	Multilateral MozFIP	3 196 016	3 196 016	3 196 016	3 196 016	3 196 016	-	-	-	-	**15 980 078**
	Sub-total - international	**7 320 516**	**7 320 516**	**6 616 016**	**6 616 016**	**6 616 016**	**4 125 000**	**4 125 000**	**4 125 000**	**4 125 000**	**50 989 078**
Revenue from products & services		-	-	-	-	-	-	-	-	-	**-**
Revenue from emission reductions	Revenue from emission reductions contracted	-	-	-	-	-	-	-	-	-	**-**
	Total financing sources	**7 320 516**	**7 320 516**	**6 616 016**	**6 616 016**	**6 616 016**	**3 875 000**	**3 875 000**	**3 875 000**	**3 875 000**	**49 989 078**
	Gap						**(250 000)**	**(250 000)**	**(250 000)**	**(250 000)**	**(1 000 000)**

7. CARBON POOLS, SOURCES AND SINKS

7.1 Description of sources and sinks selected

According to criterion 3 of the FCPF MF (FCPF, 2016a), several sources and sinks can be accounted for. Degradation is required to be accounted for if it is significant (i.e. if it represents 10% of total forest-related emissions in the Accounting Area during the Reference Period). Justification for inclusion of sources and sinks is provided hereafter:

- **Deforestation**: Deforestation must be included;
- **Forest degradation**: In the ER Program area, forest degradation is mainly caused by forest exploitation and, to a lesser extent, by charcoal production. Emissions related to those two sources were estimated in the ZILMP Background Study (Mercier et al., 2016). However, it is likely that emissions related to charcoal production have been overestimated because tree cuts for this production were accounted for separately from slash-and-burn agriculture whereas, on the fields, it can actually be observed that charcoal is produced on land areas that would deforested for agriculture purpose the same year or the year after. Hence, charcoal production is more to be considered as part of the slash-and-burn cycle (occurring at the beginning of the cycle) and as a by-product of agriculture, which is itself the main cause of deforestation. As a consequence, the impact of charcoal production on the ER Program emissions is already accounted for in the estimation of emissions due to deforestation and it was decided to not include it as a source of emissions related to degradation (which is conservative).

  Two options to estimate emissions related to forest exploitation were considered and are summarized hereafter. The analysis based on exploited volume (as presented in the ZILMP Background Study) is detailed in Annex 3. Since those emissions represent less than 10% of global program emissions, it was decided to not include forest degradation in the sources of emissions for the ER Program. Moreover, small-scale agriculture being the main cause of deforestation, there is no indication that measures intended to reduce deforestation would result in leakage towards degradation. Rather, with the ER Program enabling activities such as land tenure clarification or national policies to reduce illegal logging, both deforestation and degradation would probably be reduced if the program succeeds. Hence, it is conservative to not account for degradation and it is estimated to not be a significant source for the following reasons:

  - While analyzing the factors to delimitate intact and degraded forest, we considered distance to anthropic activities (i.e. distance to deforestation patches of deforestation) or to forest edge in relation to carbon stocks – from biomass inventory data for the present program. It shows that proximity to anthropic activities or to forest edge does not have a significant impact on carbon stocks. Moreover, carbon stocks have an unexpected negative correlation to distance of deforestation patches. On this basis, it is not possible to delimitate degraded forest with the indirect approach of the GOFC-GOLD.
  - As a consequence, the method presented in the ZILMP Background Study (Mercier et al., 2016) using exploited volumes seems to be the most suitable. Based on estimation of exploited volumes in Zambezia (legal and illegal logging)

with secondary data from the literature, it gives an estimation of emissions due to forest exploitation in the accounting area of 37,945 tCO_2e (Mercier et al., 2016), which corresponds to less than 10% of emissions due to deforestation. The method to estimate those emissions is described in Annex 3.

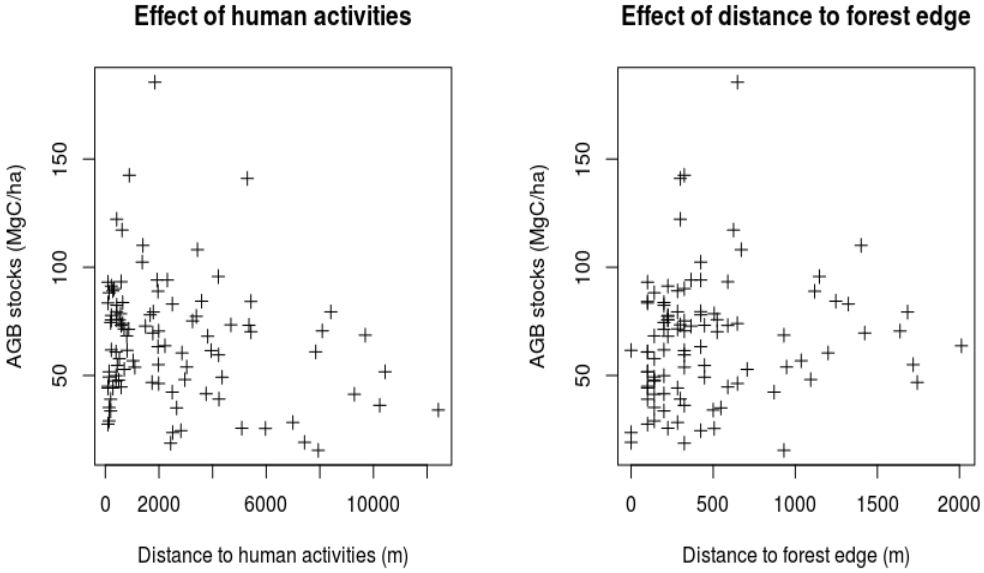


Figure 16**:** Relation of carbon stocks in forest inventory plots and distance to deforestation patches (left) and forest edge (right)

- **Enhancement of carbon stocks**: This activity can encompass carbon sequestration through tree plantation or assisted regeneration of natural forest (non-forestland to forestland or in forestland remaining forestland). It was decided to not account for enhancement of carbon stocks. First, this decision is conservative; second, these sinks are not considered as sufficient in the accounting area:
    - Some plantations exist in the ZILMP area, but not all of them respect the UNFCCC safeguards requiring that activities included in REDD+ programs do not lead to the conversion of natural forest. In addition, in the ZILMP Background Study, emission reductions potential associated with carbon stock enhancement was not estimated as significant enough (Mercier et al., 2016).
    - Although assisted natural regeneration activities are part of the proposed ER Program interventions (see section 4.3), the few areas managed for natural regeneration actually represent a small part of the ER Program area. They would be limited to 1,000 ha. Carbon sequestration for such an area, based on inventories on follows (*see following section*) would not be significant enough.
- **Sustainable management of forests:** Although some ER Program activities focus on improved forest management and planning, those would only result reduced degradation that is not accounted for. Moreover, it is conservative to not include this activity.
- **Conservation of carbon stocks:** in the ER Program accounting area, this would concern the Gilé National Reserve. Since its creation the GNR has proved to have efficiently maintained its forest cover (except for forest degradation due to illegal logging of specific tree species) in its central zone. However, a REDD+ project is developed in its buffer zone – where deforestation does occur – and the GRN will benefit from the program funds

through its performance in reducing deforestation in this area. No additional accounting of conservation efforts was therefore included in the ER-Program.

At national level, for the development of national forest reference level (FRL), degradation and enhancement of carbon stocks will be analyzed, but results will only be available in 2018 (see R-Package). As the MF does not accept the inclusion of new activities or pools in the update of the historical reference level, those results will not be include in the program baseline. However, the evolution of those sources and sinks, analyzed at national level, will feed the program strategy that can evolve if they become significant in the future. The method planned for the analysis is described in the monitoring section - *see section 9.*

Table 33**:** Selection of REDD+ activities

REDD+ Activities	Included?	Justification / Explanation
Emissions from deforestation	**Yes**	At a minimum, ER Programs must account for emissions from deforestation.
Emissions from forest degradation	No	Not significant in the accounted area; it is conservative not to include it.
Enhancement of carbon stocks	No	It is conservative to not include it.
Sustainable management of forests	No	Not a sufficient level of effort to be included.
Conservation of carbon stocks	No	Reward of the GNR's conservation effort through monitoring of performance to reduce deforestation in its buffer zone.

7.2 Description of carbon pools and greenhouse gases selected

According to the criterion 4 of the FCPF MF (FCPF, 2016a), significant carbon pools - i.e. carbon pools that contribute for more than 10% to total emissions - should be accounted for. They can otherwise be excluded if it is a conservative choice. For this ER Program, the following carbon pools can be selected:

- **Biomass in trees**:
    - Aboveground biomass (AGB): This pool is automatically considered.
    - Belowground biomass (BGB): This pool is usually significant in the case of deforestation because BGB is supposed to degrade itself after tree cut.
- **Biomass in non-woody vegetation**: This pool is usually non-significant and it is conservative to exclude it.
- **Dead organic matter (DOM),** which includes litter and dead wood carbon pool, is probably not significant as dead wood is collected for firewood or burnt during bush fires of the dry season. Although it is conservative to not account for this pool in the ER Program RL, it will be considered in the National Forest Inventory (currently under development - its results should be available in 2018) and will be estimated during national MRV. However, it will not be included in the program as the MF does not allow for inclusion of new pool during the revision of the REL.

- **Soil organic carbon (SOC)** is not included as it is conservative and it is considered to not be significant for the following reasons (no specific inventories for soils was made for the present document but data are available in the literature):
    - Woollen et al. (2012) sampled soil carbon stocks in the Miombo forest in Mozambique (in the Gorongosa National Park – soils range from sandy and ferralytic to more hydromorphic, which is comparable to the global situation of the ZILMP area) and found an average of 12.1 tC/ha (± 0.6 tC/ha) in the top 5 cm and 40.1 tC/ha (± 2.5 tC/ha) in the top 30 cm. Ryan et al. (2010) found that, between 0 and 50 cm, the average carbon stock in soil was 76.3 tC/ha in Sofala Province.
    - Williams et al. (2008) also conducted a soil carbon stocks analysis in forests and in post deforestation areas such as abandoned *machambas* (from 2 to 20 years) in Mozambique (Sofala Province). He unexpectedly concluded that post deforestation dynamic was flat: there was no progressive decrease in soil carbon after fields' abandonment. However, he underlined a clear decrease of soil carbon between forests (but no average is available from his results for the Miombo forest – median was 57.9 tC/ha) and abandoned fields. According to his results, the average for post deforestation soil carbon is 45.2 tC/ha (± 14.1 tC/ha).
    - Etc Terra realized an inventory around the GNR for the development of the Gilé REDD+ project. Although it is uncompleted, this inventory is interesting because it is situated in Zambézia province. The results show very low carbon stocks in soil organic matter: 14.3 tC/ha (± 9.2 tC/ha) for soil in the Miombo forest and 9.2 tC/ha (± 16.5 tC/ha) for soils in post-deforestation lands, resulting in a difference of 5.1 tC/ha or 18.7 tCO_2eq/ha.
    - It is not possible to establish emission factors with those estimations as they all use different methods in various locations in Mozambique. However, it appears that carbon stocks in the Miombo forest are relatively low and that the difference with soil carbon stocks in post-deforestation lands is also small. According to FCPF Methodological framework (criterion 4.2), a pool must be included if it contribute to 10% of the global emissions. As activity data are the same for carbon stocks changes in biomass and in soils, the criterion can be interpreted as 10% of emissions factor: emission factor for soil should be above 23.7 tCO_2eq/ha, which is unlikely according to the results presented in the literature.

In the present document, only the first pool (biomass in trees, AGB and BGB) is considered as significant. It is conservative to ignore the others in the baseline (Mercier et al., 2016). However, the National Forest Inventory (NFI), which currently is under development - its results should be available end of 2018 - will measure DOM and SOC. Although the NFI will therefore provide for updated data about the significance of these pools, **they will remain excluded under the ER program.**

Table 34: Selection of carbon pools

Carbon pools	Selected?	Justification / Explanation
Aboveground biomass in trees	**Yes**	Most significant pool.
Belowground biomass in trees	**Yes**	Significant pool related to the previous one/
Biomass in non-woody vegetation	No	Not significant in comparison to biomass in trees.
Dead organic matter	No	Not significant as litter is reduced (burnt frequently during the dry season) in Miombo forest and dead wood is collected for firewood or burnt during dry season.
Soil organic carbon	No	Data from literature show that this pool is not significant: emission factors related to SOC would be between 5.1 tC/ha (Mercier et al., 2016) and 12.7 tC/ha (Williams et al. 2008a).

Sources of greenhouse gas (CO_2, CH_4 or N_2O) emissions except from deforestation - conversion of land from forest to non-forest (mainly agricultural land) - can be the following:

- **Biomass burning**: Biomass is burnt every year in the ER Program area during the conversion of forest into fields *via* "slash and burn" agriculture, or during the non-woody vegetation on forest-land - this activity that does not cause deforestation as Miombo forest is adapted to fires.
    - Although CO_2 emissions due to deforestation are automatically accounted for, this is not true for CH_4 and N_2O emissions because they are not significant enough (less than 10%). An estimation was done with the following equation and standard values from IPCC (2006) for combustion factor[53] and IPCC (2003) for emission factor and global warming potential of CH_4 and N_2O on all deforested areas considered to be converted for slash and burn agriculture. It gives a result of 5% of total program emissions due to deforestation. Moreover, it is conservative not to account for it as the ER Program, in any case, also aims to reduce fires and related emissions.
    - Emissions due to other gas (CH_4 or N_2O) related to fires in forest or non-forests areas (Figure 17). As explained, this does not cause deforestation or degradation as only the herbaceous biomass (estimated to 8.7 tdm/ha – GIEC, 2003) burns. However, it causes every year greenhouses gas emissions but they correspond to less than 10% of emissions due to deforestation: in average (2001-2016) 3% of total emissions from fires in forests remaining forests and 9.7% of total emissions from all fires of the ZILMP area, including fires in savannah. Burnt areas were estimated with MODIS products (MCD45A1) over the period of reference on the whole ER Program accounting area. Results are presented in Figure 17. Forest map used for this analysis is the one produced for the background study but

[53] *0.45 for open tropical forest*

extended to the whole program area as it is currently the most recent forest map (forest cover in 2014 - Mercier et al., 2016).

$$E_{biomassburn,i,t} = \sum_{g=1}^{G} \left(\left(\left(A_{burn,i,t} \times B_{i,t} \times COMF_i \times G_{g,i} \right) \times 10^{-3} \right) \times GWP_g \right)$$

Where:

$E_{biomassburn,i,t}$	Greenhouse gas emissions due to biomass burning as part of deforestation activities in stratum *i* in year *t* of each GHG (CO_2, CH_4, N_2O) (t CO_2e)
$A_{burn,i,t}$	Area burnt for stratum *i* in year *t* (ha)
$B_{i,t}$	Average aboveground biomass stock before burning stratum *i*, year (t d.m. ha^{-1})
$COMF_i$	Combustion factor for stratum *i* (unitless)
$G_{g,i}$	Emission factor for stratum *i* for gas *g* (kg t^{-1} d.m. burnt)
GWP_g	Global warming potential for gas *g* (t CO_2/t gas g)
g	1, 2, 3 ... *G* greenhouse gases including carbon dioxide[1], methane and nitrous oxide (unitless)
i	1, 2, 3 …*M* strata (unitless)
t	1, 2, 3, … *t** time elapsed since the start of the project activity (years)

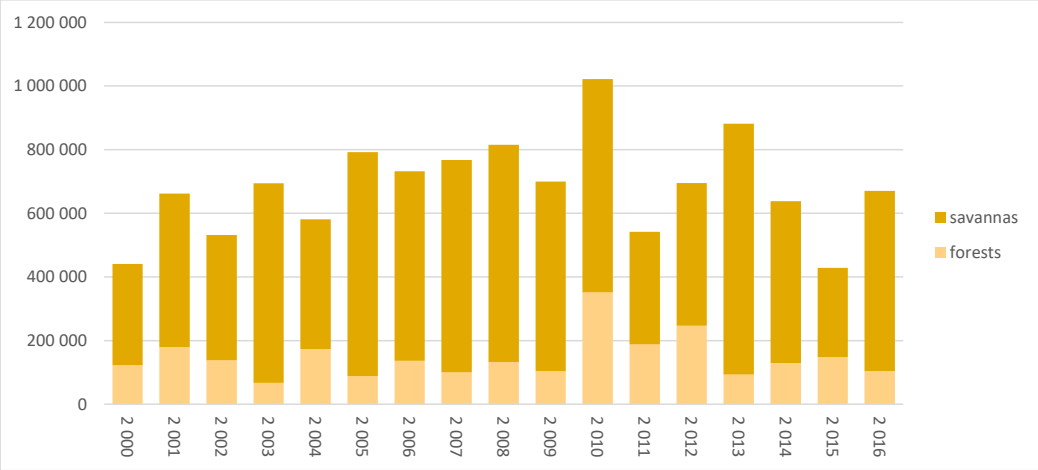


Figure 17: Areas burnt every year on forests remaining forests or on savannas from MODIS burnt area product (in ha)

Table 35: Selection of greenhouse gases

Greenhouse gases	Selected?	Justification / Explanation
CO_2	**Yes**	The ER Program shall always account for CO_2 emissions and removals.
CH_4	No	Source of emission from this gas are not significant in the context of the ZILMP.
N_2O	No	Source of emission from this gas are not significant in the context of the ZILMP.

8. REFERENCE LEVEL

8.1 Reference Period

According to the indicator 11.1 of the FCPF MF (FCPF, 2016a), the end-date for the Reference Period is "the most recent date prior to two years before the TAP starts the independent assessment of the draft ER Program Document". Since this assessment is expected to take place in 2017, the end date for the ER Program Reference Period should be 2015. In the same way, indicator 11.2 requires the start date of the Reference Period to be about 10 years up to 15 years (with convincing justification) before the end date.

As a consequence, the Reference Period used in the construction of the Reference Level for the ER Program should be 2005 – 2015. However, as stated in criterion 11 of the FCPF MF, alternative start and end dates could be allowed if justified, with the necessity for the start date to never exceed 15 years prior to end date.

At this stage, it should be noted that Mozambique has recently undertaken a thorough analysis of historical deforestation in order to establish its national FREL/FRL. This analysis is composed of a historical analysis of deforestation as described in the RL section and of the production of a LULC map with Sentinel 2 images to delimitate forest strata and produce Activity Data. In order to guarantee full alignment of the jurisdictional reference level with the national FREL, the data produce at national level are used in the present document**.**

The program RL and MRV system is based on the national FREL/FRL and NFMS. The historical analysis of Activity Data at national level uses the reference period 2001-2016 and the MRV system will be based on the LULC reference map produced with 2016 Sentinel-2 and Landsat data (most recent date for which forest-cover data is available to enable IPCC Approach 3) as described hereafter in the RL section.

Thus, in order to respect the FCPF MF, data for the ER Program RL have been extracted from national FREL/FRL for the Program accounting area and for the period 2005-2015.

8.2 Forest definition used in the construction of the Reference Level

According to the national REDD+ strategy and to the Final Report on Forest Definition (Falcão and Noa, 2016) approved by MITADER in November 2016, forest in Mozambique is defined as followed: **minimum surface of 1 ha, minimum height at maturity of 5 m and minimum coverage of tree of 30%**. This definition is the one used in the present document. As a consequence, for the production of deforestation map, minimum mapping unit was 1 ha, as explained in the following section.

The 2006 IPCC Guidelines considers the following land-use categories for greenhouse gas inventory reporting:

(i) **Forest Land**: This category includes all land with woody vegetation consistent with thresholds used to define Forest Land in the national greenhouse gas inventory. It also includes systems with a vegetation structure that currently fall below, but which *in situ* could potentially reach the threshold values used by a country to define the Forest Land category.

(ii) **Cropland**: This category includes cropped land, including rice fields, and agro-forestry systems where the vegetation structure falls below the thresholds used for the Forest Land category.

(iii) **Grassland**: This category includes rangelands and pasture land that are not considered Cropland. It also includes systems with woody vegetation and other non-grass vegetation such as herbs and brushes that fall below the threshold values used in the Forest Land category. The category also includes all grassland from wild lands to recreational areas as well as agricultural and silvo-pastoral systems, consistent with national definitions.

(iv) **Wetlands**: This category includes areas of peat extraction and land that is covered or saturated by water for all or part of the year (e.g. peatlands) and that does not fall into the Forest Land, Cropland, Grassland or Settlements categories. It includes reservoirs as a managed sub-division and natural rivers and lakes as unmanaged sub-divisions.

(v) **Settlements**: This category includes all developed land, including transportation infrastructure and human settlements of any size, unless they are already included under other categories. This should be consistent with national definitions.

(vi) **Other Land**: This category includes bare soil, rock, ice, and all land areas that do not fall into any of the other five categories.

And the following land-use conversions:

(i) FF = Forest Land Remaining Forest Land, LF = Land Converted to Forest Land

(ii) GG = Grassland Remaining Grassland, LG = Land Converted to Grassland

(iii) CC = Cropland Remaining Cropland, LC = Land Converted to Cropland

(iv) WW = Wetlands Remaining Wetlands, LW = Land Converted to Wetlands

(v) SS = Settlements Remaining Settlements, LS = Land Converted to Settlements

(vi) OO = Other Land Remaining Other Land, LO = Land Converted to Other Land

At national level, the classification system was designed to be composed of non-overlapping LULC classes and forest strata, with an independent class for forest systems where cyclical changes in forest cover are present, to be in compliance with both methodological frameworks (FCPF CF and VCS JNR). National LULC classes (level 2) and national subclasses (level 3) and their correspondence with the IPCC classes (level 1) are shown in the following table. The National Classification presented here matches the National (level 2) and Provincial classes (level 3) of the 'Integrated Assessment of Mozambican Forests' (AIFM 2007, Mazorli, A., Rural Consult Lda.,Agriconsulting, Cooperazione Italiana) and the LULC classes (level 3) of the 'Zoneamiento Agroecológico de Moçambique' (ZAEN, 2010-2014). Provincial Forest Inventories conducted by JICA (Japan International Cooperation Agency) in Gaza and Cabo Delgado (2015-2016) and the current National Forest Inventory (2016-2017) use strata that are sets of the classes previously detailed. For REDD+ purposes, non-forest

classes could be aggregated as long as conservative estimates would be used for the whole non-forest class, but disaggregation is a requirement of the 2006 IPCC GL for reporting purposes. Thus, as a first approach, we can consider a sole non-forest class (bringing together Grassland, Cropland, Settlement, Wetland, and Other Land) to estimate EFs, but for the proper performance of the PMRV, also non-forest classes should be disaggregated following National and IPCC classifications.

Forest strata selected in the present document are based on the definition used in the FREL at national level (Table 36) and on the available data for carbon stocks estimation. For the historical AD analysis, forests strata considered are those presented in Table 36 but, since the NFI is not yet finished and carbon stocks estimation from dedicated inventories or bibliography are only available for few strata, they have been merged in 2 strata: Semi-deciduous forests and Evergreen forests (Table 38). According to the national classification, for the historical analysis of Activity Data, the following forest strata have been considered:

- **Semi-deciduous forests** in the ER Program area: open and dense Miombo and open Mopane forests;
- **Evergreen forests** in the ER Program area: open and close montane forests, open and closed coastal forests and gallery forests;
- **Mangroves** are present in the ZILMP area and are accounted for.

The definition of strata will be updated before the first monitoring event when results from the LULC benchmark map and the NFI will be available. Strata with significantly different carbon stocks will be defined on the basis of those results to stratified forest of the ZILMP accounting area.

Table 36: Classification used for the LULC map production at national level (From R-Package – Annex 6)

Level1 IPCC		**Level2 National Classification**		**Level 3 National Classification**	
1	**Cropland**	1TCF	Tree crops	1TCF	Tree crops
		1FC	Field crops	1FC	Field crops
				1SCT	Shrub Plantation (Tea)
				1FCR	Rainfed field crops
				1FCI	Irrigated field crops
				3AC	Rice crop
		1CXF	Shifting cultivation with open to closed forested areas	1CXF	Shifting cultivation with open to closed forested areas
2	**Forest Land**	1TCW	Forest Plantation	1TCW	Forest Plantation
		2FXC	Forest with shifting cultivation	2FXC	Forest with shifting cultivation
		2FE	Broadleaved (Semi-)	2FE	Broadleaved (Semi-) evergreen

Level1 IPCC		**Level2 National Classification**		**Level 3 National Classification**	
			evergreen closed forest		closed forest
				2DEC	Coastal dense woody vegetation
				4FF	Mangrove dense
				2FEA	Mecrusse dense
				2FEG	Gallery forest
				2FEM	Closed broadleaved (Semi-) evergreen mountaineous forest
		2FD	Broadleaved (Semi-) deciduous closed forest	2FD	Broadleaved (Semi-) deciduous closed forest
				2FDB	Miombo dense
				2FDC	Mopane dense
		2WE	Broadleaved (Semi-) evergreen open forest	2WE	Broadleaved (Semi-) evergreen open forest
				2DEO	Coastal open woody vegetation
				iva4WF	Mangrove open
				2WEA	Mecrusse open
				2WEM	Open broadleaved (Semi-) evergreen mountaineous forest
		2WD	Broadleaved (Semi-) deciduous open forest	2WD	Broadleaved (Semi-) deciduous open forest
				2WDC	Mopane open
				2WDB	Miombo open
3	**Grassland**	2GL	Grasslands	2GL	Grasslands
		2T	Thicket	2T	Thicket
				2TE	Broadleaved (Semi-) evergreen thicket
				2TD	Broadleaved (Semi-) deciduous thicket
		2S	Shrubland	2S	Shrubland
				2SE	Broadleaved (Semi-) evergreen shrubland
				2SD	Broadleaved (Semi-) deciduous shrubland
4	**Wetlands**	4SF	Aquatic or regularly flooded shrublands	4SF	Aquatic or regularly flooded shrublands

Level1 IPCC		Level2 National Classification		Level 3 National Classification	
		4HF	Aquatic or regularly flooded herbaceous vegetation	4HF	Aquatic or regularly flooded herbaceous vegetation
		7WB	Artificial water bodies	7WB	Artificial water bodies
		8WB	Natural water bodies	8WB	Natural water bodies
		17	Salt lake	17	Salt lake
5	**Settlements**	5	Settlements	5	Settlements
6	**Other Land**	6BS	Bare soils	6BS	Bare soils
		6BR	Bare rocks	6BR	Bare rocks
		6SS	Dunes	6SS	Dunes

8.3 Average annual historical emissions over the Reference Period

Description of method used for calculating the average annual historical emissions over the Reference Period

The method used to assess emissions is the one described in IPCC (2006)[54] for Land (Forest in the present case) converted to other land use (croplands) consisting on the **multiplication of activity data** – area of land converted from forestland to other land (cropland in the present case) – **by emission factors** – difference of carbon stocks before and after deforestation – as presented on the following equations. The data used for the present document are Tier 2 (country specific data or country level estimates) or Tier 3 (data specifically produced for the ER Program) when possible. Activity data are produced on the reference period with spatially explicit method based on available satellites images. In compliance with criterion 13 of FCPF MF (FCPF, 2016a) that specifies that REL should not exceed the average annual historical emissions, different activity data of the reference period will be averaged to produce annual deforestation areas over the whole period.

Emissions factors are derived from literature or forest inventory in the accounting area. As analysis is done over the reference period, long term (10 years) changes (increase or decrease) of carbon stocks on deforested areas (land converted to another land use) are considered instead of annual increase or decrease - *see the equation below*.

[54] *Vol. 4, Chapter 2 - Generic*

ANNUAL CHANGE IN BIOMASS CARBON STOCKS ON LAND CONVERTED TO OTHER LAND-USE CATEGORY (TIER 2)

$$\Delta C_B = \Delta C_G + \Delta C_{CONVERSION} - \Delta C_L$$

Where:

ΔC_B = annual change in carbon stocks in biomass on land converted to other land-use category, in tonnes C yr^{-1}

ΔC_G = annual increase in carbon stocks in biomass due to growth on land converted to another land-use category, in tonnes C yr^{-1}

$\Delta C_{CONVERSION}$ = initial change in carbon stocks in biomass on land converted to other land-use category, in tonnes C yr^{-1}

ΔC_L = annual decrease in biomass carbon stocks due to losses from harvesting, fuel wood gathering and disturbances on land converted to other land-use category, in tonnes C yr^{-1}

INITIAL CHANGE IN BIOMASS CARBON STOCKS ON LAND CONVERTED TO ANOTHER LAND CATEGORY

$$\Delta C_{CONVERSION} = \sum_i \{(B_{AFTER_i} - B_{BEFORE_i}) \bullet \Delta A_{TO\_OTHERS_i}\} \bullet CF$$

Where:

$\Delta C_{CONVERSION}$ = initial change in biomass carbon stocks on land converted to another land category, tonnes C yr^{-1}

B_{AFTER_i} = biomass stocks on land type *i* immediately after the conversion, tonnes d.m. ha^{-1}

B_{BEFORE_i} = biomass stocks on land type *i* before the conversion, tonnes d.m. ha^{-1}

$\Delta A_{TO\_OTHERS_i}$ = area of land use *i* converted to another land-use category in a certain year, ha yr^{-1}

CF = carbon fraction of dry matter, tonne C (tonnes d.m.)$^{-1}$

i = type of land use converted to another land-use category

Activity Data estimation

Approach for activity data

Three different approaches to assess activity data can be considered:

1. Measuring total area for each land use category, without information on conversions (only net changes);
2. Tracking of conversions between land-use categories (non-spatially explicit land-use conversion matrix between 2 points in time);
3. Spatially explicit tracking of land-use conversions over time.

At national level, it was decided that the third one is the most desirable to be reached, in order to understand the drivers of deforestation and forest degradation and to plan the adequate mitigation activities. Approach 3 considers two different options for obtaining the activity data: through wall-to-wall mapping or point sampling. The second option was selected as it offers a good ratio between efficacy and accuracy at national level. As previously explained, in order to guarantee the alignment between national and jurisdictional levels, the AD used for the reference level of the ER Program are simply extracted from those produced for the national FREL. National FREL considers a spatially explicit tracking of land-use conversions over time (Approach 3) in order to understand the drivers of deforestation and forest degradation and plan the adequate mitigation activities. It uses a well-designed sampling approach to train a supervised classification of changes on a multi-temporal stack of images results. Result through this sampling approach could also be a map of changes.

The activity data that are presented in the present document are therefore derived from the national FREL/FRL that uses a point sampling method. In parallel, at national level, a national LULC benchmark map for the year 2016 is currently under development with Sentinel 2 images. The map will be available at the end of the year 2017 and will be used for MRV purposes as a benchmark. More information on the production of this map is provided in Section 9.1. **Monitoring will be done from that point forward using a stratified estimator, where forest cover change maps will be used for stratification and reference sampling units will be used for estimating activity data and reporting associated confidence intervals**.

The methods and results described hereafter are extracted from the documents prepared at national level in the context of the development of R-Package (Gonzalo et al., 2017).

Production method of activity data – point sampling method used at national level - For the historical analysis of AD, the entire area of the country has been visually assessed on a 4 x 4 km regular grid at national level - which is the same grid used to allocate the NFI clusters from the Stratified Random Sampling design - using high and medium resolution imagery. The spatial assessment unit is almost the equivalent a 3 x 3 block of Landsat pixels (100 x 100 m) where a plot of the same dimensions and an internal grid of 5 x 5 points is overlapped. This set of data, which characterizes the current LULC and the changes produced in the historical series, will be used to decide the training areas for the LULC 2016 (sentinel-2 benchmark map) and for the image stack of Landsat 8 OLI and Landsat 5 TM (historical AD analysis).

Figure 18: LULC changes detection using Collect Earth Tool. (www.openforis.org). High resolution imagery from Google Earth (From R-Package – Annex 5)

This sampling approach for historical AD calculation based on the regular National 4 x 4 km grid has been designed and conducted using the high and medium resolution images repository available through Google Earth and Earth Engine as a visual assessment exercise. These imagery with the forms designed to collect the LULCC information on the points of the grid are automatically accessible through the Collect Earth tool (www.openforis.org) along with scripts accessible through Earth Engine code that facilitate vegetation type's interpretation (e.g. MODIS or Landsat NDVI time series). Each point of the grid is photo-interpreted thanks to Collect Earth tool and the year and type of changes are also collected.

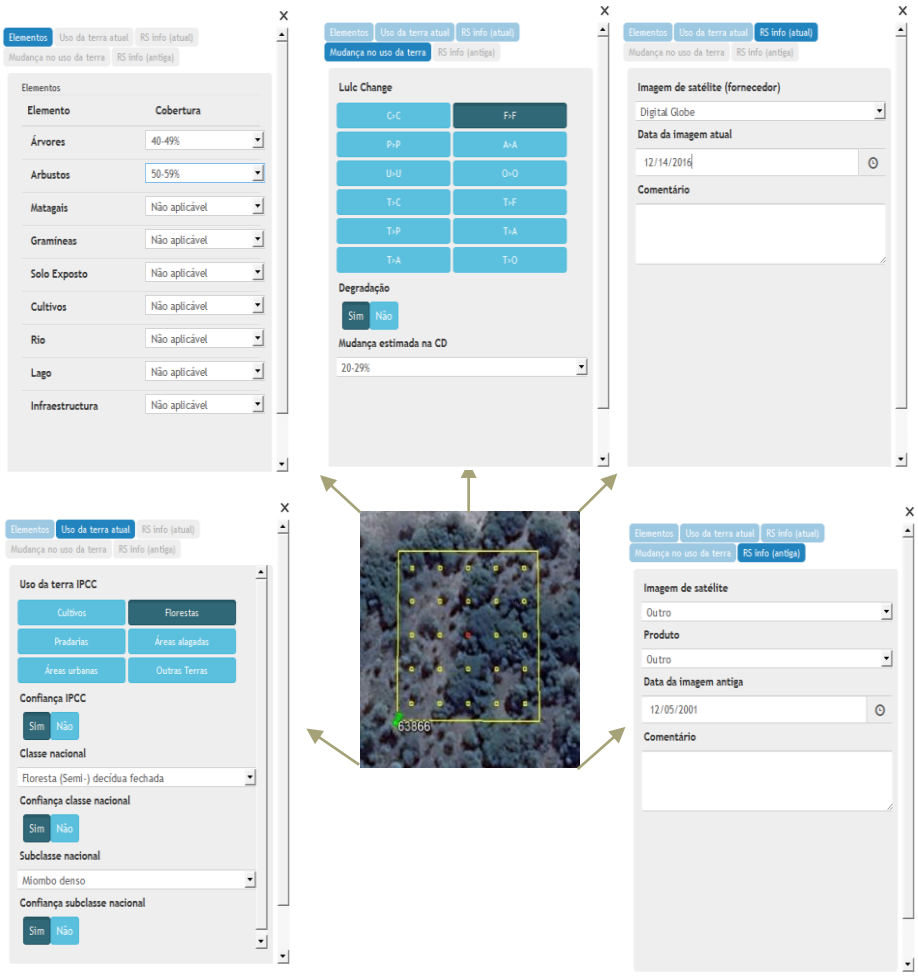


Figure 19: LULC changes detection using Collect Earth Tool. (www.openforis.org). Forms designed with Collect Tool (From R-Package – Annex 5)

The use of various scripts programmed on Earth Engine Code facilitates the interpretation of the vegetation type and the determination of LULC changes. Specifically, the MOD13Q1 (NDVI 16-day Global Modis 250 m) graphic from 2001-2016, most recent Sentinel-2 image, most recent Landsat-8 pan sharpened image, Landsat-7 pan sharpened image (2000, 2004, 2008, 2012), etc.

The completeness of the series is guaranteed using RS products from medium resolution imagery repositories from 2001 (e.g. Annual TOA Reflectance Composite, Annual NDVI Composite, Annual EVI Composite, Annual Greenest-Pixel TOA Reflectance Composite, etc. from Landsat 5 TM) and the most recent Sentinel-2 image from 2016. In this way, a temporal analysis of LULC changes has been completed for each node of the national 4 x 4 km grid (48,894 records). The period of AD analysis could be adapted within the general period 2001-2016 with little effort, due to the operators collecting the date of the LULC change.

Landsat 8 spatial resolution is 30 meters for VNIR and 15 meters for panchromatic. By using this product and Landsat 5 TM (Landsat 7) for historical AD analysis, thanks to its geometrical accuracy of 1 pixel (30m), a MMU of 3 x 3 pixels = 90 m x 90 m = 0.81 ha could be achieved, which is lower than the 1 ha MMU. A subset of these data (30% of points) will be used for validation - *Accuracy assessment method is presented in section 12.*

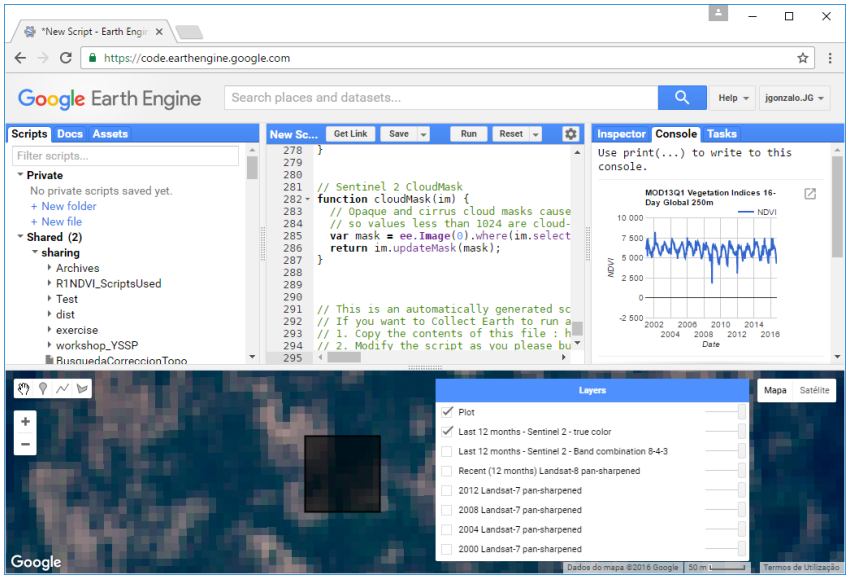


Figure 20: Earth Engine code accessible through Collect Earth Tool. (www.openforis.org). Scripts of NDVI series (From R-Package – Annex 5)

From this National 4 x 4 km grid, 48,894 nodes have been visually evaluated and their information collected in a complete database on LULC changes at the national level. Five trained operators have carried out the activity in approximately 98 effective working days (4.4 months). At jurisdictional level, this corresponds to 3,308 points being interpreted. A small group of expert interpreters was used which were trained in the classification protocols which represents acceptable QC procedures. In terms of QA, a number of samples (aprox. 10%) at national level were re-interpreted to ensure the correct application of the QC procedures.

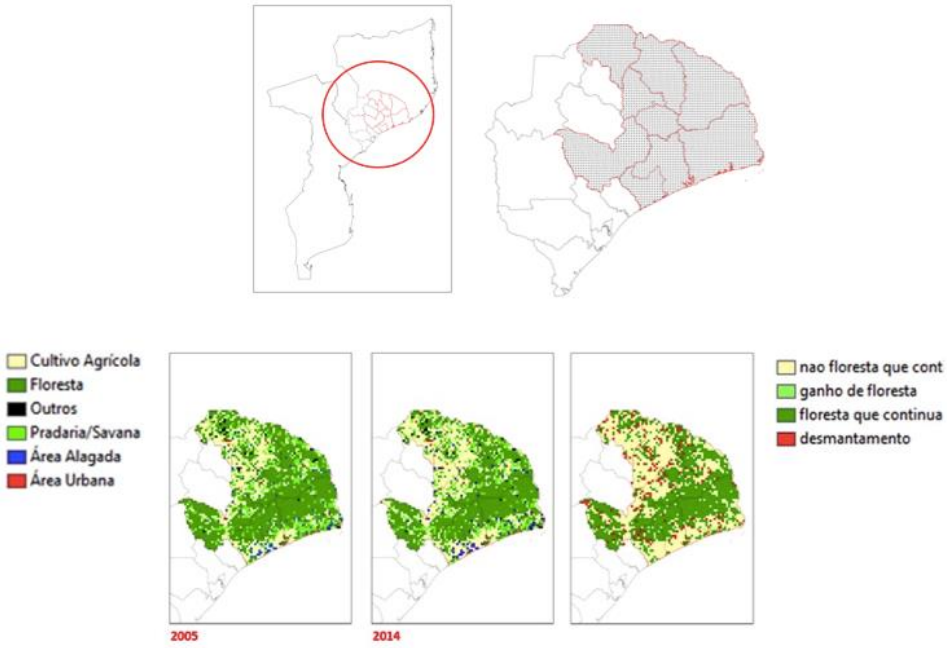


Figure 21: Example of temporal and spatial selection and analysis for the FREL of the Zambezia ER-PD (From R-Package – Annex 5)

Results for Activity Data - The temporal analysis of LULC changes with Collect Earth Tool enables to obtain detailed estimation of annual deforestation rates. For the ER Program area, the results for the 2005-2015 period have been extracted. It is possible to produce a map of forest cover and changes but the resolution is based on the grid for the sampling design, as presented in the following figure.

The results from the point sampling analysis are the annual areas of deforestation over the reference period that have been extracted from national database for the ER Program accounting area the following figure.

From the sample of points, the area for each stratum is calculated as followed:

$$A_i = n_i \frac{A_{ZILMP}}{N}$$

Where:

A_i is the area in hectare of the stratum i

n_i is the number of points collected in stratum i over the reference period

A_{ZILMP} is the accounted area of the program in hectare

N is the total number of points

The annual rate of deforestation per strata corresponds to A_i divided by the number of year in the reference period (=10).

Standard error of this estimation (E_i in %) is calculated for each stratum (i) as followed:

$$E_i = \sqrt{\frac{p_i(1-p_i)}{N-1}}$$

Where

$$p_i = \frac{n_i}{N}$$

The 90% Confidence interval is calculated as followed:

$$CI_{90\%,i}[ha] = 1.64\,.E_i[\%].A_{ZILMP}$$

$$CI_{90\%,i}[\%] = CI_{90\%,i}[ha]/A_i$$

All points used for the present analysis and the related information collected with Collect Earth Tool are available with the MRV team at FNDS.

Total forest cover in the ER Program accounting area is 3,382,328 ha, with 3,137,143 ha of natural forest (semi-deciduous, evergreen and Mangrove forest). It is distributed as follows: 2,328,964 ha in semi-deciduous forests, 755,242 ha in evergreen forests and 52,387 ha in Mangrove forests – *see Table 37*.

Table 37. Forest cover according to the point sampling analysis extracted from national activity data on the ER Program accounting area for 2015

Forest cover class 2015	Points number	Area (ha)	pi	Standard Error (proportion)	Standard Error (ha)	Conf. Interval at 90% (ha)	Error %
Semi-deciduous	*1,289*	*2,328,964*	*0.388*	*0.008449*	*50,773*	*± 83,268.3*	*± 3.58%*
Miombo open	*709*	*1,281,021*	*0.213*	*0.007102*	*42,681*	*± 69,997.6*	*± 5.46%*
Miombo dense	*580*	*1,047,943*	*0.174*	*0.006580*	*39,544*	*± 64,851.8*	*± 6.19%*
Mopane open							
Mopane dense							
Evergreen forests	*418*	*755,242*	*0.126*	*0.005749*	*34,546*	*± 56,655.7*	*± 7.50%*
Montane open	*107*	*193,328*	*0.032*	*0.003060*	*18,389*	*± 30,158.5*	*± 15.60%*
Montane closed	*72*	*130,090*	*0.022*	*0.002524*	*15,167*	*± 24,873.3*	*± 19.12%*
Coastal forest open	*50*	*90,340*	*0.015*	*0.002110*	*12,682*	*± 20,797.7*	*± 23.02%*
Coastal forest dense	*5*	*9,034*	*0.002*	*0.000672*	*4,038*	*± 6,621.8*	*± 73.30%*
Gallery forest	*155*	*280,054*	*0.047*	*0.003655*	*21,967*	*± 36,026.5*	*± 12.86%*
Mangrove	*29*	*52,397*	*0.009*	*0.001612*	*9,689*	*± 15,889.7*	*± 30.33%*
Mangrove open	*8*	*14,454*	*0.002*	*0.000850*	*5,105*	*± 8,372.2*	*± 57.92%*
Mangrove closed	*21*	*37,943*	*0.006*	*0.001374*	*8,255*	*± 13,538.0*	*± 35.68%*
Forest with shifting cultivation	*173*	*312,576*	*0.052*	*0.003851*	*23,142*	*± 37,952.7*	*± 12.14%*
Plantation	*4*	*7,227*	*0.001*	*0.000601*	*3,612*	*± 5,923.6*	*± 81.96%*
Total	**1,884**	**3,404,010**					

Total deforestation between 2005 and 2015 in the ER Program accounting area is 213,202 ha – corresponding to 21,320 ha/yr. It is distributed as follows: 169,839 ha in

semi-deciduous forests, 43,363 ha in evergreen forests and 0 ha in Mangrove forests corresponding to a rate of 16,984 ha/yr, 4,363 ha/yr and 0 ha/yr respectively - *see Table 38*.

Table 38: Results of the point sampling analysis extracted from national activity data on the ER Program accounting area for the period 2001-2015

IPCC category	Points number	Area (ha)	pi	Standard Error (proportion)	Standard Error (ha)	Conf. Interval at 90% (ha)	Error %
Forest -> Non-forest	**118**	**213,202**	**0.035**	**0.003208**	**19,278**	**± 31,616.7**	**± 14.83%**
Semi-deciduous	**94**	**169,839**	**0.028**	**0.002874**	**17,271**	**± 28,324.2**	**± 16.68%**
Miombo open	**64**	**115,635**	**0.019**	**0.002382**	**14,317**	**± 23,479.6**	**± 20.30%**
Miombo dense	**30**	**54,204**	**0.009**	**0.001640**	**9,853**	**± 16,158.9**	**± 29.81%**
Mopane open	0	-	0.000	0.0000	0	± 0	-
Mopane dense	0	-	0.000	0.0000	0	± 0	-
Evergreen forests	**24**	**43,363**	**0.007**	**0.001468**	**8,821**	**± 14,466.1**	**± 33.36%**
Montane open	**10**	**18,068**	**0.003**	**0.000949**	**5,706**	**± 9,357.6**	**± 51.79%**
Montane closed	**3**	**5,420**	**0.001**	**0.000521**	**3,129**	**± 5,130.8**	**± 94.66%**
Coastal forest open	**2**	**3,614**	**0.001**	**0.000425**	**2,555**	**± 4,189.9**	**± 115.95%**
Coastal forest dense	0	-	0.000	0.0000	0	± 0	-
Gallery forest	**9**	**16,261**	**0.003**	**0.000901**	**5,414**	**± 8,878.8**	**± 54.60%**
Mangrove	0	-	0.000	0.0000	0	± 0	-
Mangrove open	0	-	0.000	0.0000	0	± 0	-
Mangrove closed	0	-	0.000	0.0000	0	± 0	-
Forest with shifting cultivation	0	-	0.000	0.0000	0	± 0	-

Plantations	0	-	0.000	0.0000	0	± 0	-

Discussion on mangroves forests – deforestation in mangrove according to the activity data is zero during the period 2005-2015, while the forest cover in 2015 was 52,397 ha ± 15,889 ha at 90% of confidence level. Deforestation in Mangrove is so low that it was not detected by the national grid. In order to confirm whether this is an issue of the design itself or the fact that deforestation is close to zero, a different source was used for comparison purposes.

In the framework of the Background Study (Mercier et al., 2016) for the preparation of the present document, a wall-to-wall map specific to the program area was produced. Government of Mozambique chose to not use this map because, in the meantime, the elaboration of the national FREL started. This map is however used in the present document for estimation of mangroves area and changes. It was produced using a multi-temporal direct detection of land cover and changes based on the algorithm RandomForest (Grinand et al., 2013). Detailed method, data, tools and results are presented in Mercier et al. (2016). Accuracy was estimated following Olofsson et al. (2013), but not covering the whole region of interest but a subset of it where very intense systematic sampling was conducted. The reference period used in this Background Study (2005-2014) is not exactly the same as the one of the ER Program (2005-2015).

Results for mangroves from this wall-to-wall map (Mercier et al., 2016) are an area in 2014 of 53,348 ha and a mean annual rate of deforestation between 2005 and 2014 of 0.52 ha/yr (see following table and Figure 22). These estimates are consistent with the estimates of the national grid which provides a deforestation equal to zero and a forest cover of 50,866 ha ± 18,763.8 ha at 95% of confidence level. Forest cover of Mangrove corresponds more or less to one year of deforestation, showing that deforestation in mangrove would have to increase very significantly to make this emission source as significant.

Table 39: Forest cover and deforestation rates for mangroves (From Mercier et al., 2016)

Areas in ha			
2005	**2010**	**2014**	**Accuracy (90% CI)**
53,353	53,349	53,348	3.2%
Deforestation per periods in ha			
2005-2010	**2010-2014**		
4	1		
Deforestation per periods in ha/y			**Average for 2005-2014 in ha/yr**
2005-2010	**2010-2014**		
0.77	0.27		0.56

Synthesis of Activity Data

The activity data per forest strata that are accounted for are summarized in the following tables. They correspond to the annual deforestation rate obtained by dividing the total area of deforestation per stratum over the reference period by the duration of the period (10 years).

Table 40: Activity data information – Semi-deciduous forest annual cover change

Description of the parameter, including the time period covered	A_i/10 Semi-deciduous forest (Miombo and Mopane forest) annual cover change between 2005 and 2015 in the 9 districts of the ER Program area.
Explanation for which sources or sinks of the parameter is used	Mean annual historical deforestation per reference period to furnish activity data per period and calculated reference emissions per year.
Data unit	ha/yr
Value for the parameter	16,984
Source of data or description of the method for developing the data, including (pre-) processing methods for data derived from remote sensing images (including the type of sensors and the details of the images used):	Spatially explicit tracking of land‐use conversions through the point sampling method using Collect Earth tool of Google Earth Engine. Semi-deciduous class is separated in various strata for the classification of point land use changes but are merged in on class of homogeneous carbon stock. Images used are various, those available in Collect Earth tool, included from different Landsat sensors.
Spatial level (local, regional, national or international):	ER Program area
Discussion of key uncertainties for this parameter:	Sources of uncertainties are: - Operator error during the interpretation of land use land cover during the classification of points
Estimation of accuracy, precision, and/or confidence level, as applicable and an explanation of assumptions/methodology in the estimation:	90% CI associated with this deforestation class: ± *3,385* ha/yr Error: **±** *16.68* **%**

Table 41: Activity Data information – Evergreen forest annual cover change

Description of the parameter, including the time period covered	A_i/10 Evergreen forest (Montane miombo and coastal) annual cover change between 2005 and 2015 in the 9 districts of the ER Program area.
Explanation for which sources or sinks of the parameter is used	Mean annual historical deforestation per reference period to furnish activity data per period and calculated reference emissions per year.

Data unit	ha/yr
Value for the parameter	4,336
Source of data or description of the method for developing the data, including (pre-) processing methods for data derived from remote sensing images (including the type of sensors and the details of the images used):	Spatially explicit tracking of land-use conversions through the point sampling method using Collect Earth tool of Google Earth Engine. Evergreen class is separated in various strata for the classification of point land use changes but are merged in on class of homogeneous carbon stock. Images used are various, those available in Collect Earth tool, included from different Landsat sensors.
Spatial level (local, regional, national or international):	ER Program area
Discussion of key uncertainties for this parameter:	Sources of uncertainties are: - Operator error during the interpretation of LULCC on sampled points - Classification of images with model
Estimation of accuracy, precision, and/or confidence level, as applicable and an explanation of assumptions/methodology in the estimation:	90% CI associated with this deforestation class: **± 1,446 ha/yr** Error: **± 33.36%**

Table 42: Activity Data information – Mangrove forest annual cover change

Description of the parameter, including the time period covered	$A_i/10$ Mangrove forest annual cover change between 2005 and 2015 in the 9 districts of the ER Program area.
Explanation for which sources or sinks of the parameter is used	Mean annual historical deforestation per reference period to furnish activity data per period and calculated reference emissions per year.
Data unit	ha/yr
Value for the parameter	0
Source of data or description of the method for developing the data, including (pre-) processing methods for data derived from remote sensing images (including the type of	Spatially explicit tracking of land-use conversions through the point sampling method using Collect Earth tool of Google Earth Engine. Semi-deciduous class is separated in various strata for the classification of point land use changes but are merged in on class of homogeneous carbon stock. Images used are various, those available in Collect Earth tool, included from different Landsat sensors.

sensors and the details of the images used):	
Spatial level (local, regional, national or international):	ER Program area
Discussion of key uncertainties for this parameter:	Sources of uncertainties are: - Operator error during the interpretation of LULCC on sampled points - Classification of images with model
Estimation of accuracy, precision, and/or confidence level, as applicable and an explanation of assumptions/methodology in the estimation:	90% CI associated with this deforestation class: **± 0 ha/yr** Error: **± 0 %**

iption of method used for producing emission factors

Emissions factors are the difference between pre- (forests) and post-deforestation (crop fields mainly) carbon stocks for different strata. These carbon stocks were derived from several sources, from the literature or dedicated biomass inventories.

Field inventories have been carried out to estimate aboveground biomass in Miombo forest. For other strata, data from literature were used.

For them to be representative, inventories were planned in several parts of the Miombo forests of the ER Program area, including in potentially degraded forest areas (near cities or roads) and in dense forest: forest in the GNR core zone, forest in its buffer zone, forest in the Mocubela – Mulevala massifs, forest in the Alto-Molocué and North of Gilé districts, etc. A total of 100 plots were inventoried (see Figure 22). A sample design was realized with groups of 4 plots on a topographical and vegetation transect in order: (i) to account for influence of biophysical variables, such as slope or elevation; and (ii) to reduce inventory work time. Each plot on each transect was separated by 2 km.

For each transect location, plots were located according to the elevation map available (ASTER DEM). To estimate the number of plots necessary to guarantee forest inventory accuracy, the tool developed by Winrock[55] (Walker, Pearson, and Brown 2007) was used. It depends on the mean biomass measured and on the standard deviation. With current dataset, to achieve a confidence level of 90% with an error of 10%, 50 plots should be inventoried. With the current inventory, the sample size (100 plots) is largely above this minimum threshold guaranteeing the accuracy and representativeness of the inventory. The location of plots is presented in Figure 22.

The inventory was conducted on circular plots of a 16 m radius. For each plot, GPS coordinates and altitude were collected. For every tree above 5 cm diameter, the following

[55] http://www.winrock.org/resources/winrock-sample-plot-calculator

measurements were gathered: diameter at breast height (DBH), height (with a vertex) and tree species.

Aboveground biomass is calculated using an allometric equation linking biomass to diameter and, potentially, height. Given the high species composition heterogeneity in tropical forests, multi-species equations are more relevant. Few generic equations are available for the Miombo forest. The Chave's global equation (Chave et al. 2014), presented below, was selected because it is adapted to the range of measured diameters and it accounts for tree height, which is more precise.

Trees height and diameter are measured during inventories. Wood density for each species encountered during inventories was selected from the global wood density database (Zanne et al. 2009; Chave et al. 2009).

According to IPCC (2003), carbon fraction in aboveground biomass averages 0.5 tC/tdm. In IPCC (2006), belowground to aboveground ratio (or root-to-shoot ratio) in tropical dry forests is expected to average:

- 0.56 if aboveground biomass is below 20 t/ha;
- 0.28 if aboveground biomass is above 20 t/ha.

The same method was used to determine post-deforestation carbon stocks on 10 years old fallows (younger fallows were not selected to remain conservative). Vegetation on fallows is comparable to the one of natural Miombo forest as it is composed of clump shoots or root suckering, but with less diversity. 18 plots of this inventory were realized around the GNR. Data from literature exists for Mozambique but they do not involve Zambezia (McNicol et al., 2011) and it is more conservative to use those produced for the GNR.

The method for this inventory is described in Mercier et al. (2016). It is based on 16-m diameter circular plots on which DBH and height of tree above 5-cm diameter are measured and tree species are reported for the correspondence with wood density (use of the global wood density database). The allometric equation that is used is the one of Chave et al. (2014) for dry forests.

Chave's allometric equation used:

$$AGB = 0.0673 \times (\rho D^2 H)^{0.976}$$

Where AGB is aboveground biomass, ρ is wood density, H is tree height and D is diameter at breast height.

As previously explained, the MRV team in FNDS is currently conducting a NFI. The resulting Emission Factors will be used for monitoring purposes as accepted under the MF. The RL is not expected to be updated with these new Emission Factors as it is not allowed by the MF. Updates to the RL using new EFs will be done if accepted in the future under the MF. This update might consider a disaggregation of the strata Semi-Deciduous forest and Evergreen forest using the AD reported in Table 38 for the sub-strata (Miombo, Mopane for the semi-deciduous stratum, Coastal and Montane for the evergreen stratum) The strata that will be inventoried are presented in Table 36. The methods used for the NFI are described in section 9 (MRV).

Mangroves haven't been measured by the NFI, so the EFs won't be updated at the time of

monitoring, but the impact of this is minor due to the low deforestation rates observed and its impact in GHG emssions, see **Table 39**.

Inventories on Miombo forests are considered as representative of semi-deciduous stratum and data from the literature about Montane forest are considered as representative of evergreen forest. The tables below show results of forest inventories on pre- and post-deforestation strata of Miombo forest. Results for carbon stocks in 10-years fallows around the GNR are comparable to other results from another district in Mozambique for crops (9.4 tC/ha in ABG) and savannahs (11.5 tC/ha in ABG – McNicol et al., 2011).

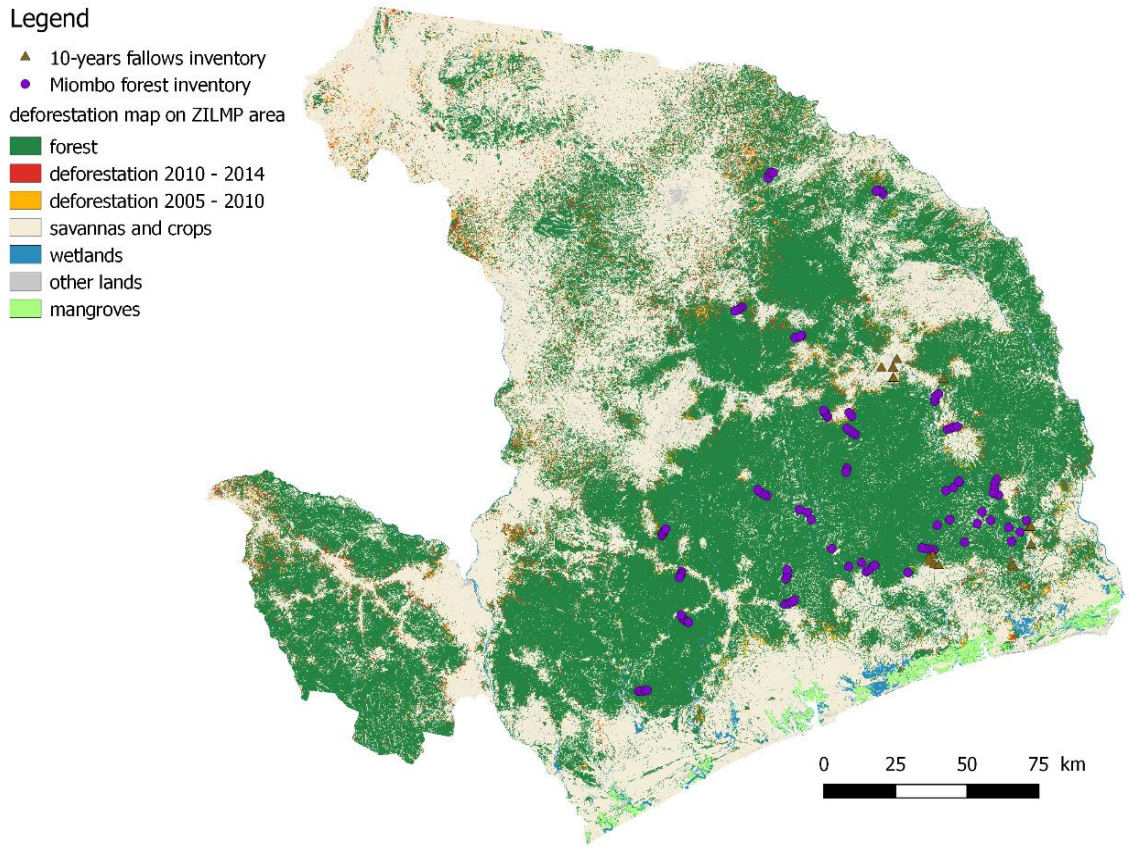


Figure 22: Map of inventories on Miombo pre- and post-deforestation strata (map from Mercier et al., 2016)

Pre-deforestation strata:

Table 43: Emissions factors information – pre-deforestation strata; Carbon stocks in Semi-deciduous strata (Miombo forests)

Description of the parameter including the forest class if applicable:	Carbon stocks in AGB and BGB of semi-deciduous stratum

Data unit (e.g. t CO_2/ha):	tCO_2e/ha
Value for the parameter:	AGB: 257 BGB: 71.9
Source of data (e.g. official statistics, IPCC, scientific literature) or description of the assumptions, methods and results of any underlying studies that have been used to determine the parameter:	Data are from a forest inventory planned specifically for this purpose and described in the ZILMP Background Study for the development of the ER-PD (Mercier et al., 2016). The inventory is composed of data from 100 plots of 16 m of diameter and biomass was estimated using the Chave et al. (2014) allometric equation. Belowground biomass is estimated with default factors of IPCC (2006) - 0.56 if aboveground biomass is below 20 t/ha and 0.28 if aboveground biomass is above 20 t/ha.
Spatial level (local, regional, national or international):	ER Program area
Discussion of key uncertainties for this parameter:	Uncertainties derive from (i) the representativeness of selected plots to the whole strata; (ii) the evaluation of DBH and tree height from field operator; and (iii) error related to the choice and the allometric equation used.
Estimation of accuracy, precision, and/or confidence level, as applicable and an explanation of assumptions/methodology in the estimation:	Confidence levels are calculated based on standard deviation between plots. Results are the following: AGB 90 % CI: 18 (7%) BGB 90 % CI: 3.45 (4.8%) To assess the representativeness of the inventory to Miombo forest, Winrock tool[56] (Walker, Pearson, and Brown 2007) was used as presented in Mercier et al. (2016).

Table 44: Emissions factors information – pre-deforestation strata - carbon stocks of evergreen stratum (montane forests)

Description of the parameter including the forest class if applicable:	Carbon stocks in AGB and BGB of Evergreen forest stratum

[56] http://www.winrock.org/resources/winrock-sample-plot-calculator

Data unit (e.g. t CO2/ha):	tCO_2e/ha
Value for the parameter:	To establish the NFI sampling plan, several data available at national level were identified. We selected for evergreen (montane) forest data that were produced in Mozambique and gave the most conservative estimation from **Lisboa et al.** (**2014)**. Root/shoot ratio of 0.27 was applied as for AGB above 20 t/ha (IPCC, 2006). AGB: 369.89 BGB: 99.89
Source of data (e.g. official statistics, IPCC, scientific literature) or description of the assumptions, methods and results of any underlying studies that have been used to determine the parameter:	Lisboa et al. (2014)
Spatial level (local, regional, national or international):	International
Discussion of key uncertainties for this parameter:	/
Estimation of accuracy, precision, and/or confidence level, as applicable and an explanation of assumptions/methodology in the estimation:	Uncertainties are those presented in the results of the reference used. AGB 90% CI: 40.68 (11%) BGB 90% CI: 10.98 (11%)

Table 45: pre-deforestation strata - carbon stocks in Mangroves

Description of the parameter including the forest class if applicable:	Carbon stocks in AGB and BGB of Mangroves
Data unit (e.g. t CO_2/ha):	tCO_2e/ha

Value for the parameter:	AGB: 463.6 BGB: 147.23
Source of data (e.g. official statistics, IPCC, scientific literature) or description of the assumptions, methods and results of any underlying studies that have been used to determine the parameter:	Data are secondary, extracted from existing literature. Stringer et al. (2015) made an inventory on this ecosystem in the Zambezi delta in Mozambique; we can easily assume that carbon stocks are comparable to those of mangroves in Zambézia province. They divided mangroves into 5 strata and estimated carbon stocks in above and belowground biomass.
Spatial level (local, regional, national or international):	Regional
Discussion of key uncertainties for this parameter:	
Estimation of accuracy, precision, and/or confidence level, as applicable and an explanation of assumptions/methodology in the estimation:	Accuracy calculation is based on the results presented in Stringer et al. (2015). Mean biomass and standard deviation is furnished per stratum and pool (AGB and BGB). From this, a weighted average (depending on the area of each stratum) and standard deviations were calculated for the entire ecosystem and corresponding 90% CI are presented here: AGB 90% CI: 37.08 (8%) BGB 90% CI: 14.72 (10%)

Post-deforestation strata:

Table 46: Emissions factors information – post-deforestation strata - Carbon stocks in Semi-deciduous stratum (Miombo forests)

Description of the parameter including the forest class if applicable:	Carbon stocks in AGB and BGB in 10-years fallows after deforestation of Miombo forests and cultivation
Data unit (e.g. t CO_2/ha):	tCO_2e/ha
Value for the parameter:	AGB: 37 BGB: 16.3
Source of data (e.g. official statistics, IPCC, scientific literature) or description of the assumptions, methods and results of any	Post-deforestation uses of the land are agriculture – succession of fields and fallows – and savannas. One post-deforestation stratum and long term average carbon stock of this stratum was used. A biodiversity and biomass inventory was realized around the GNR in 2016 (mainly in the buffer zone where deforestation occurs)

underlying studies that have been used to determine the parameter:	following, for biomass estimation, the same method as the one for pre-deforestation data, except that plots' size was 10 m of diameter. Inventories were realized on fallows of different ages but, to remain conservative, only biomass data from fallows of 10 years are used in the present document (this stratum is represented by 18 plots). The same methodology for inventory as the one used for estimation of biomass in Miombo forest was used.
Spatial level (local, regional, national or international):	Local
Discussion of key uncertainties for this parameter:	Uncertainties derive from: (i) the representativeness of selected plots to the whole strata; (ii) the evaluation of DBH and tree height from field operator; and (iii) error related to the allometric equation used.
Estimation of accuracy, precision, and/or confidence level, as applicable and an explanation of assumptions/methodology in the estimation:	Confidence levels are calculated based on standard deviation between plots. Results are the following: AGB 90 % CI: 17.4 (47%) BGB 90 % CI: 5.86 (36%)

Table 47: Emissions factors information – post-deforestation strata – Carbon stocks for evergreen stratum (Montane forests)

Description of the parameter including the forest class if applicable:	Post deforestation for evergreen forests[57]
Data unit (e.g. t CO_2/ha):	tCO_2e/ha
Value for the parameter:	AGB: 37 BGB: 16.3
Source of data (e.g. official statistics, IPCC, scientific literature) or description of	Use of the same data as for Semi-deciduous stratum (Miombo forest)

[57] *This section will be updated, pending on data from NFI. For now, it is based on post deforestation data for Miombo.*

the assumptions, methods and results of any underlying studies that have been used to determine the parameter:	in the ER Program area.
Spatial level (local, regional, national or international):	
Discussion of key uncertainties for this parameter:	/
Estimation of accuracy, precision, and/or confidence level, as applicable and an explanation of assumptions/methodology in the estimation:	Confidence levels are calculated based on standard deviation between plots. Results are the following: AGB 90 % CI: 17.4 (47%) BGB 90 % CI: 5.86 (36%)

Table 48: Emissions factors information – post-deforestation strata_Carbon stocks in Mangroves

Description of the parameter including the forest class if applicable:	Post-deforestation carbon stocks in Mangroves
Data unit (e.g. t CO_2/ha):	tCO_2e/ha
Value for the parameter:	AGB: 115.95 BGB: 36.81

Source of data (e.g. official statistics, IPCC, scientific literature) or description of the assumptions, methods and results of any underlying studies that have been used to determine the parameter:	No post deforestation evaluation of stocks was found in existing literature but Siikamäki (2012) evaluated losses from biomass after deforestation to be of 75%. This value was retained here.
Spatial level (local, regional, national or international):	Local
Discussion of key uncertainties for this parameter:	
Estimation of accuracy, precision, and/or confidence level, as applicable and an explanation of assumptions/methodology in the estimation:	Accuracy depends on pre-deforestation class so it is the one discussed in Stringer et al. (2015). AGB 90% CI: 13.91 (12%) BGB 90% CI: 3.68 (10%)

Emissions factors:

Table 49: Emission factor for AGB in all forest strata

Description of the parameter including the forest class if applicable:	Emission factor for AGB in all forest strata
Data unit (e.g. t CO_2/ha):	tCO_2e/ha
Value for the parameter:	Semi-deciduous forests: 220

	Evergreen forest: 332.87 Mangroves: 347.66
Source of data (e.g. official statistics, IPCC, scientific literature) or description of the assumptions, methods and results of any underlying studies that have been used to determine the parameter:	Difference of carbon stocks of pre- and post-deforestation strata. When deforested, AGB is considered to be completely instantly emitted.
Spatial level (local, regional, national or international):	ER Program area
Discussion of key uncertainties for this parameter:	Uncertainties for this parameter are combination of uncertainties for pre- and post-deforestation carbon stocks for each forest stratum. The only dedicated inventories are those on Miombo forest (semi-deciduous stratum) for which we can calculate indicators of precision. Other data are from existing literature and we have no access to databases.
Estimation of accuracy, precision, and/or confidence level, as applicable and an explanation of assumptions/methodology in the estimation:	90% confidence intervals for emission factor are the following: Semi-deciduous forest: ±25.03 (11%) Evergreen forest: 44.25 (13%) Mangrove: 39.6 (11%)

Table 50: Emission factor for BGB in all forest strata

Description of the parameter including the forest class if applicable:	Emission factor for BGB in all forest strata
Data unit (e.g. t CO2/ha):	tCO_2e/ha
Value for the parameter:	Semi-deciduous forests: 55.63 Evergreen forest: 83.6 Mangroves: 110.42

Source of data (e.g. official statistics, IPCC, scientific literature) or description of the assumptions, methods and results of any underlying studies that have been used to determine the parameter:	Difference of carbon stocks of pre- and post-deforestation strata. When deforested, BGB is considered to be emitted at a rate of 10% per year according to IPCC recommendation, as the decomposition is progressive.
Spatial level (local, regional, national or international):	ER Program area
Discussion of key uncertainties for this parameter:	Uncertainties for this parameter are combination of uncertainties for pre- and post-deforestation carbon stocks for each forest stratum. The only dedicated inventories are those on Miombo forest for which we can calculate indicators of precision. Other data are from existing literature and we have no access to databases.
Estimation of accuracy, precision, and/or confidence level, as applicable and an explanation of assumptions/methodology in the estimation:	90% confidence intervals for emission factor are the following: Semi-deciduous forest: ±6.8 (12%) Evergreen forest: ±12.45 (14.9%) Mangrove: ±15.17 (13.7%)

Calculation of the average annual historical emissions over the Reference Period

According to the FCPF MF (FCPF, 2016a), the REL equals to the average over the reference period of activity data multiplied by emission factors. Emission factors for AGB and BGB are added to account for all tree biomass. In the following tables, activity data (annual deforestation rate) and emissions due to deforestation in each forest strata are presented.

The addition of all these emissions gives a mean annual emissions for the entire ER Program accounting area of: 6,487,447 tCO_2e/yr.

Table 51: Annual emissions due to deforestation in the ER Program area

Reference periods	Historical deforestation rate - in ha/yr	Emissions related to AGB - in tCO_2e	Emissions related to BGB - in tCO_2e	Total reference emissions - in tCO_2e/yr
Semi-deciduous forests	16,983.9	3,736,461	944,956	4,681,417
Evergreen forests	4,336.3	1,443,440	362,590	1,806,030
Mangroves	0	0	0	0
Average over the reference period - baseline	**21,320.20**	**5,179,901**	**1,307,546**	**6,487,447**

Note on Mangroves: Had the deforestation rates for mangrove presented in Table 39 been used, total emissions would have been 239 tCO2, i.e. 0.0023% of total GHG emissions.

8.4 Upward or downward adjustments to the average annual historical emissions over the Reference Period

Not applicable to this ER Program.

8.5 Estimated Reference Level

As deforestation is the only source of emissions accounted for in the ER Program and as no adjustment is demanded, the REL correspond to the mean annual emissions as presented in Table 51, which corresponds to the multiplication of the mean deforestation rate in ha/yr and emissions factors per forest stratum considered.

ER Program Reference level

ERPA term year t	Average annual historical emissions from deforestation over the Reference Period (tCO_2e/yr)	If applicable, average annual historical emissions from forest degradation over the Reference Period (tCO_2e/yr)	If applicable, average annual historical removals by sinks over the Reference Period (tCO_2e/yr)	Adjustment, if applicable (tCO_2e/yr)	Reference level (tCO_2e/yr)
2nd sem. of 2018	3,243,723	-	-	-	3,243,723
2019	6,487,447	-	-	-	6,487,447
2020	6,487,447	-	-	-	6,487,447
2021	6,487,447	-	-	-	6,487,447
2022	6,487,447	-	-	-	6,487,447
2023	6,487,447	-	-	-	6,487,447
2024	6,487,447	-	-	-	6,487,447

8.6 Relation between the Reference Level, the development of a FREL/FRL for the UNFCCC and the country's existing or emerging greenhouse gas inventory

The program Reference Level is fully aligned with the national FREL/FRL because it was built in that purpose. Activity data of the RL are an extraction of the FREL/FRL for the emissions due to deforestation. Other sources of emissions will be considered (such as degradation) in the process of the development of the FREL and it they are found to finally be significant, the program RL will be updated at the first monitoring event, by adding other sources. Emissions factors for the program RL and the FREL/FRL are not estimated with the same method. It is difficult to know if results will be comparable as some decisions still need to be made at national level such as the allometric equations that will be used. However, at the first monitoring event, once the NFI is completed, emissions factors for the ER Program will also be updated with carbon stocks of the significant pools from the NFI (results available end of 2018). The last greenhouse gas inventory of Mozambique dates from 1994[58]. The MRV team of the FNDS is currently updating this inventory, by using the results of the FREL/FRL for the LULUCF/LUCF emissions linked to deforestation or forest degradation.

[58] http://unfccc.int/di/DetailedByParty/Event.do?event=go

9. APPROACH FOR MEASUREMENT, MONITORING AND REPORTING

9.1 Measurement, monitoring and reporting approach for estimating emissions occurring under the ER Program within the Accounting Area

The Program M&MRV system is based on the NFMS (National Forest Monitoring system), which is being developed at national level by the MRV team in the FNDS. For the ER Program, the activity data and the emissions factors will be extracted from the results of the NFMS on the same frequency for the sources and sinks and carbon pools considered in the program. The NFMS is composed of:

- **The NFI**: the results from the first inventory will be available in the beginning of 2018 and the NFI will be updated every 10 years. It will monitor all carbon pools for all selected class of vegetation types (Table 36) associated with deforestation, forest degradation and enhancement of carbon stocks;
- **The Activity Data monitoring system**: it is expected to periodically update the analysis of activity data – every 2 years - and the National Land Cover Map. Since enhancement of carbon stocks is excluded for the ER Program - *see section 7* - only data for deforestation and degradation will be extracted from national MRV.

The National Greenhouse Gas Inventory will be updated in 2018 and will periodically estimate and report anthropogenic emissions by sources and removals by sinks. *Information of the method used is provided here, but more details are available in the documentation composing the R-Package.*

Monitoring of activity data

Monitoring of deforestation

The method used to update the AD will be the one developed at national level with extraction of results for the ER Program area. For the MRV purposes in the NFMS, new tools and algorithms improving results will be positively valued and considered. The national fund for sustainable development (FNDS) is in charge of developing those components and aims at submitting a FREL to the United Nations Framework Convention on Climate Change (UNFCCC) in January 2018.

In 2017, the MRV team of FNDS produced the AD for national level with the 4km grid covering the extent of the country and using the Collect Earth application as described in section 8.3. The results from the interpretation of the grid are used for the generation of AD for the FREL and for the program RL as presented in section 8.3. This exercise is referred to as the AD grid.

In parallel, FNDS has engaged in a wall-to-wall mapping work of land use and land cover for the year 2016. Combined Sentinel 2 (S2, delivered by the ESA) and Landsat 8 (L8, delivered by NASA) satellite image mosaics were created for the wet and dry season of the year 2016

(MozMosaic, MITADER, 2016). Training data is currently being collected by the MRV GIS&RS team in order to perform supervised classification of land use and land cover over the mosaics. Both mosaics are divided into 41 granules. The acquisition of training data corresponding to the level 3 of the NLCS over a given granule is facilitated by identifying the location of the AD grid points belonging to each class on the granule.

LULC maps and LULC change maps will be prepared every year for MRV in order to monitor the implementation of the mitigation activities and their impact - and for other purposes as NFI design, forest management, etc. In jurisdictional programs, more detailed information could be prepared at local level (bottom-up perspective) to train a change detection mosaic under a sampling approach methodology or to produce an updated version of a LULC map. However, estimates of activity data using the stratified sampling based approach will be conducted biennially so as to report estimates and their associated uncertainties, with consistent methods to the national grid.

LULC maps during the M&MRV will be produced with Sentinel-2 and Landsat-8 mosaïc on the entire country territory and 2 dates in the year will be analyzed: (i) in May/June, when the cloud cover is reduced but the trees of dry Miombo have lost their leaves; (ii) in August/September to confirm first classification with trees having their new leaves but higher cloud cover. The national MRV is based on the production of LULC change maps and the use of reference samples every 2 years. The use of the 4 x 4 km grid will be used every 5 years in order to update estimates of the national GHG inventory.

The description of the method for the production of LULC map is from RPackage (Annex1) and d'Annunzio (2017).

Production method for the LULC map at national scale - Sentinel-2 imagery is being used to produce the benchmark map at national scale (it will be finalized in November, 2017) that is necessary as a starting point for MRV purposes. 4 national mosaics (2 epochs / 2 spectral resolutions and 2 spatial resolutions 10m/20m) have been prepared (See R-Package - Annex 1).

The classification system, consistent with the national FREL and the GHG inventory, should be composed of non-overlapping LULC classes and forest strata, with an independent class for forest systems where cyclical changes in forest cover are present, to be in compliance with FCPF CF. National selected LULC classes (level 2) and national subclasses (level 3) and their correspondence with the IPCC classes (level 1) are shown in Table 36.

The MozMosaic is primarily composed of bottom of atmosphere (BOA) data from Sentinel 2 from 123 tiles of 100 km by 100 km but no harmonization of the spectral information has been produced across tiles, resulting in a patchy pattern covering the country. The supervised classification of all granules separately on several test zones has showed its limitations in terms of visual aspect of the end product, with the different BOA tile boundaries showing as edges. Cloud based computing platforms like Google Earth Engine offer possibilities of generating smooth mosaics from freely available public satellite imagery (MODIS, Landsat, Sentinel 1 and 2, ALOS) and classifying the results into robust products that overcome the issues coming from individual tile classification. However, the use of cloud-based platforms requires technical skills in programming that can show steep learning curves.

The SEPAL platform (https://sepal.io) has been developed by FAO in the frame of the OpenForis initiative in order to give easy access to the cloud computing environment of

Google Earth Engine through an intuitive graphical user interface. In addition, SEPAL offers access to several geospatial libraries and processing tools including R, Rstudio, GDAL/OGR, OrfeoToolbox (OTB) and the OpenForis Geospatial Toolkit (OFGT), encapsulated in a Linux server. This enables to produce elaborated automatic classification chains that can be shared and reproduced easily, ensuring transparency in the process of map elaborations.

Pixel based classification products are not easily edited and modified and usually not compliant with large minimum mapping unit compared to satellite native resolution: in the case of Mozambique, the MMU is 1ha but the resolution of the prescribed satellite imagery is 10m. Object based image analysis enable to by-pass most of these limitations by integrating fine resolution raster information into large objects. One way of implementing this is to produce an independent segmentation of the entire area of interest in order to reach objects compliant with a MMU in which several products (intermediate classifications) can be merged through robust and transparent decision tree. Again, the SEPAL platform provides the necessary library and tools to efficiently realize those operations.

The implementation of the processing chain is performed using the ENVI software to delineate the area of interest and the R software to harmonize and select the relevant training data and partly on the Cloud in the GEE and SEPAL platforms to generate mosaics, classify the mosaics with the training data, generate segments for the AOI, implement a decision tree to obtain the final object based classification map and generate area statistics.[59]

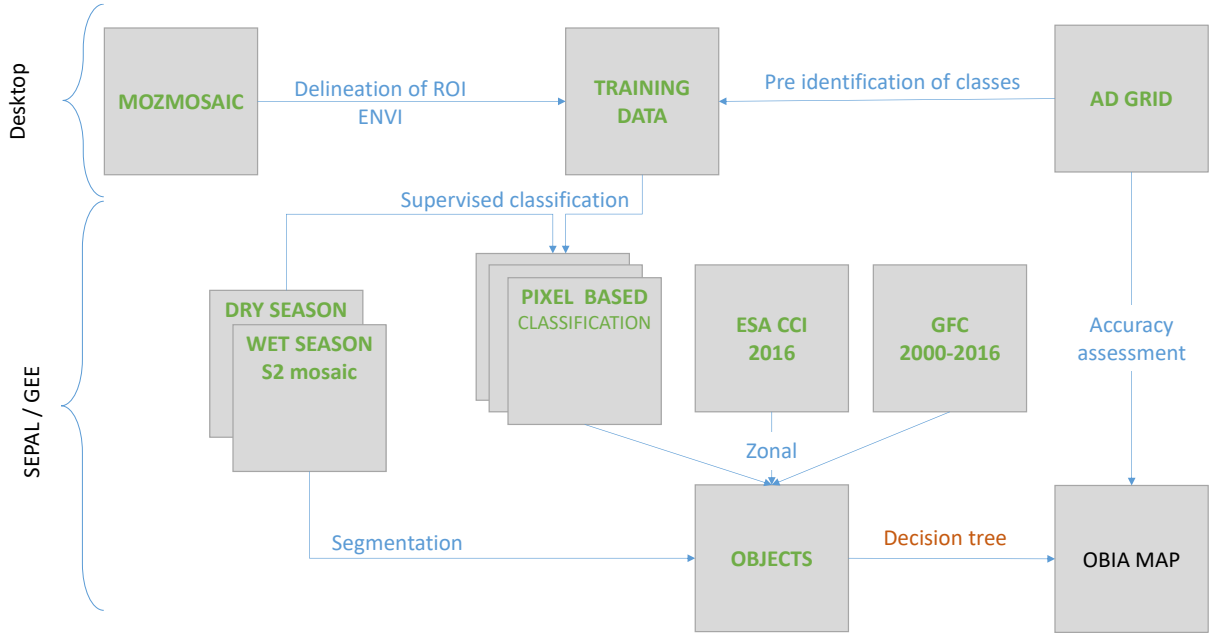


Figure 23: Schematic processing chain for the land cover land use 2016 map

Generation of mosaic: Two national scale mosaics for the wet and the dry period of 2016 were created using Sentinel 2 data. These mosaics were initiated by the RC on a dedicated SEPAL account and further improved by the MRV team members.

[59] *Most steps of the chain rely on free and open source tools from the GDAL/OGR, OFGT and OTB libraries, all embedded in R scripts available on a GIT repository at https://github.com/lecrabe/moz_lulc.*

Each mosaic is composed of the following bands: Green (G), Red (R), NIR (N), SWIR 1 (S1) and SWIR 2(S2), all resampled at 10m spatial resolution. Both mosaics weigh around 60 GB and upon suggestion of the MRV team, were stacked into one GEE asset for easier direct access[60]. Finally, a mosaic produced by IICT for the year 2016, at 20m resolution with 10 bands (B2, B3, B4, B5, B6, B7, B8, B8A, B11, B12) was also used as input.[61]

By using Sentinel-2 for MRV purposes (LULC map 2016 and LULC changes monitoring), a MMU of approximately 1 ha could be achieved, due to images spatial resolution (10m/20m) and its absolute geo-location uncertainty: 20 m at 2σ confidence level without Ground Control Points and 12.5 m 2σ with GCPs (absolute geo-location < 11 m at 95.5% confidence, baseline 02.04, 08/12/2016).

Training data acquisition

The classification to produce the LULC map is a supervised one (maximum likelihood) and based on training areas (more than 57,000 regions). Those training areas were located on the entire country to be representative of each stratum and the AD grid was used to help to choose relevant locations. Each training plot will correspond to at least 10 pixels on each band (see Annex 6 of the R-Package for details). A subset of these data (30% of training areas) will be used for validation of the LULC map.

To define the sample size, at national level, to produce the LULC map, the following equation for Cochran (1997) was used with a target of 0.01 for overall accuracy and for user's accuracy: 0.7 for deforestation, 0.6 for forest gain and forest degradation.

$$n = \frac{(\sum W_i S_i)^2}{\left[S(\hat{O})\right]^2 + (1/N)\sum W_i S_i^2} \approx \left(\frac{\sum W_i S_i}{S(\hat{O})}\right)^2$$

Where N is the number of units in the ROI, $S(\hat{O})$is the standard error of the estimated overall accuracy that we would like to achieve, W_i is the mapped proportion of the area of class i, and $S_i = \sqrt{U_i(1-U_i)}$ (where U_i is the user's accuracy of class i) is the standard deviation of stratum i. Because N is typically large, the second term in the denominator can be ignored.

The very small area of interest (AOI) derived from individual pixels, as well as very large areas that can potentially encompass different land cover classes have been excluded from the potential pool of training data, leading to a clean database of 36,376 polygons available for classification. The characteristics of this database are summarized in table 2. The size of the available polygons in the clean database is comprised between 0.1 ha and 100 ha.

The polygons of the database cover the entire country with a higher density on the provinces of Zambezia and Cabo Delgado. The rationale behind this asymmetry is that the collection of training data started prior to the establishment of the processing chain, with the objective of tile by tile classification. The approach taken to directly classify a mosaic of the full country scale using cloud based platforms has a direct consequence that the number of training data is limited to ~1000 AOI for memory reasons.

[60] *It is available with the following GEE asset ID: 'users/mrvfndsmoz/s2_wet_dry_stack_20171123'.*

[61] *It is publicly available with ID: 'users/catarinagouveialopes/National/GS_mosaic_10bands_Final'*

Rather than intensively collecting AOI that would be anyway discarded for the exercise, the members of the MRV team were tasked to collect a maximum of 10 class per granule per level 3 NLCS in order to cover the full country within the expected time line. Training polygons should be included in land cover classes as homogeneous as possible in order to avoid mixed spectral information that can bring the classification algorithm to errors.[62]

Table 52: Full training database characteristics: 36376 polygons available. Count and minimum, average, maximum and sum of the area (ha) for each level 2 NLCS (From d'Annunzio, 2017)

class	count	min_ha	average_ha	max_ha	sum_ha
17	78	0.10	1.74	46.35	136
1FC	4353	0.10	3.47	97.84	15,123
1TCF	803	0.10	1.69	14.44	1,356
1TCW	323	0.10	3.88	99.40	1,252
2FD	1847	0.10	12.51	99.52	23,103
2FE	7580	0.10	3.48	99.76	26,400
2GL	1201	0.10	2.60	75.44	3,120
2S	2737	0.10	9.21	99.24	25,216
2T	22	0.10	0.32	1.13	7
2WD	3908	0.10	6.02	99.32	23,544
2WE	2097	0.10	2.26	96.42	4,734
4HF	3010	0.10	4.63	99.16	13,936
4SF	341	0.10	4.17	96.54	1,422
5BU	1209	0.10	0.70	38.08	843
6BR	959	0.10	2.94	89.44	2,815
6BS	3360	0.10	1.62	83.40	5,429
6SS	169	0.10	3.35	79.06	567
8WB	2379	0.10	9.33	99.52	22,193

Preparation of auxiliary datasets:

Two global products were identified as potentially valuable for the process: the ESA CCI map of Africa for 2016, produced at 20m resolution (ESA, 2017) and the global forest change product updated for 2016 (Hansen et al., 2013). The ESA map uses a 10-land cover class legend and was produced for the pivot year 2016, while the GFC product gives tree cover percentage for the year 2000 together with annual detection of tree cover loss up to 2016.

[62] *The final database has been loaded as a fusion table for further uses and is publicly available at level 2 NLCS with the following ID: 1-eNM5z-DhS3pS2sWV6TtaxjqSgm7e0WdX9Mb5C_m.*

Table 53: Characteristics of the global auxiliary products used in the processing chain (From d'Annunzio, 2017)

	ESA CCI	UMD GFC
Spatial resolution	20m	30m
Temporal coverage	2016	2000-2016
Classes	Trees Shrubs Grassland Cropland Vegetation aquatic / regularly flooded Lichen mosses / Sparse vegetation Bare Built up Snow / Ice Open Water	Tree cover in 2000 [0-100%] Annual loss [1-16] Gain 2000-2012 [0-1]

Both products have been downloaded from internet into the SEPAL server and clipped to the bounding box of Mozambique. They will be used as secondary product information in the decision tree, to help identify with more certainties polygons with mixed information from the direct supervised classifications.

Supervised classification of the mosaics:

Different classifications have been produced with different sensors, seasons and training type and size (points vs. polygons). Initial classification has been performed in SEPAL but was then transferred to GEE in order to have more control on classification parameters (algorithm, ratios).[63]

The following ratios have been calculated for each mosaic prior to classification: NDVI, NDWI, NBR, Red/Green. Furthermore, for each band, the wet to dry ratio was added to increase the separation potential for the classification. The main classification used in the process is the one derived from the Dry / Wet stack, containing the following 22 bands and ratios: *'wet_G', 'wet_R', 'wet_N', 'wet_S1', 'wet_s2', 'dry_G', 'dry_R', 'dry_N', 'dry_S1', 'dry_S2', 'ndvi_w', 'ndwi_w', 'nbr_w', 'RG_w', 'ndvi_d', 'ndwi_d', 'nbr_d', 'RG_d', 'R_wetdry', 'N_wetdry', 'S1_wetdry', 'S2_wetdry'*. This classification will be refered to as spc_wd

A segmentation was used to smooth the results in the respect of the MMU (1ha). Because the MMU is 1 ha and already represent more than 10 Sentinel pixels, it was decided to produce the segmentation with Landsat imagery rather than Sentinel 2 imagery, in order to keep reasonable processing times and efficiency. Segments were created in SEPAL.

A decision tree for object integration was built. The simplest decision tree that can be implemented only uses one product (one pixel based classification) and applies a majority rule on each segment (the most occurring class is attributed to the whole polygon).

[63] *A google drive document has been setup and shared with the MRV team to store the assets and fusion IDs used for the different classification intermediate steps.*

The effect of that decision tree can be seen on Figure 24, obtained for segments based on the kmeans algorithm. All salt-and-pepper effects from the automatic classification are filtered out and the majority class is coming as output.

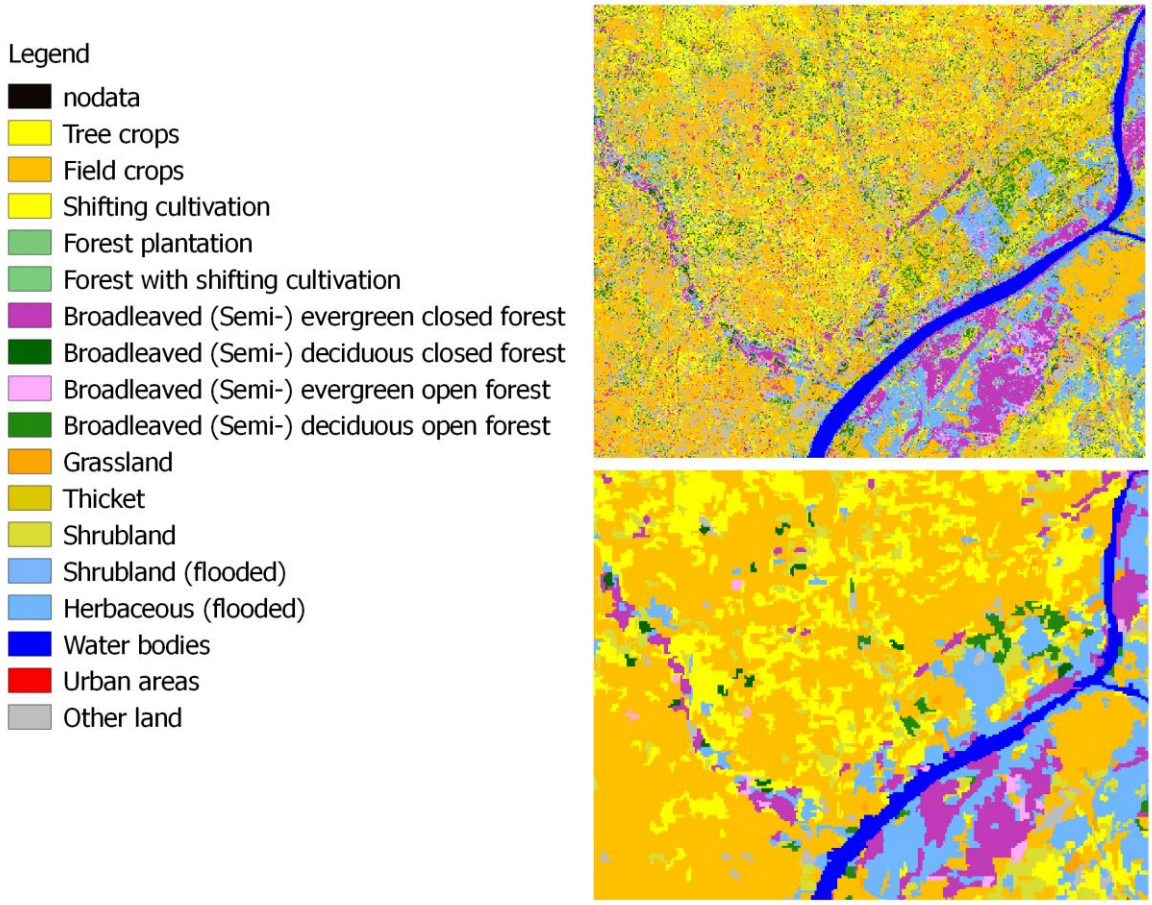


Figure 24: Effect of a majority rule on the automatic supervised classification (From d'Annunzio, 2017)

The structure of a more elaborated tree was initiated and tested. For each polygon the majority rule of each product is calculated and used as an input into the decision tree. The general logic behind the tree is to use one product as referee. The available products for each polygons are: the Wet/Dry stack mosaic classification (spc_wd), the IITC mosaic classification (spc_iitc), the ESA map and the GFC product. If the spc_wd and spc_iitc layers are in the same group, the spc_wd code is given. For each polygon the majority rule of each product is calculated and used as an input into the decision tree.

If they disagree, the esa_cci is used as a referee to take a decision. An example for the "Crop" group is given on Figure 25.

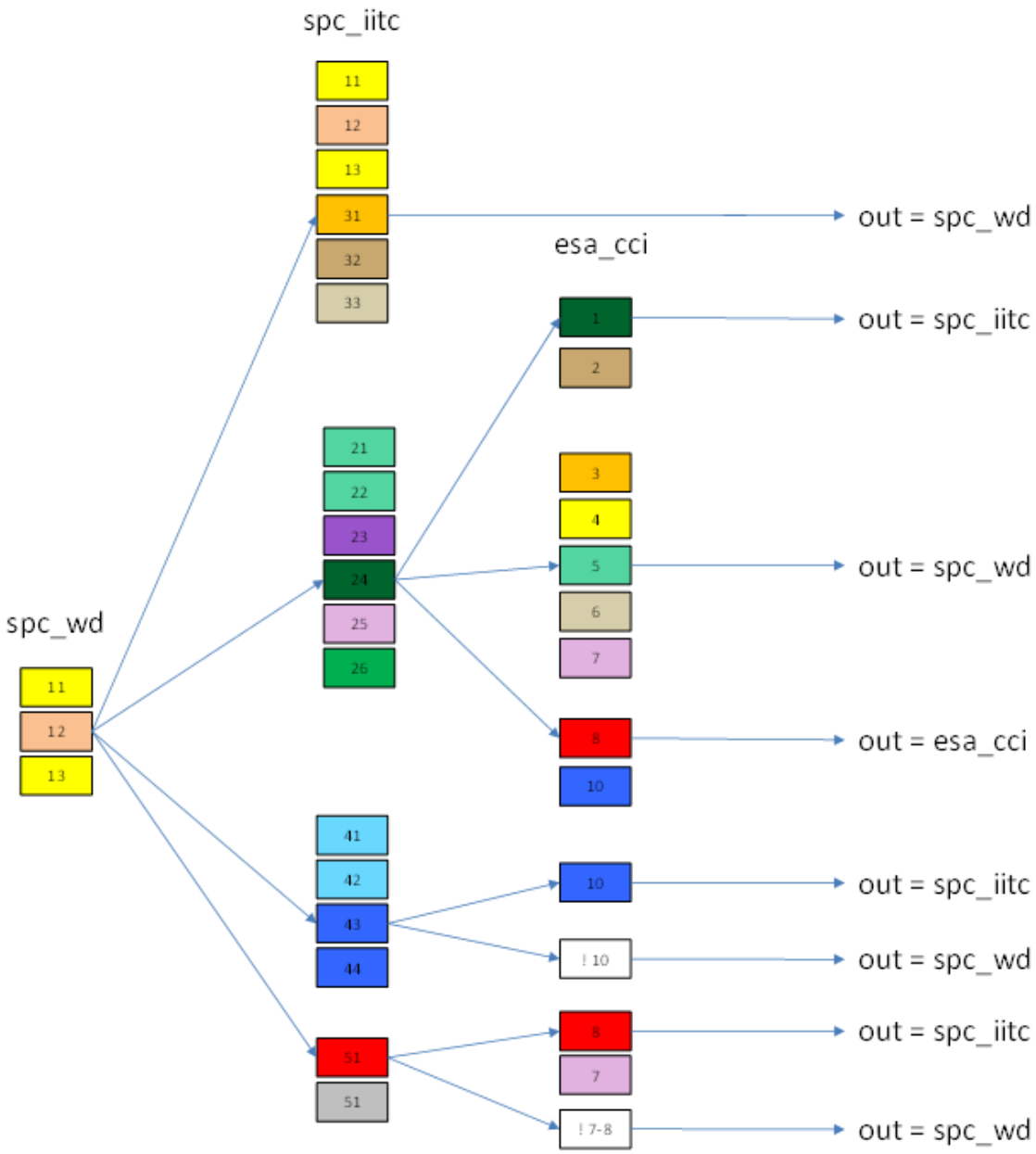


Figure 25: "Crop" branch of the decision tree (From d'Annunzio, 2017)

A preliminary result is available but still need for improvement (Figure 26). It is based on 848 training polygons distributed over the whole country. All provinces are processed separately and the final results merged together. The intermediate classifications are all processed at national scale and the integration rules are the same, so the tiled approach doesn't pose particular issues for aggregation and the integration can run smoothly. The overall accuracy of the draft map, taking all the points from the AD grid into account, is 61%. The user accuracy of the forest class is 79%.

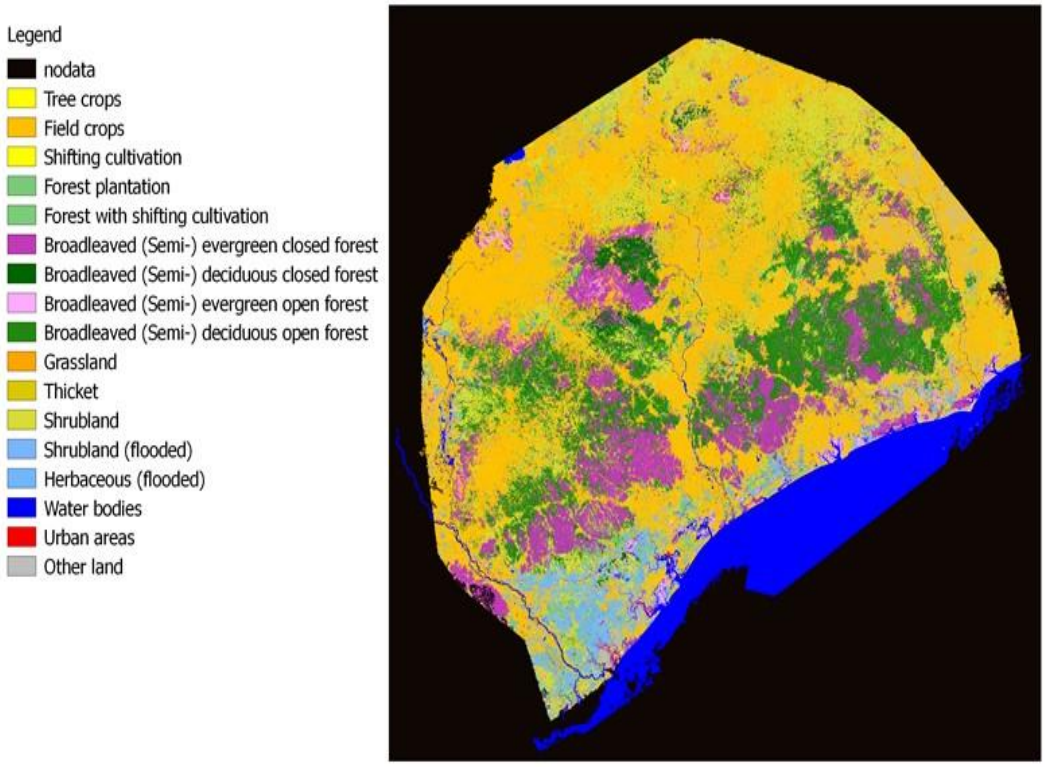


Figure 26: Preliminary LULC 2016 result for Zambezia province

MRV process - AD will be updated every 2 years (consistent with the biennial reporting set under the UNFCCC) based on new LULC change maps and reference data, but the MRV team (FNDS) will generate annual LULC maps which will not provide AD estimates for GHG emission reporting. The method at national level to monitor AD is based on the comparison of LULC map at 2 dates (Figure 27), starting with the LULC benchmark map of 2016. LULC changes map will be produced once the LULC 2016 benchmark map will be finalized. The principles of the analysis are described in Table 54 but the algorithm still have to be developed for Mozambique with the objective of a first result in 2018.

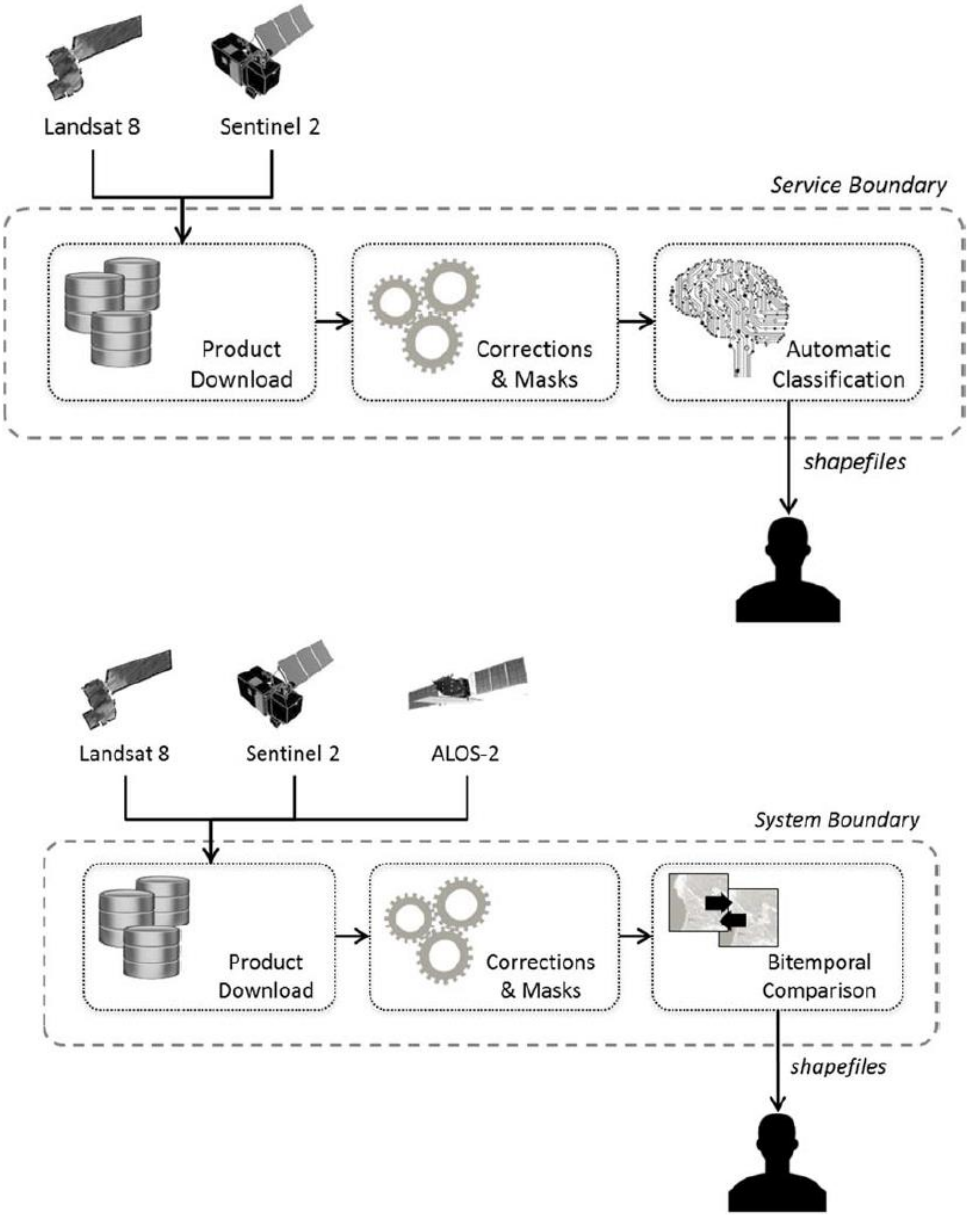


Figure 27: Steps of the chain generating LULC maps (top) and the analysis of changes for production of AD (bottom) (From R-Package - Annex 8)

Monitoring of degradation

At national level, a methodological approach is currently tested to measure forest degradation with a combination of visual assessment and radar application (led in collaboration with JICA and the University of Edinburg). The method described in Annex 5 (Historical Activity Data Analysis in Mozambique) of ER Package is summarized hereafter.

SAR (Synthetic Aperture Radar) data, specifically Phased Array type L-band Synthetic Aperture Radar (PALSAR is an active microwave sensor using L-band frequency to achieve cloud-free and day-and-night land observation) from ALOS (2006, Advanced Land Observing Satellite – JAXA - Japan Aerospace Exploration Agency) and from the new ALOS-2 (launched in 2014) would provide useful and complementary information for specific

vegetation types and activities (forest degradation). JAXA has produced the 4 year-25m spacing global PALSAR mosaics, that Advanced Land Observing Satellite (ALOS)/ Phased array Type L-band SAR (PALSAR) collected globally from 2007 to 2010 using the accurate SAR processing, and the same product for 2015 (ALOS-2)[64].

Table 54: Processing steps to produce LULCC maps and generate AD during the MRV (From R-Package - Annex 8)

Id.	Descripción	Landsat 8	Sentinel 2	ALOS-2
LCC-1	The operator selects the products on which the processing will be run.	In all three cases the selection is done manually by the operator. The service takes a list of product identifiers as input.		
LCC-2	Products are downloaded on the processing facility from the data providers.	Products are obtained from USGS.	Products are obtained from the Copernicus Data Hub.	Products are obtained from PASCO through a mechanism to be defined (JICA collaboration).
LCC-3	Pre-processing	Same atmospheric corrections and cloud and cloud shadow mask computation as done in the land use and land cover map processing chain.		For ALOS-2 PALSAR-2 products a pre-processing using the ESA NEST tool could be done. Depending on the access to PALSAR-2 scenes, maybe spatial as well as temporal filters can be used.
LLC-4	Bitemporal image comparison.	Based on the application of the iMad (iterative multivariate alteration detection transformation) and post-processing using the MAF algorithm (maximum autocorrelation factor transformation). The iMAD transformation is based on a canonical correlation analysis between two points in time of multivariate data; Canonical correlation of changes between bands. This scheme transforms two series of multivariate observations into a difference between two linear combinations of the original variables, these differences quantify the maximum change in all variables simultaneously. The MAD transformation is invariant on a linear scale and can be used iteratively. In the first instance, it can be used to detect outliers and noise and in a second iteration, it can be used to perform real change detection, once the previous result is managed. In order to improve the spatial consistency of the change components, the MAF (Maximum Autocorrelation Factor) transformation (also invariant on a linear scale) is applied to the MAD components, equivalent to a minimum noise fraction transformation that generates image components with a Maximum signal-to-noise ratio.		
LLC-5	Resulting shapefiles are delivered to the user.	Delivery is done through a FTP server.		

This product will be analyzed in the context of the NFMS to assess degradation at national level.

Until now, it is only a test on historical data to try to establish a relationship between RADAR imagery data and ground data of forest biomass. If the results are concluding, the method will be included in the national MRV system. The same method as the one presented for the monitoring of deforestation (Table 54) of comparison between 2 dates will be applied to the RADAR imagery and classification maps by the MRV team of FNDS. **However, even if this activity is accounted for in the national FRL, it will stay excluded in the Program's RL and MRV in respect of the FCPF MF**. The results from this analysis will be available in 2018.

[64] *These products are freely available from: http://www.eorc.jaxa.jp/ALOS/en/palsar_fnf/data/index.htm.*

Human resources and materials

The implementation of the M&MRV is coordinated by the UT-REDD+ and implemented by the MRV team at the FNDS with support from the Department of Natural Resources Inventory (DIRN). The MRV team is currently trained during the establishment of the national FREL/FRL. A complete geospatial laboratory has been designed and purchase in the framework of the R-Package development. All the equipment required is described in the Annex 4 of the R-Package.

List of monitored parameters:

Parameter	**$AD_{def,strata,t}$**
Description	Activity data for deforestation on all forest strata included in the ER Program (i.e. semi-deciduous, evergreen forests and Mangroves)
Data unit	Hectares
Source of data or measurement/calculation methods and procedures to be applied (e.g. field measurements, remote sensing data, national data, official statistics, IPCC Guidelines, commercial and scientific literature), including the spatial level of the data (local, regional, national, international) and if and how the data or methods will be approved during the Term of the ERPA	Extraction of deforestation statistics for the ER program accounting area from NFMS (realized with the change detection method based on sentinel-2 images) on a biennial basis. The LULC maps will then be used for stratification for estimating activity data with associated confidence intervals as recommended y Olofsson et al. (2014).
Frequency of monitoring/recording:	Every 2 years
Monitoring equipment:	Satellite images and computers for analysis – use of free softwares
Quality Assurance/Quality Control procedures to be applied:	Accuracy assessment will be implemented for the LULC changes map (AD), to estimate confidence intervals of each LULC change class following Olofsson et al. (2014)
Identification of sources of uncertainty for this parameter	Sources of uncertainties are: Operator error during the interpretation of LULCC on sampled points Classification of images with model
Process for managing and reducing uncertainty associated with this parameter	Sufficient number of sampling units
Any comments	/

Parameter	IPCC assessment
Description	Estimates of all IPCC Land Use categories included in the ER Program area
Data unit	Hectares (of the distribution of each class)
Source of data or measurement/calculation methods and procedures to be applied (e.g. field measurements, remote sensing data, national data, official statistics, IPCC Guidelines, commercial and scientific literature), including the spatial level of the data (local, regional, national, international) and if and how the data or methods will be approved during the Term of the ERPA	The national grid will be repeated every 5 years so as to have a consistent time series of full IPCC land use category data that could be used to update the national GHG inventory.
Frequency of monitoring/recording:	Every 5 years
Monitoring equipment:	Free satellite images, computers for analysis and use of free softwares
Quality Assurance/Quality Control procedures to be applied:	
Identification of sources of uncertainty for this parameter	Sources of uncertainties are: Operator error during the interpretation of LULCC on sampled points
Process for managing and reducing uncertainty associated with this parameter	Sufficient number of sampling units
Any comments	

Monitoring of emission factors

The emissions factors will be updated at the time of the first monitoring event using the newly collected data by the NFI. EFs might be updated from the annual measurements collected in the national network of permanent plots created for the NFI (48 over 96 plots including 22 plots in Semi-deciduous forests and 12 in Evergreen forests – see following box) and an update of the NFI every 10 years. For the NFI, a total of 620 clusters of inventory plots will be realized across the country in all strata (Table 36).

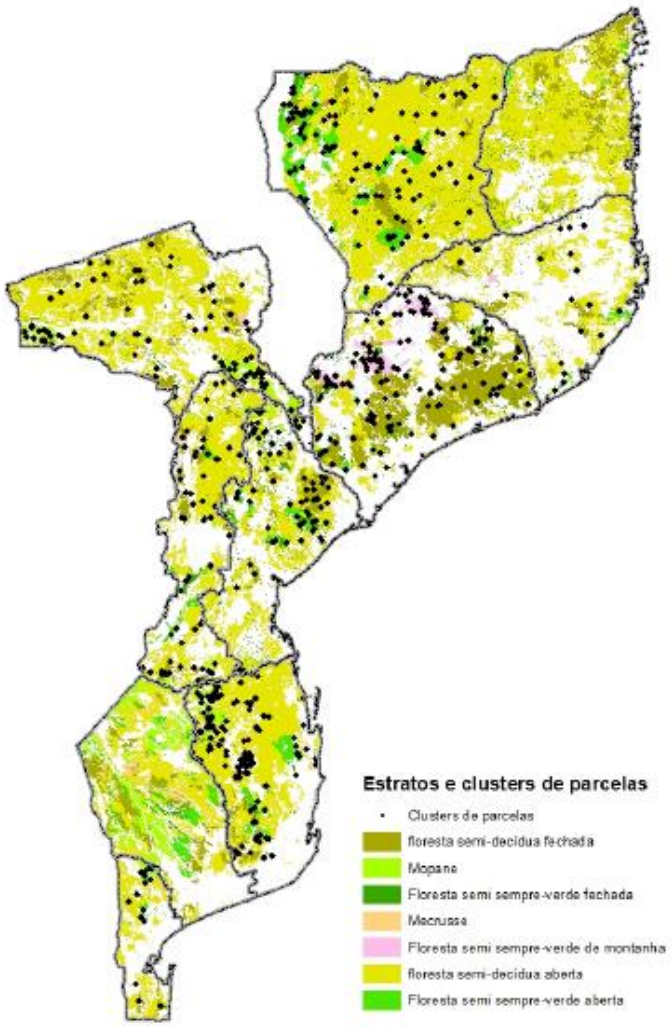


Figure 28: NFI plan in Mozambique

Clusters of the NFI are the same as those used for point sampling analysis of deforestation with remote sensing techniques. The shape of cluster for forest inventory is presented in Figure 28. On each plot, trees' DBH, height and species will be measured for the calculation of aboveground tree biomass and, soil (30 cm depth) and litter (on 25 x 25 cm sub-plots) will be collected for lab analysis. *A detailed procedure for the measurements to be done in each plots of the NFI is available as a separated document in Annex 3 of R-Package (Gonzalo et*

al., 2017). Allometric equations to calculate AGB for the NFI are not chosen yet - *the most updated list of questaions is available in Annex 12.* A synthesis of all equations existing for Mozambique have been produced but the best equations for each stratum have still to be selected.

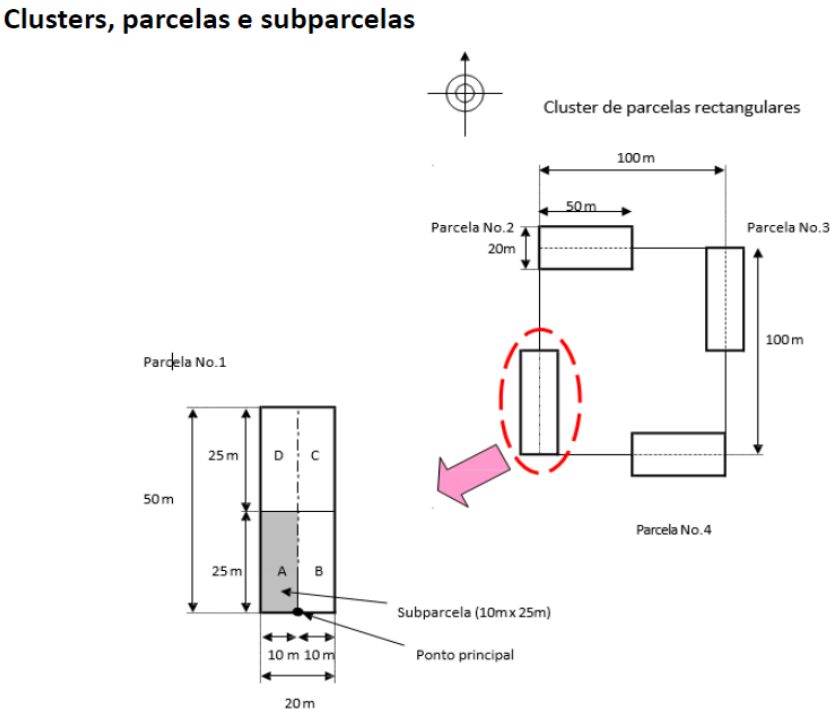


Figure 29: Shape of plots for the NFI in Mozambique

NFI is being coordinated by the DINAF and implemented by *Serviços Provinciais de Florestas e Fauna Bravia* (MITADER), DIRN, IIAM and UT-REDD+, and with the support of other collaborating Institutions (Eduardo Mondlane University). *The complete method and budget for the NFI is described in the Mozambique R-Package.*

With the results from the NFI, it will be possible to calculate by the beginning of 2018 the carbon content for aboveground (AGB) and below-ground biomass (BGB), dead organic matter (litter and dead wood) (DOM) and soil pools (SOC) by vegetation type/ land use, and the corresponding EFs**. Methods of the NFI are presented here but if carbon pools that are not included in the present document happen to be significant, they will not be integrated in the RL in respect of the FCPF MF.**

However, results from NFI for the carbon stocks national average of the forest strata of interest in the ER Program area (Miombo, Mopane, Montane and Coastal forests or Semi-deciduous and Evergreen Forests) will be used to update EF in the next MRV session (expected to be available end of 2018). Update of the RL of the ER program using the new EFs is currently not allowed by the CF; if allowed in the future the RL will be revised accordingly, perhaps using a new stratification that disaggregates the semi-deciduous class in Mopane and Miombo, and the evergreen class in Coastal and Montane and for which AD is reported in this ERPD, see Table 38.

Box 8: Establishment of a National Net of Permanent Plots (2018)

The MRV team of the FNDS in close collaboration with IIAM, UEM, DINAF and JICA, has planned to establish a net of permanent plots (RNPAP - *Rede Nacional de Parcelas de Amostragem Permanentes*) in key ecosystems in Mozambique to deepen the knowledge of species composition, structure, dynamic, and specifically to serve as a basis of the MRV system allowing estimate repeatedly over time key carbon stocks and EFs. It is intended to add 60 permanent plots to the existing 36 and complete the representativeness of the different vegetation types. In the following table, the distribution of permanent plots by vegetation types in forest ecosystems in Mozambique is summarized (preliminary proposal). The total net of permanent plots should be measured again every two years to report differences in carbon stocks and EFs (half of the plots are measured per year). It is a sustainable proposal on which the EFs' updating process (Tier 3) could be based, rather than on the National Forest Inventory that should be updated every 10 years.

Table 55: Permanent plots

Vegetation types	Existing variables	Additional variables	Permanent plots that already exits	New permanent plots
Floresta sempre verde	DBH, Ht, Hcomercial, quality, health status and altitude	Aboveground biomass (AGB) and below ground biomass (BGB), dead organic matter (litter and dead wood) (DOM) and soil pools (SOC), EFs	5	10
Floresta sempre verde de montanha	DBH, Ht, Hcomercial, quality, health status and altitude	Aboveground biomass (AGB) and below ground biomass (BGB), dead organic matter (litter and dead wood) (DOM) and soil pools (SOC), EFs	0	12
Floresta semi decidua	DBH, Ht, Hcomercial, quality, health status and altitude	Aboveground biomass (AGB) and below ground biomass (BGB), dead organic matter (litter and dead wood) (DOM) and soil pools (SOC), EFs	0	12
Miombo	DBH, Ht, Hcomercial, quality, health status and altitude	Aboveground biomass (AGB) and below ground biomass (BGB), dead organic matter (litter and dead wood) (DOM) and soil pools (SOC), EFs	19	3
Mopane	DBH, Ht, Hcomercial, quality, health status and altitude	Aboveground biomass (AGB) and below ground biomass (BGB), dead organic matter (litter and dead wood) (DOM) and soil pools (SOC), EFs	9	6
Mecrusse	DBH, Ht, Hcomercial, quality, health status and altitude	Aboveground biomass (AGB) and below ground biomass (BGB), dead organic matter (litter and dead wood) (DOM) and soil pools (SOC), EFs	3	7
Mangal	DBH, Ht, Hcomercial, quality, health status and altitude	Aboveground biomass (AGB) and below ground biomass (BGB), dead organic matter (litter and dead wood) (DOM) and soil pools (SOC), EFs	0	10
Galeria	DBH, Ht, Hcomercial, quality, health status and altitude	Aboveground biomass (AGB) and below ground biomass (BGB), dead organic matter (litter and dead wood) (DOM) and soil pools (SOC), EFs	0	0
Savana	DBH, Ht, Hcomercial, quality, health status and altitude	Aboveground biomass (AGB) and below ground biomass (BGB), dead organic matter (litter and dead wood) (DOM) and soil pools (SOC), EFs	0	0
Total			36	60
Grand Total				96

Monitoring of DOM

During the NFI, carbon stocks of the Dead Organic Matter pool will be measured in trunks lying down on the soil. In each inventory plot, diameter (if above 10 cm) of the lying trees intersection in the central axe will be measured as presented in the following figure. For each tree the following information will be needed: tree species (vernacular, commercial and scientific names), tree diameter and decomposition state of a scale of 3 classes. However, **even if this pool is accounted for in the NFI, it will stay excluded in the Program's RL and MRV**.

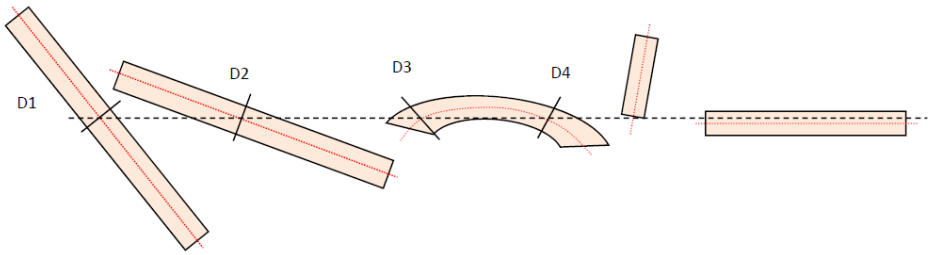


Figure 30: Diameter measurement of lying trees on the central axe of inventory plots

Monitoring of SOC

Soil Organic Carbon will also be estimated during the NFI. At each plot center (4 plots per cluster), samples of litter on a 25x25 cm square and of soil collected with a auger on the first 30 cm of depth will be collected (Figure 31). A total of 1 kg of soil will be collected in each cluster (addition of the samples of the 4 plots of each cluster). Samples will be sent for analyses at the laboratory of the UEM in Maputo. For the estimation of the soil density, an undisturbed sample of soil will also be collected in each plot. This sample will be weighted after having been dried. However, even if this pool is accounted for in the NFI, **it will stay excluded in the Program's RL and MRV**.

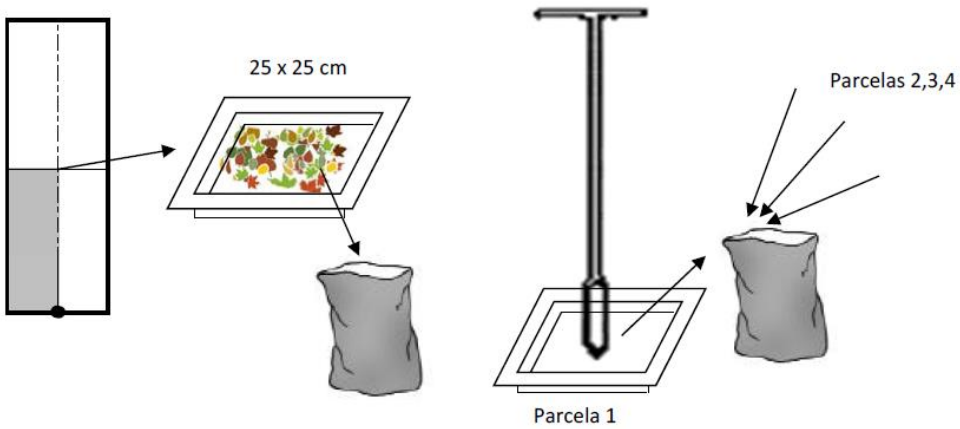


Figure 31: collection design for the litter and soil sample in inventory plots

Human resources and material

In each province, 8 field teams are mobilized for the NFI. A team is composed of:

- 1 team leader, responsible for the location of plots, the delimitation of plots with guides, the filling of field forms and for getting the insurance that all required data have been collected on a plot;
- 3 technicians, for measurement purposes: 1 for the measurement of tree diameter, 1 for tree height and 1 for collection of soil and litter samples in addition to the measurements of the diameter of lying trees;
- 1 botanist for tree species identification;
- 2 guides who help to locate the plots and to facilitate the access.

After fieldwork, data sheets are sent to the FNDS specialists for analysis. The Material used is the following:

- A GPS for plots center location;
- A measuring tape for the plot delimitation;
- For tree measurements in order to estimate AGB: a measuring tape for DBH, a hypsometer (Vertex) for tree height and a machete to evaluate decomposition state of lying trees;
- For soil and litter samples collection: a measuring tape, plastic bags, a weighting scale, an auger and a metallic cylinder.

List of monitored parameters:

Parameter	ΔAGB_{strata}
Description	Difference between AGB on pre- and post-deforestation strata, for each stratum of the Program (i.e. semi-decidious, evergreen and mangrove forests)
Data unit	tCO_2e/ha
Source of data or measurement/calculation methods and procedures to be applied (e.g. field measurements, remote sensing data, national data, official statistics, IPCC Guidelines, commercial and scientific literature), including the spatial level of the data (local, regional, national, international) and if and how the data or methods will be approved during the Term of the ERPA	Average carbon stocks from NFI (national scale or Provincial scale) for each stratum included in the program
Frequency of monitoring/recording:	Every year on half of the permanent plots and repetition of the NFI every 10 years
Monitoring equipment:	Inventory material (measuring tapes, GPS devices, clinometer, etc.)

Quality Assurance/Quality Control procedures to be applied:	Confidence interval per forest stratum will be calculated from inventory data
Identification of sources of uncertainty for this parameter	Uncertainties are from (i) the representativeness of selected plots to the whole strata, (ii) the evaluation of DBH and tree height from field operator and (iii) error related to the allometric equation used.
Process for managing and reducing uncertainty associated with this parameter	Sufficient number of plots to be representative
Any comments	

Parameter	DOM and SOC per stratum
Description	Carbon stocks in DOM and SOC pools on pre- and post-deforestation strata, for each stratum of the Program (i.e. Miombo forest, mangroves, montane forests)
Data unit	tCO_2e/ha
Source of data or measurement/calculation methods and procedures to be applied (e.g. field measurements, remote sensing data, national data, official statistics, IPCC Guidelines, commercial and scientific literature), including the spatial level of the data (local, regional, national, international) and if and how the data or methods will be approved during the Term of the ERPA	Average carbon stocks from NFI (national scale or Provincial scale) for each stratum included in the program
Frequency of monitoring/recording:	Every year on half of the permanent plots and repetition of the NFI every 10 years
Monitoring equipment:	Inventory material (measuring tapes, GPS devices, auger, etc.)
Quality Assurance/Quality Control procedures to be applied:	Confidence interval per forest stratum will be calculated from inventory data
Identification of sources of uncertainty for this parameter	Uncertainties are from (i) the representativeness of selected plots to the whole strata, (ii) the quality of the samples collected by the field operator and (iii) error related to analysis in the laboratory.
Process for managing and reducing uncertainty associated with this parameter	Sufficient number of plots to be representative
Any comments	

Community participation in monitoring

In accordance with criterion 16 of the FCPF MF (2016a), the ER-program has explored opportunities for communities to participate in monitoring and reporting for carbon and non-carbon benefits and safeguards. Carbon accounting will be based on techniques ensuring high qualification and will be managed at national level because it is completely linked to the NFMS. Hence, it would not be relevant to include communities in this system.

The MRV system is national so all the measurement and reporting of GHG emissions will be done nationally. However, monitoring of REDD activities will follow a separate stream, which is the Participatory Monitoring system (PMS).

Participatory monitoring at local level (From R-Package)

Besides the contribution of different national entities, in the context of a national forest assessment and monitoring, time and financial resources to support participatory approaches of communities (PMS) for the monitoring of activity data or emissions factors is very limited.

The lowest level of the monitoring system consists of projects or interventions that will have their own monitoring systems to collect relevant information for feeding the national PMS. The information will include for instance data reported by REDD+ projects, M&E systems or other data (see below). It will be necessary to ensure that all these data will be generated and reported in a consistent manner. Opportunities for community participation are described hereafter.

Aerial photographs and satellite images haven't proved very functional in the village context; high costs, limited availability and need of abstraction of lower resolution imagery - it has been demonstrated in the early stages of implementation of the national forest inventory where it has not been operationally possible to implement at the same time the collection of forest information and other indicators more related to the Safeguards Information System (Social and Environmental variables).

Conversely, Google Earth covers most rural landscape areas at a high resolution with fairly updated images, meaning that it is possible to view villages and landscapes in considerable detail. It is thus adequate to conduct "virtual transects". It would be possible to conduct village focus groups discussions pinpointing areas in the landscape using Google Earth and with the LULC and LULC change products biennially generated. For this purpose Internet connectivity is not necessary, as it is possible to download workable imagery of the village areas to be discussed ahead of time.

Local level interpretation of Google Earth images (key informant and focus group) is recommended in order to assess currents LULC and LULC changes. It would be possible to organize focus group with a computer running Collect Earth and pick out points in the landscape on the grid of particular interest to develop a further understanding of e.g. current LULC, recent or past changes of LULC, management regimes of particular forest blocks, social and economic conditions etc.

Thus a combined biophysical and socio-economic survey (e.g. a household survey, part of the SIS) could be conducted at the same time with the proper design of tables and forms that will be more effectively and efficiently answered in a focus groups setting, with the support of the Collect Earth tool. These forms will be accessible by clicking on the grid plots in Google Earth.

Another relevant activity would be the survey with GPS of the perimeters of afforested / reforested areas (Enhancement of Carbon stocks A/R) and areas of intervention or implementation of the project or program activities. The results of these analyses could be sent (uploaded to the platform: NFMS) to UT-REDD+. This information might also feed the MRV system in terms of ground reference data that could serve to improve existing forest cover products.. Through pilot testing of the PMRV system in Mozambique in 15 districts of the Cabo Delgado and Zambezia provinces during the 2018, optimal areas will be detected for local interpretation (square rectangle that represents the surroundings of the village: e.g. 15 km).

Participatory Monitoring at jurisdictional and provincial level

The PMS applying to the ER Program builds on the national PMS.. This activity will most probably be coordinated by the PIU which will compile all primary and secondary data from the project level and would check and ensure that all data has been collected and reported following the defined standards or guidelines. The compiled data would be communicated to the national level where it would be processed. The results of this processing will then be reported again to national level.

9.2 Organizational structure for measurement, monitoring and reporting

The national MRV system has the overall objective of organizing and coordinating, with standardized and internationally accepted procedures, the quantification of emission and removal of greenhouse gases (GHG) from the Agriculture, Forestry and Other Land Use (AFOLU) sector. The national MRV for Mozambique will measure, report and verify deforestation, forest degradation and enhancement of carbon stocks (A/F) through the implementation of a the National Forest Inventory (NFI) and the National Net of Permanent Plots, combined with forest area change mapping.

The MRV system is centralized at national level, in line with UNFCCC decisions relying on existing systems, ensuring the sustainability of the system and avoiding the creation of duplicities. The reported results must be consistent with UNFCCC communications. Any results reported at sub-national level have to be fully consistent with the UNFCCC communications, meaning consistent with the reported results by the national MRV system. The aspects not related to carbon will be monitored through the PMS which is a multi-scale system (national, provincial and local) respecting a top-down approach, with integration of low level data at higher level.*The organizational structure of the MRV system for the ER Program is based on national arrangements, explained below. It is summarised in the* Figure 32 *and the responsibility of each actor is summarized in* Table 56*.*

National supervision and coordination of the MRV system - A stated in section 6.1, the national supervision and coordination of the MRV system will be the responsibility of the FNDS, at central level, and PIU, representation of FNDS at program level This team will be responsible for coordinating all works related to MRV, including the implementation of the

NFMS, the SIS and the GHG inventory[65] (Figure 32).

According to the new REDD+ Decree (April 2018 – article 10), the FNDS will be responsible for managing the national REDD+ Programs and Projects Data Management System and for communicating to the entity in charhe of managing the ER Transactions Registry (who will be the MEF, according to the same decree – Articles 14 and 26) all information related to ERs generated by REDD+ projects, including by the ZILMP.

The MRV team is composed of 5 technicians who are trained to remote sensing and forest resources analysis. They are responsible for the measurement, monitoring and reporting of activity data and carbon stocks from NFI. They will collect primary data at national level and will compile primary and secondary data coming from provincial or local level, thanks to the information provided by the PIU in Zambézia (see below). The MRV team is currently preparing the LULC 2016 map based on Sentinel-2 products. They will produce LULCC maps and analyze results from NFI. With these data, the MRV team will produce official Activity Data and Emission Factors and will calculate the Emission Reductions of the ZILMP.

Monitoring at program level - A program MRV unit is located within the PIU (Program Implementation Unit) in Mocuba. It is composed of 2 persons. They will be responsible for extracting data from national monitoring for the ER Program and to guarantee the flow of data to the relevant beneficiaries. They will also assure the link with other projects and programs that may have their own measurement and monitoring systems in the ER Program area. The program unit will also be responsible for compiling data from communities about the ER Program activities.

Monitoring at local level - Local offices for community monitoring will be created in each district where local activities have to be monitored. CGRNs, where they exist, will be reinforced for that purpose. Data from this monitoring will be transmitted to the PIU. Project implementers can also develop their own monitoring system and report to the PIU and FNDS in a consistent manner, following national standards, but no nesting of REDD project is provided.

Complementary information on institutional arrangement for PMRV is provided in section 6. A complete document is available at FNDS describing the national PMRV system. The PMRV system will be tested in several districts of the Zambezia and Cabo Delgado Provinces, in 2018 and it will be fully operational by July 2018.

65 The UT REDD+ is in charge of informing DINAB on the GHG inventory related to forest.

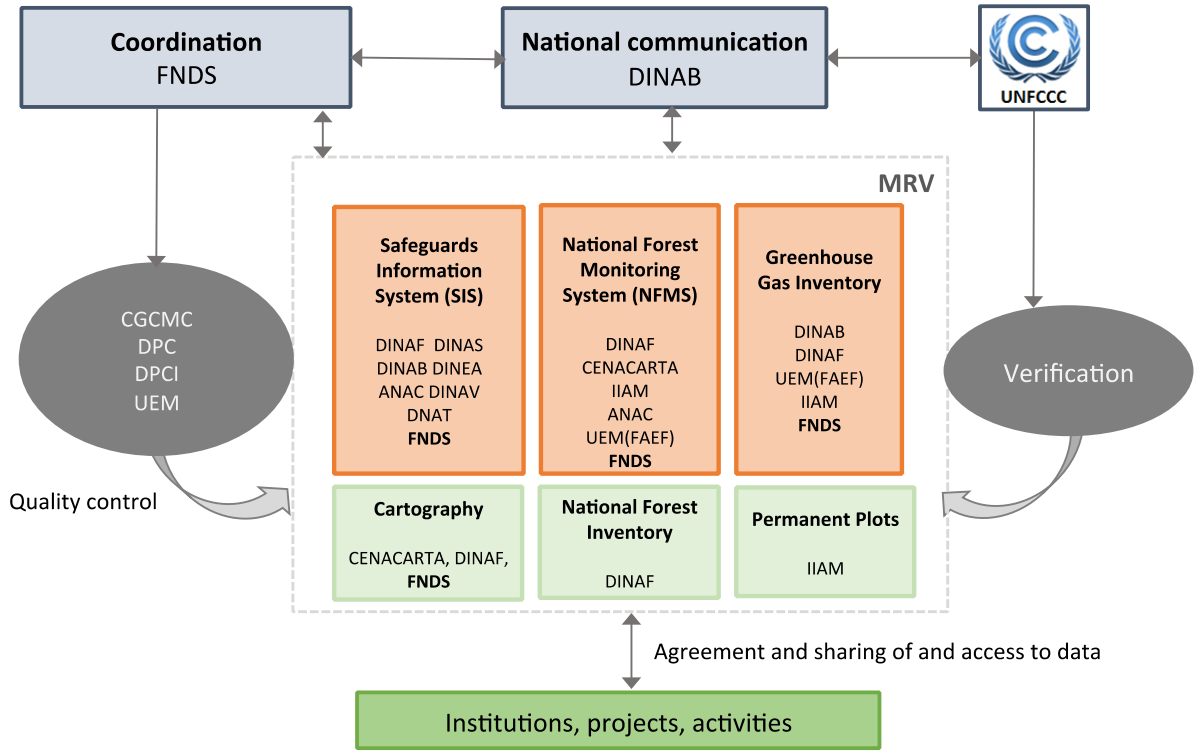


Figure 32: Institutional arrangements at national level for the MRV (From R-Package – Annex 7)

Production and management of data - As shown in Figure 32, the MRV institutional arrangements for the ER Program will primarily rely on governmental structure, with each of the relevant directorates in the MITADER and MASA involved. The DINAF is especially expected to ensure a key role in the process, accordingly with its national functions[66]. Relevant partners expected to participate also are:

- The National Center for Cartography and Detection (CENACARTA): CENACARTA, through the processing of satellite images, cartography and tele-detection, has a high capacity to process and distribute the images, produce land cover and land use maps, including changes;
- The National Institute for Agrarian Research (IIAM): the IIAM has a Department of Natural Resources with various sections including Forests, Gene Bank, Water Management and Management of Soil Fertility, equipped with human capacity and materials for soil analysis. This capacity can be used to assess change of carbon stocks as result of current uses and adoption of REDD+ activities. They will be in charge of the management of the permanent plots network with financial support of the UT-REED;
- The Department of Forestry of Eduardo Mondlane University (UEM-FAEM): the UEM-FAEF (Faculty of Agronomy and Forest Engineering) is used to research on various forest issues including remote sensing and aerial photography to assess vegetation,

[66] *Conducting national inventories at national scale as well as provincial and regional level; processing and analyzing satellite imagery on forest cover; defining forest use categories and producing of forest maps, etc.*

changes in forest cover, forest degradation, change of species composition, assessment of forest biomass and stocks of carbon in the forest ecosystems. UEM also offers training to institutions at national and local level, including districts and communities on MRV.

Table 56: MRV institutional arrangements and roles (from Gonzalo, 2016 – R-Package)

Activities	National Level	Provincial Level	Project Level / Communities
Measurement	▪ MRV Unit at FNDS will produce the LULC map and disaggregate it into adequate forest classes and will implement the AD analyses. ▪ MRV Unit regularly will collect primary and secondary data (AD/EFs) from lower MRV levels, will analyze and compile this data. ▪ The MRV Unit elaborates the GHG emission calculation at national, provincial and project level.	▪ MRV team at provincial UT-REDD+ will collect, compile and analyze primary and secondary data on project interventions, e.g. emission factors, boundaries of activities, lulc changes, etc. This includes databases, GIS and remote sensing data.	▪Project implementer will design its own monitoring system (following national guidelines) and will collect and analyze primary and secondary data within project boundaries; e.g. forest inventory data, boundaries of activities, lulc changes mapping, etc. This information includes databases and GIS data. •Relevant forest information and socio-economic and environmental information will be collected at Community level.
Reporting	▪ MITADER (appropriate directorate: DINAB) is responsible for reporting at international (UNFCCC) and National Level and also for generating the information in collaboration with provincial institutions and project implementers for program and project reports. ▪ MITADER (appropriate directorate:DINAB) reports to UNFCCC.	▪ UT-REDD+ is responsible for compiling results from the Provincial MRV Unit for the province and reports in form of a Monitoring Report.	▪Project implementer is responsible for compiling results from the Federal MRV Unit and Regional MRV Unit for the project and reports in form of a Monitoring Report.
Verification	▪Third party national or international (accredited agency)		

The current timeline for the MRV system and the chronological plan for MRV are presented in the following figure and table.

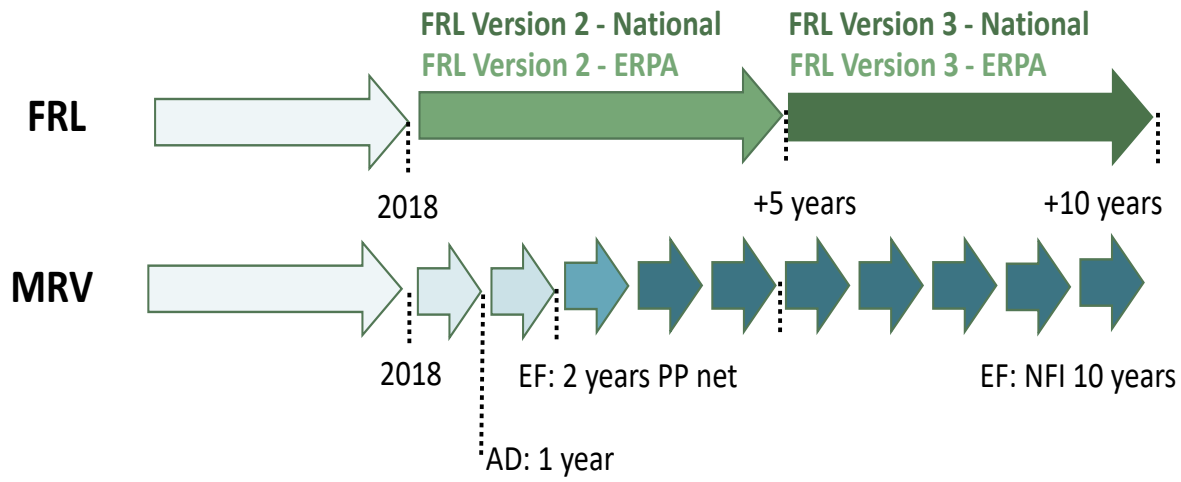


Figure 33: national MRV timeline

Table 57: Chronological MRV plan as scheduled by FNDS

Tasks		2016	2017	2018	2019	2020	2021	2022
National Forest inventory	Preparation							
	Training							
	Launch							
	Field work							
	Data analysis							
	Report							
	Dissemination of results							
LULC map 2016 Sentinel 2	Preparation							
	Sampling Collection							
	Segmentation and classification							
	Report							
	Dissemination of results							
Activity data Sampling method	Training							
	Data collection and classification							
	Report							
	Verification							
	Validation							
	Dissemination of results							
Permanent Sampling Plot Project	Creation of RNPAP							
	Production of PSP manual							
	Project Design							
	Establishment of PSPs							
	Monitoring of PSPs							
	Reporting							
Participatory MRV	Concept project							
	Detailed project design							

	Implementation							
	Reporting							
Knowledge management	Needs assessment for training							
	Training							
	Development of manuals and Standard procedures							
	Dissemination of information							
MRV equipment/ Infrastructure	Needs assessment							
	Procurement							
	Equipment maintenance							
Coordination	Need assessment for coordination							
	Establishment of mechanism of coordination							
	Monitoring							
Platform for SMF	Assessment needs for the platform							
	Development/ Improvements on the platform							
	Monitoring							
	Reporting							
Improvement methodologies for estimation of carbon stocks	Assessment needs for methodologies and studies							
	Prioritization							
	Acquisition							
	Implementation							
	Monitoring							
	Reporting							

9.3 Relation and consistency with the National Forest Monitoring System

Since a NFMS is currently under development in Mozambique, in respect to criterion 15 of the FCPF MF (FCPF, 2016a), the MRV system of the ER Program will follow the NFMS as described in section 9.1. For each monitoring event, data for the ER Program will be extracted from results of the national monitoring, which is described previously. Thus, the MRV system is perfectly consistent with the NFMS. As the NFMS will be spatially explicit, performance of zones of interest can be specifically monitored for benefit sharing purposes.

10. DISPLACEMENT

According to criterion 17 of the FCPF MF (FCPF, 2016a), the ER Program should be designed and implemented so as to "prevent and minimize potential Displacement" of emissions from the ER Program Accounting Area to outside of it. The ER Program fully complies with this requirement.

10.1 Identification of risk of displacement

The ER Program is not expected to generate any displacement of emissions, as it was already stated in the ER-PIN (UT REDD+, 2015a). The only possible displacement of emissions may be related to the risk of market leakage, depending on the evolution of the prices of precious timber on the international market - on which the ER Program has no grip.

Admittedly, as shown in section 4.3, the planned interventions under the proposed ER Program are all addressing the main drivers of deforestation and forest degradation in the ER Program area through specific and targeted measures. **Those measures are primarily based on incentives and on the valorization of non-carbon benefits rather than coercive and, therefore, are expected to lower the appeal of deforestation and forest degradation *per se* for the agents of deforestation** – which should contribute to reducing the risk of displacement. The only coercive measures are related to interventions aiming at reducing artisanal logging of precious timber (through support to AQUA - EA-C2 - and law enforcement around the GNR - EA-C1 - for instance) – which already is an illegal activity also addressed at national scale by the GoM outside of the ER Program.

Those interventions were defined taking into account (i) the strategies and needs of the agents of deforestation and (ii) the main barriers to REDD+ in Mozambique – including potential institutional weaknesses, which are addressed in section 6. Their associated risk of displacement was assessed and categorized, according to criterion 17.1 of the FCPF MF (FCPF, 2016a).

This section focuses on the direct drivers of deforestation.

Figure 34: Reminder of the main drivers and agents of deforestation and forest degradation in the ER Program area

Table 58: Identification of risks of displacement of emissions

Driver of deforestation or degradation	**Small scale agriculture based on "slash and burn" techniques**
Risk of displacement	**Low**
Main agents of deforestation / degradation identified	Smallholders and local population
Explanation / Justification of risk assessment	As stated in section 4.1, the main driver of deforestation in the ER Program area is small-scale agriculture based on "slash and burn" techniques. Displacement of "slash and burn" agriculture because of the ER Program is very unlikely to happen. One of the priority objectives of the ER Program is, precisely, to reduce deforestation through land intensification and progressive disappearance of itinerant agriculture. Because the main agents of deforestation are smallholders and local population, the displacement of "slash and burn" agriculture outside of the ER Program area would imply a significant population displacement far from their current localization, which is not expected to happen. In any case, if smallholders were really prone to displacement because of the ER Program, they would likely migrate to forestland areas; yet, at national scale, there is few – if any – other districts with as much forest cover as those comprised in the ER Program area. Their displacement would therefore be limited within the ER Program Accounting Area. In addition, one of the most important ER Program interventions is the implementation of sustainable agricultural techniques (conservation agriculture) in the ER Program area (ERI-D1), which is expected to favor agricultural activities' settlement through land intensification. The ER Program provides for the training of smallholders (main agents of deforestation) in order for them to adopt and benefit from sustainable and settled agriculture. The ER Program seeks to lower deforestation with the actual increase of agricultural production in the ER Program area, through sustainable and improved practices based on - in addition to conservation agriculture: (i) support to cash-crops production (ERI-D2); (ii) support to the establishment and strengthening of commercial agriculture (ERI-D2) and (iii) the strengthening of NTPF valorization around the GNR (ERI-D5). Those measures are expected to generate new agricultural and commercial opportunities for smallholders in the ER Program area. The potential additional revenues generated will contribute to the long-term settlement of agricultural practices, agents of deforestation and drivers of deforestation, thus reducing the risk of displacement of deforestation. **All in all, the ER Program is therefore not based on the prohibition of any agricultural practices – except in the central zone of the GNR,**

	which has already been the case over the past 10 years - which could have generated displacement of "slash and burn" agriculture. Conversely, it is based on incentives for agricultural intensification and settlement within the ER Program area. At this stage, it should be reminded that, although this section focuses on the risk for the displacement of emissions from the ER Program area to outside of the ER Program area, a possibility that could also be forecasted is the displacement of emissions that were occurring outside of the ER Program area to inside of it, due to population increase. If the ER Program area is to become an appealing area to live in, thanks to the success of the ER Program, one could argue that more people may want to live in this area, especially in a context of fast growing population. However this risk is considered as low: a scenario is which the ER Program area would become a "high standard living place" in comparison to neglected neighboring areas, making local population decide to massively move towards the ER Program area, is very unlikely to happen. The rest of Zambézia province will not be abandoned on behalf of the ER Program, which fits into a broader REDD+ framework. Other activities, aiming at improving the quality of life of local population, are occurring in Zambézia even if they are not part of the ER Program area. In any case, the planned interventions of the ER Program, addressing anthropogenic causes of deforestation and forest degradation, were defined so as guarantee the actual reduction of emissions in the ER Program area, taking into account various possible variables, with projection of future deforestation and map of risks of future deforestation. *See section 12 on uncertainties on the accuracy of planned ER.*
Driver of deforestation or degradation	**Charcoal production**
Risk of displacement	**Low**
Main agents of deforestation / degradation identified	Smallholders and local population
Explanation / Justification of risk assessment	As stated in section 4.1, charcoal production may be a driver of forest degradation, but is it above all strongly linked to agricultural practices (see Box 2). Most of the time, the agent of deforestation and forest degradation linked to charcoal production is the local population, also engaged in other activities that are often, is not always, agriculture. Charcoal production actually is a typical by-product of "slash and burn" agriculture (see Box 2). Consequently, in this case too, a displacement of charcoal production due to the proposed ER Program measures would imply a massive population displacement from outside of the 9 districts that compose the ER Program area, which is not expected to happen.

	This is also reinforced by the fact that charcoal production is located close to demand areas that are the urban centers within the ER Program area. Because population growth is expected to continue its high progression, charcoal demand is also expected to increase in the ER Program area. Consequently, the ER Program interventions comprise a significant component of charcoal production improvement rather than prohibition, in order to limit its impact on forest cover (see ERI-D4). This, too, is likely to reduce any risk of displacement of charcoal production. Admittedly, the ER Program interventions linked to charcoal production follow the same logics as those focusing on small-scale agriculture: no practices are prohibited but the measures rely on the improvement of the production techniques in order to meet the increasing demand with sustainable practices ensuring the maintaining of forest cover. The creation of fast growing species plantations for energy purpose (see ERI-D3 & ERI-D4) and the improvement of kiln yields (ERI-D4) are expected to create a "win-win environment" in which charcoal production displacement outside of the ER Program area would not benefit the agents of deforestation, reducing this risk.
Driver of deforestation or degradation	**Unsustainable forestry practices, including illegal logging**
Risk of displacement	**Medium**
Main agents of deforestation / degradation identified	Industrials / concessionnaires; local population / artisanal (illegal) loggers
Explanation / Justification of risk assessment	*Because unsustainable forestry practices and illegal logging are very linked, they are here addressed together. At this stage, it should be reminded that they are mainly responsible for forest degradation (and not deforestation), of which the emissions are not accounted for in the ERP.* As stated in section 4.1, deforestation linked to forestry is mainly driven by: (i) the too rapid expansion of areas granted under simple licensing exploitation, with subsequent fast exploitation of non-selected timber and by (ii) non-sustainable exploitation practices in both concessions and simple licenses areas, with too short cutting cycles. The proposed ER Program measures addressing this issue (EA-C2) are mainly focusing on improving the management of the sector and the relationship between industrials and local communities (EA-A3 through the MSLF and EA-C2 through the National Forest Forum) – such activities are not expected to motivate any displacement. All the more so as the ER Program interventions focusing on improving governance and transparency in the forestry sector (EA-C2) will also be implemented at national scale (improvement of national monitoring, for instance). This should help adopt a comprehensive approach and address any risk of displacement outside of the ER Program area, which will not be treated in isolation from the rest of

the national territory.

In addition, the risk of displacement linked to the attribution of new licenses outside of the ER Program area to compensate for the ER Program interventions is mitigated by the recent adoption of the Moratorium on the attribution of new concessions and licenses at national scale (see table 20) It should be reminded that forest concessions in the ER Program area are granted for 50 years and a significant part of forest concessions and simple licensing in the ER Program area were granted between 2011 and 2015. In 2015, 31% of the area covered by the districts of Gilé, Pebane, Ilé, Alto Molocué, Mulelava, Mocubela and Maganja da Costa was under forest concessions regimes (see section 4), concessionaires being bound for several years to their leasing contract within the ER Program area: they are unlikely to move outside of the ER Program area to exploit new concessions.

Illegal logging, which is a significant driver of forest degradation in the ER Program area, is essentially driven by the international demand and failure of local law enforcement. The proposed ER Program measures aiming at reducing this driver are essentially based on increased surveillance and law enforcement and on improved forest management in the ER Program area (see EA-C1). For instance, the GNR and its surroundings, which are preferred zones of illegal logging because they entail significant and precious tree species such as *pau-ferro (Swartzia madagascariensis)*, are covered by the ER Program interventions and will benefit from enhanced law enforcement measures (EA-C1).

However, the risk of displacement of emissions related to forestry and logging still exist: because illegal logging is linked to international demand and illegal exports of unprocessed timber for first class species that are also available outside of the ER Program area, the ER Program interventions aiming at reducing this driver may not be sufficient to limit the risk of displacement in other areas in Mozambique. In the same way, and independently from the success of the ER Program measures and from law enforcement in Mozambique, a risk of international displacement towards other (and neighboring) countries exists (market leakage), due to the causal relation between logging and the prices of precious timber on the international market, on which the ER Program has no grip.

10.2 ER Program design features to prevent and minimize potential displacement

As stated in section 10.1, the risk for the displacement of emissions from the ER Program area to outside of the ER Program area is expected to be limited – if any. The table below details the mitigating measures aiming to minimize any unplanned risk of displacement linked to the proposed ER Program measures. Those mitigating strategies are not exhaustive and should be apprehended in the framework of the ER Program as a whole, of which the comprehensive approach enables to forecast an overall net benefit of emissions reductions. *More details are provided in section 4.3 with the description of ER planned interventions.*

Table 59: Mitigation of the risks of displacement and prioritization of sources of displacement

Identified risk of displacement	**Unsustainable forestry practices, including illegal logging**
Prioritization	***1 - Medium risk of displacement & medium significance in ER Program area***
Risk mitigation measures	As stated above, the proposed ER Program interventions aiming at reducing unsustainable forestry practices and illegal logging may not entirely limit the risk of displacement of this driver outside of the ER Program area. The main strategies and intervention of the ER Program with this regards are expected to contribute to the reduction of those unsustainable practices in the ER Program area through (*see section 4.3*): ▪ Improving law enforcement around the GNR (EA-C1) and at broader scale (through supporting the government's forest law enforcement institutions – EA-C2); ▪ The creation of online forest platform to increase transparency in forest sector – GIS platform (EA-B2) - *see sections 4 and 6 for more details*; ▪ Strengthening forest governance, transparency and forest management (EA-C2) in the ER Program area and at national scale. The remaining displacement risk is expected to be mitigated by: o The overall approach of the ER Program that, based on a comprehensive vision, aims at improving livelihood in the ER Program area: through addressing the underlying causes of deforestation in the ER Program area, increasing smallholders' revenues and improving local population livelihood (*see section 4*), the ER Program is expected to reduce the appeal of deforestation and forest degradation practices, including illegal logging. o Governmental initiatives outside of the scope of the ER Program and at national scale, with which the ER Program is aligned. Those mitigating measures include the overall reform of the forest sector law (supported by MozFIP – *see section 4.1*) and the recent adoption (January 2016) of a moratorium on the harvesting of *pau-ferro (Swartzia madagascariensis)* -

	which is the species that is the most illegally logged - and on exportation of unprocessed logs, whatever the wood type[67]. In 2015, the GoM had already suspended the issuing of new permits for logging, for a period of two years. Those are core concern of the ongoing forest sector law revision. Those measures are expected to highly contribute to mitigate any risk of displacement linked to the ER Program interventions with regards to illegal logging and unsustainable forestry practices. Applied at national level, they are expected to reduce the global volume of logging in Mozambique and are fully complementary to the ER Program measures in Zambézia. Granted, the risk of displacement due to of market leakage can hardly be fully mitigated. It should be considered as an "acceptable" risk, providing that is it not dependent on the good implementation of the ER Program but on the evolution of timber prices the international market. Consequently, this overall risk is considered as “medium”: although there is still a risk of displacement at the international level, governmental initiatives (including ban on pau ferro harvesting, ban of unprocessed logs exports, ban on attribution of new concessions) and ER Program mitigation measures should reduce the risk of displacement at national level - *see also section 11 on reversals*.
Identified risk of displacement	**Small scale agriculture relying on “slash and burn” techniques**
Categorization	**2 - *Low risk of displacement & high significance in ER Program area***
Risk mitigation measures	As discussed above, small-scale agriculture does not involve any substantial risks for displacement. The main measures that are mitigating this risk are all contributing to the settlement of agricultural practices in the ER Program are through increasing the benefits associated to it for smallholders. They include: ▪ The promotion of conservation agriculture (ERI-D1) through trainings, support, and monitoring of smallholders’ activities (MozFIP and MozBio); ▪ The support to cash-crops (ERI-D2) and agroforestry system (ERI-D1) with the distribution of selected tree plants (distribution of at least 45 000 fruit trees) according to relevant markets to support agro-forestry systems, including 30 000 cashew trees around the GNR; 5 000 cashew producers should be trained on quality issues for their cashew nuts to meet specific quality standards and on the

[67] *The Ministerial Decree 10/2016 banned pau-ferro from logging for 5 years. The law entered into force on January 1st, 2016. The same document decrees closed in exploration of the species that produce the first class wood for 5 years period too.*

	maintenance of orchards. ▪ The support to the establishment of commercial agriculture in areas with no forest cover (ERI-D2) including the implementation of a market information platform to support producers, with the diffusion of information on markets dynamics and prices through SMS. ▪ The promotion of value chain development of non-timber forest products (NTFP) (ERI-D5), to improve and strengthen natural resource-based livelihoods of communities living in the ER Program area. In particular, the development of community management plans for non-timber products will ensure the long-term character of this initiative. *This list is not exhaustive. For more details please refer to section 4.3.* Finally, although it is very unlikely, the remaining risk of displacement of emissions that were occurring outside of the ER Program area to inside of it will be mitigated by the very existence of the PIU, which is assuming a significant role in the implementation of the ER Program (*see section 6*), to ensure that all activities will be well coordinated according to an integrated approach and landscape vision, in which MRV (*see sections 6 and 9*) holds a significant place to reduce the risk of un-forecasted deforestation/forest degradation. In the same way, it should be reminded that the ER Program activities are not random actions: they are well organized and were defined according to spatial geographic tools, including GIS techniques enabling to produce maps of risk of future deforestation based on projections on the evolution of the drivers of deforestation, which are all linked to anthropogenic activities.
Identified risk of displacement	**Charcoal production**
Prioritization	**3 - *Low risk of displacement & medium significance in ER Program area***
Risk mitigation measures	As discussed above, charcoal production does not involve any substantial risks for displacement. The main measures that are mitigating this risk are all contributing to the settlement of charcoal production in the ER Program are through making sustainable production of charcoal benefit small producers and local population. They include: ▪ The sustainable use of biomass through the introduction of improved and efficient kilns (ERI-D4), including the training of 165 charcoal producers to improved charcoal production techniques in the districts of Gilé and Pebane; ▪ The promotion of plantations for energy purpose (ERI-D4 and ERI-

D3). Those measures include the plantation of 10ha of fast growing trees for bioenergy production around the GNR.

For more details please refer to section 4.3.

11. REVERSAL

11.1 Identification of risk of reversals and ER Program

Within the scope of the ER Program, reversals refer to the non-permanence of removed carbon – that is, a reversal of the ER process. It occurs « if one or more disturbance event(s) result in the aggregate amount of ERs measured and verified within the Accounting Area for one reporting period being less than the aggregate amount of ERs measured and verified within the Accounting Area for the previous reporting periods » (FCPF, 2015). The risk of reversal is the risk associated with any physical disturbance within the accounting area that may result in a reversal (FCPF, 2015). The risk of reversal therefore represents the possibility of reversing climate benefits through the loss of forest carbon biomass that was not provided for in the rationale and design of the ER Program. Those reversals can be of anthropogenic nature (intentional) or linked to natural phenomena on which the ER Program has no control (unintentional).

Following indicator 18.1 of the FCPF CF (FCPF 2016a), this section aims to identifying anthropogenic and natural risks of reversal that might affect ERs during the term of the ERPA and undermine its sustainability. **Those risks of reversal can also be apprehended as potential ER Program implementation risks.** They have been summarized in the next tables, which also present the mitigation strategies associated with each identified risk, in accordance with criterion 18.2 of the FCPF MF (FCPF, 2016a).

Table 60: **Description, assessment and mitigation of Risk A**

Risk A - Lack of broad and sustained stakeholders' support
Associated sub-risks and factors:

- Continuation of Illegal logging;
- Limited adoption of improved agricultural practices with possibility of not substancial reduction of deforestation
- Limited adoption of improved charcoal production practices, with possible increase of forest degradation due to the increase profitability of charcoal production;
- Poor perception of carbon and non-carbon benefits generated by the ER Program;
- Limited understanding of REDD+ and of the ER Program;

- Lack of clear mechanisms for compensation and performance;
- Land conflicts.

Mitigation measures in the ER Program

The continuation of illegal logging and the limited adoption of improved agricultural and charcoal production practices can be apprehended as reversal risks as well as implementation risks.

The poor benefits of carbon and non-carbon benefits generated by the ER Program, the limited understanding of REDD+ and of the ER Program and the lack of clear mechanisms for compensation and performance may highly affect both the efficiency of the implementation of the ER Program and the reduction of emissions in the ER Program area, due to a lack a stakeholders' wish to really engage in the Program. Those risks will be addressed through several mitigation measures.

First, local population should be able to make use of a transparent, clear and well-known Feedback and Grievance Redress Mechanism (FGRM) all along the ER Program implementation process in order for their concerns and criticism to be taken into account in the design and implementation of the ER Program. As stated in (MITADER, 2016d), the grievance mechanism will be available to all Project Affected Persons throughout the project life cycle – *see section 14.* This is a key element that, at short term, will enable the ever-on-going definition of the ER Program so as to be as coherent as possible with stakeholders' needs and, consequently, maximize their chance of commitment to the Program; at longer term, and beyond the terms of the ERPA, is it likely to generate autonomous schemes respecting stakeholders' requirement and, therefore, having the potential to be maintained on the long run, beyond the project life time.

Linked to this component is the understanding by stakeholders of both REDD+ and the benefits linked to it. With this regards, it should be noted that, even out of the scope of the ER Program and according to the Ministerial Diploma n°158/2011 and the Regulation of the Land Law, community consultation is mandatory for all projects related to land use - *see section 4.5*. This is expected to favor long-term understanding of issues related to land, including REDD+. Communication with stakeholders in a transparent and participatory way is also ensured in the ER Program through the creation of the Zambézia Multi-Stakeholders Landscape Forum (MSLF) for which various MoUs will be signed, including with the ER Program implementing partners – *see section 5 on stakeholders' engagement*. Such platform should also guaranty the careful planning, implementation and monitoring of ER intervention in order to harmonize all interests. More importantly, the direct benefits of the MSLF for all stakeholders is expected to valorize such a participatory initiative on the long-term, including beyond the scope of the ERPA. In addition, the broad and sustained local population support is also ensured through the implementation of the MozBio project (*see section 4.1*) which focuses on providing communities with alternative livelihoods choices - in this case, some form of participating in conservation revenues - that can facilitate and promote a long-term change in behavior with regard to currently unsustainable land and natural resources management and use (Tanner, 2017a).

Admittedly, the risk of more efficient charcoal production practices leading to increased charcoal production (because of increased profitability) and further to increased forest degradation in the ER Program area cannot be ignored. However, this is not expected to happen and, on a precautionary note, mitigation measures have been planned. As already explained in section 4.3, the ER Program intervention to support sustainable charcoal production is part of an integrated landscape approach. As such: (i) it will help to supervise and regulate the production of charcoal (rather than leaving it as a non-addressed driver) so as to limit as much as possible the impact of this production on forest cover; (ii) it is not an isolated measure but comes as part of a conjunction of ER Program interventions that

are, altogether, contributing to reducing any risk of reversal linked to charcoal production, such as the support to charcoal producers organizations creation and the adoption of forest management plans, or the establishment of plantations for energy purpose, with fast growing species, which will be used for charcoal production; (iii) it will consequently be based on law enforcement, facilitated by the fact that, since the majority of producers also have another economic activity, they are settled in their area of production and can easily be identified to work with them on the adoption of sustainable practices based on relevant training and awareness rising. The ER Program will be able to monitor their actions.

With regard to illegal logging, the improvement of control, forest management and overall livelihood that the ER Program is expected to generate should reduce both the possibility and the appeal of illegal logging. In order to ensure the long-term reduction of illegal logging and the sustainable commitment of rural population to the ER Program, the interventions will partly focus on increasing revenues for smallholders in the ER Program area, as an incentive for their long-term endorsement.

In addition, improved accountability and « ownership » on forest areas through collaborative management and participatory forest monitoring are part of the proposed interventions – through the creation and maintaining of an efficient PMRV (*see section 14*) and participatory inventories of resources involving local communities and authorities.

They partly rely on a land tilting process, in order to provide security over land to all actors and particularly to the communities. This is an important component of the ER Program, supported by the "*Sustenta*" project and MozFIP – *see section 4*. It will include efficient delimitation and zoning of the areas of interventions. This mitigation measures is significant: as stated by (Tanner, 2017a) and as previously explained (*see section 4.4*), land tenure is a major risk for the ER Program and, in general, for the adoption of long term sustainable behavior with regard to natural resources, if it is not adequately dealt with: secure land tenure rights are the bedrock upon which “alternative means of economic and food security” can be built. Land rights are therefore a critical factor in the successful implementation of the ER Program and in the mitigation of risks of Reversal linked to the lack of broad support from stakeholders. As Tanner (2017) puts it, slowing or even halting deforestation and forest degradation in areas that have significant levels of population evidently implies a) an impact on local livelihoods that rely heavily on forest access and use; and b) the need to involve these same populations in project activities. Whilst land and natural resources are constitutionally State property in Mozambique, secure tenure rights (DUATs) can give local people a strong stake in any developments involving these resources. In addition, a sense of secure tenure which is respected by other parties also predisposes them to actively support the implementation of activities that at first sight may seem unfamiliar and in conflict with their livelihoods strategies. As a consequence, long-term adoption of sustainable practices by smallholders and the population of the ER Program area will be ensured by an efficient and large enough land titling process that will guarantee stability of land rights on the long run.

Finally, respecting local tenure rights also imposes on others (the State, private sector actors, etc.) an obligation to follow more participatory and equitable strategies when it comes to developing new initiatives, be they for economic activities or for conservation and natural resources management purposes. The way tenure rights – and the consequent right to participate – are treated therefore establishes important parameters for the development and implementation of benefit sharing schemes – which, if successful, completes a “virtuous circle” that encourages local acceptance of and involvement in the ER Program (Tanner, 2017a). The definition of a performing and precise benefit sharing plan is therefore key to ensuring that benefits of the ER Program are perceived by rural population and to gain their support for the ER Program. This is also achieved through efficient communication and practical observation of the non-carbon benefits that the ER Program is expected to generate, including through the SIS that will be implemented – *see section 14*.

Conclusion: All in all, assessment indicators (listed below) tend to show that the risk of reversals associated with a lack of broad and sustained stakeholders' support is low. However, despite the existence and implementation of relevant safeguards mechanisms with this regard, their efficiency is still difficult to assess on the long term. The ER Program is a pilot program and the processes it builds on (benefit sharing mechanism, feedback and grievance redress mechanism, etc.) are young and, for most of them, still inexperienced initiatives in Mozambique. Examples of remaining identified risks include: (i) the disappearance of fundamental mechanisms, such as the MSLF, due to financial shortfall after the terms of the ERPA; (ii) unplanned delays in actually perceiving carbon and non carbon benefits for local population, hindering their adoption of and commitment to promoted sustainable practices; (iii) the impairment of non-carbon benefits perception by stakeholders after the terms of the ERPA, when ER payments end, leading them back to previous un-sustainable practices; (iv) the failure of the land titling process, etc. This non-exhaustive list shows that, although theoretically the ER Program provides for a wide range of measures aiming at reducing risk A to almost zero, one has to keep in mind that un-forecasted parameters may still alter their efficiency, in the long run, including beyond the terms of the ERPA. Consequently, the overall risk assessment, even with the existence of a wide range of mitigation measures expected to be efficient, is medium.

Risk A – Assessment indicators

- Existence of a transparent Benefit Sharing Mechanism;
- Existence of legal mechanism for the systematization of community consultation;
- Signature of MoU with implementing partners;
- Existence of a Feedback and Grievance Redress Mechanism (FGRM) during the ER Program implementation, likely to generate the implementation of long-term efficient practices beyond the project life time;
- Existence of consultative forums and platforms involving various stakeholders with concrete and immediate perception of benefits, likely to make consultation become a long-term concern (including out of the scope of the ER Program);
- Implementation of an efficient and large enough land titling and delimitation process to ensure stability of land rights in the long run.

Overall risk assessment (with mitigation measures) – Risk A: Medium

Table 61: **Description, assessment and mitigation of Risk B**

Risk B – Lack of institutional capacities and/or ineffective vertical/cross sectorial coordination

Associated sub-risks and factors:

- Unclear distribution of the responsibilities with regard to ER Program implementation;

- Poor cooperation between the various levels of the Government;
- Poor political commitment;
- Insufficient human resources at national and local level.

Mitigation measures in the ER Program

The institutional arrangements for the implementation of the ER Program are described in both the ER-PD and the REDD+ National Strategy. Political commitment and capacities for the implementation of the ER Program are ensured by MITADER and FNDS at national level, and by the provincial Program Implementation Unit (PIU) in Zambézia,– *see section 6 on institutional arrangements and section 2 on the creation of the MITADER and FNDS*. MITADER consolidates responsibilities for land, environment and rural development into one agency with a wider and more integrated mandate. FNDS consolidates funding capacity with the broader mandate required by the new multi-sector Ministry. This provides a strong foundation for improving coordination, streamlining implementation, and clarifying roles and responsibilities for the implementation of REDD+ initiatives, including for the ER Program.

In the same way, various multi-stakeholders platforms, including the National Steering Committee, insure the on-going participation and cooperation of the various levels of the governments and of the various ministries involved in REDD+ and in the ER Program – *see sections 2 and 6*.

It should be noted that the activities of MozFIP are partly focused on fostering and coordinating political and institutional change that will generate the enabling conditions needed to add value and increase the sustainable use of the forests, and on generating the capacities and linkages between various stakeholders, institutions and markets. In the same way, the "*Sustenta*" project focuses on the government capacity strengthening, with a component dedicated to the support to provincial implementation units (such as the PIU), including support for project coordination and management at provincial level, fiduciary and safeguards management, monitoring and evaluation and communications - *see section 4.1*. MozFIP and the "*Sustenta*" project are significant supports for the ER Program.

At local level, implementation capacities have been strengthened with the creation of the Program Implementation Unit (PIU) that have been reinforced with additional staff – *see section 6*. In the same way, capacity building investments from many development partners have trained hundreds of staff members in project management, monitoring and assessment. A JICA funded project has trained over 35 technicians at the Provincial and National levels in various skills such as Remote Sensing and Carbon Stock Measuring. MITADER also has significant capacity on the ground, making use of Provincial and District representatives and coordinating sector activities at field level. Those initiatives and trainings will ensure that the activities related to forest management and monitoring in the ER Program can be maintained in the long run and outside of the ER Program lifetime.

Conclusion: All in all, institutional capacities have strongly been reinforced for the implementation of the ER Program and should guarantee an effective vertical and cross-sectorial coordination. Because the main assessment indicators listed below are respected, risk B should be considered as low. However, just like for risk A, risk B has to be assessed in light of the innovative feature of the ER Program, which relies on ever evolving processes, including with regards to institutional arrangements that are, actually, still being designed. Due to the recent creation of MITADER, its experience in terms of cross-sectorial coordination is still a learning process. In the same way, The risk that the newly created units (such as the PIU) encounters un-forecasted functioning problems

cannot be ignored, despite being limited. Those points argue for reassessments of risk B, from low to medium, on a precautionary note and in order to be realistic and acknowledge the (still) young experience of such institutions in REDD+ coordination.

Risk B – Assessment indicators

- Existence of designated and empowered relevant structure for ER Program implementation;
- Experience in multi-sectorial project implementation;
- Experience of collaboration between different levels of government;
- Existence of dedicated mechanism or body for inter-sectorial cooperation;
- Support from additional projects and programs for institutional capacities strengthening;
- Deployment of relevant staff on the ground;
- Training for long-term capacities on forest management and monitoring.

Overall risk assessment (with mitigating measures) – Risk B: Medium

Table 62: **Description, assessment and mitigation of Risk C**

Risk C - Lack of long term effectiveness in addressing underlying drivers

Associated sub-risks and factors:

Implementation risks that may lead to reversals

- Poor adoption of sustainable practices addressing the mains drivers of deforestation (including shifting agriculture and charcoal production);
- Increased deforestation linked to unpredicted levels of cultivation of cash-crops;
- Continuation of wildfires;
- Maintaining of overall local population's too high dependence on forest resources;
- External non forecasted projects, including infrastructure projects;

Political, economic and financial risk

- Difficult mobilization of up front finance to implement activities;
- Macroeconomic risk;

- Poor political stability and commitment;
- Unpredicted institutional and legislative changes.

Mitigation measures in the ER Program

Implementation risks that may lead to reversals

The poor adoption of sustainable practices for agricultural and charcoal production is an implementation risk that could lead to reversals. The associated mitigating measures are comprised in the wide range of interventions that the proposed ER Program offers - *they are detailed in sections 4 and 10*.

Generally speaking, in order to ensure long-term effectiveness in addressing the main drivers of deforestation, which are of anthropogenic nature, the priority is to ensure the long-term commitment of stakeholders to the adoption of sustainable practices, including beyond the terms of the ERPA and the project lifetime. *With this regards, see the mitigation strategies associated to Risk A*. In addition, the design of the ER Program should be clear enough for local communities: compensation, as a result of carbon sequestration, should be appealing enough, may it be in term of "payment for result" or, more importantly, on long-term non-carbon benefits. Communities will need to understand the compensation or the market returns expected for their commitment. Non-carbon benefits, especially, are key for forest conservation to turn into a long-term concern for stakeholders, beyond the terms of the ERPA and payments for performance. *See mitigation strategies associated to Risk A.*

In the same way, and at shorter term, adjusting promoted sustainable practices to the local context will be needed in order to make sure they can be followed in the long run. The expansion of conservation agriculture and improved charcoal techniques should be accompanied by the deployment of committed extension agents who understands and know local problematic. The individual commitment of the extension agents and knowledge of local habits are essential: the promoted techniques will always be adapted to local constraints in order to facilitate their adoption. This is also true for the reduction of wildfires: most of them, in the ER Program area, are of anthropogenic origin, triggered for the opening of new fields or for hunting purposes. This issue is addressed through the promotion of fire management practices, relying on significant trainings and awareness rising, as well as through the measures associated to conservation agriculture – *see section 4 of ER Program interventions and justification.*

With regards to cash crops, it should be noted that their promotion is essentially based on the valorization of cashew nuts and of the cashew value chain and, therefore, based on the promotion of fruit trees. With regards to sesame (and cashew), one of the ER Program proposed interventions is to valorize the production through premiums based on "zero deforestation" labels. Deforestation would be closely monitored in order to make sure that this label, and associated premium prices, will be granted to smallholders who adopt sustainable practices promoted by the ER Program and do not engage in any deforestation activities - may it for cashew cultivation or for food crops such as maize and cassava. Those activities entail a strong formation and training component and enable to forecast long-term benefits of cash-crops commercialization, once the labels obtained. Nevertheless, the introduction of new crops, value chains or markets would have to be consulted and aligned with community preferences.

Investments external to the sector, including infrastructure development, mining activities, transport/roads, or large commercial agriculture projects might contribute to the deforestation drivers without proper management, coordination, and integrated development planning that takes into

account rural development, local livelihood and environmental needs. The establishment and empowerment of a cross-sectorial coordination will help to take into consideration forestry and REDD+ related activities and the need to plan for multiple uses and to manage trade-offs. *This mitigation strategy is included in Risk B assessment.*

Political, economic and financial risk

The most serious risks facing the ER Program hinge around underlying capacity concerns and deeper political tensions in the country at the present time and in the future. The country remains susceptible to further outbreaks of political and social conflict, although a return to full-scale civil war is seen as very unlikely. The more likely risks are that continual and perhaps more frequent episodes of localized unrest and violence – as well as unofficial labor protests - could affect the rural economy including in the districts of the ER Program area, through lower production, deterring of foreign investment and slow development of supporting infrastructure. Other risks could arise from a change in government and possible shifts in political appointment, which may hinder buy-in and progress of the project (IDA, 2017).

According to Tanner (2017a), other more immediate concerns relate to legislative changes that are in the pipeline: the new Forestry Law, and the strong probability that the Land Law will also be revised during 2017/18. However, those changes are not expected to constitute a risk: (i) the Local Community concept, crucial for land tenure rights (*see section 4.4*), as well as the community consultation mechanism, will be maintained in both texts; (ii) the new Forestry law will formally introduce the concept of Free, Prior and Informed Consent into the Mozambican forest legislation; (iii) the revision of the Land Law will engage a lot of stakeholders and is expected to offer the opportunity to improve and consolidate, rather than embark on radical changes. It will be important for implementing and monitoring the ER program to both track this process, and where appropriate, contribute to it with feedback from program implementation on the ground.

With regards to the macroeconomic risk, the increase in debt levels, the depreciation of the metical and external shocks (such as commodity price) has heightened Mozambique's macroeconomic vulnerability and exposure to fiscal risk. A deteriorating macroeconomic context may affect the appetite to invest in Mozambique's agriculture sector and create a difficult business environment for the private sector through higher prices, exchange rate volatility and lower demand. While presently investors remain confident in Mozambique's long term growth prospects, driven by the gas sector, macroeconomic instability or low commodity prices could have an impact on growth and opportunities in sectors such as agriculture (IDA, 2017).

While the ER program can do little to address those risks, it can work to improve coordination at all levels. Some of such mitigation strategies are associated to Risk B – see above. Other measures include the maintaining of a strong and stable legal framework that ensures the continuation of the ER Program beyond government term and to prepare adaptive management measures to respond to potential change in security situation.

Finally, financial risk for the ER Program could also lead to reversal, if the ER Program interventions cannot be adequately implemented due to budget shortfalls. However, this risk is almost entirely prevented in the case of this ER Program since most of the funding is already identified - *see section 6 on budget*. All the planned intervention of the ER Program area are supported by projects and programs backed by the World Bank (MozFIP, MozDGM, MozBio, "*Sustenta*") and for which budgets are already well defined. Economic sustainability of the ER Program is therefore pursued through a well defined budget plan, the previous identification and securing of financing and the existence of a well defined structure, the Directorate for the Mobilization of Funds (PMR) – see *section 6 on institutional capacities and budget plan.*

Conclusion: Risk C is mitigated by a good range of measures that enable to limit major reversals in the future. However, implementation risks still exist and the wider context in which the ER Program fits it, including in terms of financial stability, makes it impossible to reduce this risk to zero. Risk C is therefore considered as high.

Risk C – Assessment indicators

For the implementation risks that may lead to reversals

- Experience in decoupling deforestation and degradation from economic activities;
- Support from additional projects and programs oriented on deforestation and forest degradation reduction;
- Existence of a relevant legal and regulatory environment conducive to REDD+ objectives in the long run;
- Creation of relevant incentives for adoption of sustainable agricultural practices in the long run, including beyond the project lifetime;
- Clear perception of non-carbon benefits for stakeholders at long term and especially beyond the terms of the ERPA;
- Adaptation of promoted sustainable practices to local constraints and dynamic in order to make them be able to be maintained in the long run;
- Deployments of efficient and committed extension-agents at long-term.

For the political, economic and financial risk

- Potential administrative changes are expected to be progressive and participatory;
- Well defined structures to ensure continuation of ER Program beyond government term;
- Pre-identification of financing sources.

Overall risk assessment (with mitigating measures) – Risk C: High

Table 63: **Description, assessment and mitigation of Risk D**

Risk D - Exposure and vulnerability to natural disturbances

Associated sub-risks and factors:

- Typhoons, floods or drought;
- Pest and other diseases;

- Fires.

Mitigation measures in ER Programs

The ER Program area is located in a zone that is sensitive to climate change and natural environmental risks. As stated in section 3, Mozambique is expected to be one of the countries that will be the most affected by climate change in the coming years and is one of the highest ranked African countries in terms of exposure to risks from weather-related hazards. In this context, tropical cyclones, for instance, might be considered as potential source of ERs reversals. This climatic risk, along with the risk of typhoons, flood or drought, may implies destruction of agricultural fields that would result in smallholders needing additional areas to compensate, with the subsequent opening of new fields on forested lands. This may lead to un-forecasted emissions and, therefore, reversals.

As a consequence, a relevant mitigation strategy will rely on training on conservation agriculture taking this situation into account so as to promote adequate models and crops. Appropriate selection of species able to resist to such conditions and appropriate selection of locations for specific ER Program interventions will be necessary. Generally speaking, the diversification of crops and improved soil fertility management enable to cope more easily with drought episodes, notably. The ER Program interventions focusing on the promotion of climate smart agriculture (see ERI-D1), supported by the MozFIP and "Sustenta" projects, are therefore fully contributing to mitigating this risk. Those techniques are expected to be adopted and maintained in the long run, including after the project lifetime, thanks to the non-carbon benefits they will generate - *see section 16*.

Second, in order to reduce the risk of pest and other disease, a Pest Management Plan has been designed with provisions for specific biological controls and the development and use of crop varieties that are resistant or tolerant to the pest – see (MITADER, 2016c) and section 14 on safeguards plans developed for the ER Program.

Finally, with regard to fires, which are almost exclusively of anthropogenic nature, they are subject to specific mitigation measures and will be closely monitored – *see section 4 and table above*. In any case, as previously explained, it should be noted that Miombo forest - composing most of the forest of the ER Program accounting area - is tolerant for fire.

Conclusion: Although the risk natural disturbance in the ER Program area is relevant, and despite the possible increase of drought events, the "mortality risk" for the Miombo forest composing the ER Program area during the terms of the ERPA is low: Miombo is already well adapted to fires and droughts and relevant mitigation measures are reducing this risk. However, the risk of occurrence of typhoons is too hard to predict and the emissions resulting from subsequent slash and burn agriculture cannot be fully mitigated. Risk C should therefore be considered as high.

Risk D – Assessment indicators

- Vulnerability to fires, storms and droughts;
- Capacities and experience in effectively preventing natural disturbances or mitigating their impact;
- Promotion of climate smart agricultural practices;

- Existence of a Pest Management Plan.

Overall risk assessment (with mitigating measures) – Risk D: High

11.2 ER Program Design features to prevent and mitigate Reversals

This section was treated directly in section 11.1 and the tables above, in which specific mitigation measures are describes.

11.3 Reversal management mechanism

Choice of reversal management mechanism

As stated in Gonzalo (2016b) and in accordance with criterion 19 of the FCPF CF (2016a), the ER Program implementation comprises the creation of two separate buffer reserve accounts, which are ER Program-specific: (i) an Uncertainty Buffer to create incentives for improving uncertainty associated with the estimation of ERs and manage the risk that the emission reductions were overestimates for prior reporting periods; (ii) a Reversal Buffer to insure against potential Reversals.

Table 64: **Selection of reversal management mechanism**

Reversal management mechanism	Selected
Option 1 – The ER Program has in place a Reversal management mechanism that is substantially equivalent to the Reversal risk mitigation assurance provided by the ER Program CF Buffer approach	No
Option 2 - ERs from the ER Program are deposited in an ER Program -specific buffer, managed by the Carbon Fund (ER Program CF Buffer), based on a Reversal risk assessment.	Yes

Option 2 of the FCPF MF (FCPF, 2016a) will be applied to the ZILMP ER Program, with the creation of an ER – Program specific buffer managed by the Carbon Fund (ER Program CF Buffer) (FNDS, 2017c).

The mechanism will act as insurance: a proportion of the credits generated by the ER Program will contribute to the reversal buffer. This proportion should correspond to the estimated risk of reversals. Separate accounts will be created in the ER Transaction Registry – yet to be created (*see section 18*) - for the exclusive purpose of receiving, disbursing, or canceling ERs that will be allocated to the reversal buffer and the pooled reversal buffer. Transfers of ERs to and from the account, and cancelation of ERs from the account, may only be initiated by the Buffer Manager. Once the ERs generated by the ER Program are determined for a specific reporting period, the administrator of the ER Transaction Registry

should establish serial numbers for the amount of total ERs and transfer and deposit a portion of the serialized ERs, as Buffer ERs, into the Reversal Buffer account[68] (Gonzalo, 2016b; FCPF, 2015; FNDS, 2017c).

Number of ERs to be deposited in the ER Program CF Buffer

As stated in (FCPF, 2015), certain additional quantity of ERs out of the Total ERs should be allocated as Buffer ERs to the Reversal Buffer account to help manage the Reversal Risk. This additional quantity is calculated as a percentage of the Contract ERs and Additional ERs designated for transfer to the CF following each reporting period under the ERPA. This percentage should be determined by the Trustee, following consultations with the Program Entity, or by the Buffer Manager, as applicable, in accordance with the Reversal Risk assessment tool. **Although this process still has to be undertaken and the percentage validated, we provide here a proposition based on the Reversal Risk assessment tool and the previously identified risks – *see section 11.1*. According to this analysis, 30% of the ERs generated by the ER Program will be deposited in ER Program CF Buffer.**

Table 65**: Risk assessment tool to assess the number of ERs to be deposited in the ER Program CF Buffer**

Risk factor	Risk indicators	Default Reversal Risk Set Aside Percentage	Discount (increment)	Resulting Reversal Risk Set-Aside Percentage
Default Risk	Not applicable, fixed minimum amount	10%	Not applicable	10%
Risk A - Lack of broad and sustained stakeholder support	Existence of a transparent Benefit Sharing Mechanism Existence of legal mechanism for the systematization of community consultation Signature of MoU with implementing partners Existence of a Feedback and Grievance Redress Mechanism (FGRM) during the ER Program implementation, likely to generate the implementation of long-term efficient practices beyond the project life time Existence of consultative forums and platforms involving various stakeholders with concrete and immediate perception of benefits, likely to make consultation become a long-term concern (including out of the scope of the ER Program) Implementation of an efficient and large enough land titling and delimitation process to ensure stability of land rights in the long run	10%	Reversal risk is considered Medium: 5% discount	5%
Risk B – Lack of institutional capacities	Existence of designated and empowered relevant structure for ER Program implementation Experience in multi-sectorial project	10%	Reversal risk is considered Medium: 5%	5%

[68] *The same should apply for the Uncertainty Buffer.*

and/or ineffective vertical/cross sectorial coordination	implementation Experience of collaboration between different levels of government Existence of dedicated mechanism or body for inter-sectorial cooperation Support from additional projects and programs for institutional capacities strengthening; Deployment of relevant staff on the ground Training for long-term capacities on forest management and monitoring		discount	
Risk C - Lack of long term effectiveness in addressing underlying drivers	Experience in decoupling deforestation and degradation from economic activities Support form completing projects and programs oriented on deforestation and forest degradation reduction Existence of a relevant legal and regulatory environment conducive to REDD+ objectives in the long run Creation of relevant incentives for adoption of sustainable agricultural practices in the long run, including beyond the project lifetime Clear perception of non-carbon benefits for stakeholders at long term and especially beyond the terms of the ERPA Deployments of efficient and committed extension-agents at long-term Adaptation of promoted sustainable practices to local constraints and dynamic in order to make it possible for them to be maintained in the long run Potential administrative changes are expected to be progressive and participatory. But potential risk may exist due to the fact that the ER program area doesn't cover the whole Province and additional coordination might be required. Well defined structures to ensure ensures the continuation of the ER Program beyond government term Pre-identification of financing sources	5%	Reversal risk is considered High: 0% discount	5%
Risk D - Exposure and vulnerability to natural disturbances	Vulnerability to fires, storms and droughts Capacities and experiences in effectively preventing natural disturbances or mitigating1 their impacts Promotion of climate smart agricultural practices Existence of a Pest Management Plan	5%	Reversal risk is considered High: 0% discount	5%
Actual Reversal Risk Set-Aside Percentage: 10+(Result A+ Result B+ Result C+ Result D) = 10 + 5 + 5+ 5 +5 = 30%				

Changes made to meet conditions set in CF17: The risks were assessed having in account its probability of occurrence its impacts, (in terms of carbon emissions reductions and contribution to poverty alleviation) and the ability of the project to restore or implement the preventive or corrective actions.

- For Risk A- The most important indicator is poor perception of carbon and non-carbon benefits generated by the ER Program
- For Risk B- The most important indicator is poor political commitment
- For Risk C- the most important indicator is increased deforestation linked to unpredicted levels of cultivation of cash-crops
- For Risk D- the most important indicator is the occurrence of typhoons, floods and drought

Risk A and B maintained with the same value, but risk C and D changed from medium to high risks because of the impact of the most important indicators in the carbon stocks and in poverty alleviation.

11.4 Monitoring and reporting of major emissions that could lead to Reversals of ERs

The monitoring of major emissions in the Accounting Area or changes in the ER Program circumstances that could lead to Reversals of ERs transferred to the Carbon Fund during the term of the ERPA will be ensured by the overall MRV system of the ER Program, which is fully technically capable of identifying Reversals, in accordance with criterion 21.1 of the FCFP MF (FCPF, 2016a). *The MRV system is described in section 9*. This involves major emissions that could lead to reversal and, therefore, are expected to be easily identified - as a result of extreme climatic event, for instance.

Reversals will be reported to the Carbon Fund within the timeline prescribed in the FCPF MF (FCPF, 2016a), that is, within 90 calendar days after their identification. The potential Reversals will be addressed by the Reversal management mechanism described in section 11.2. When the occurrence of any kind of reversal is confirmed and identified, Buffer ERs should be canceled from the Reversal Buffer account to compensate for the Reversal, according to the arrangements described in (FCPF, 2015).

12. UNCERTAINTIES OF THE CALCULATION OF EMISSION REDUCTIONS

12.1 Identification and assessment of sources of uncertainty

The method used to estimate annual GHG emissions of the program in the reference period is based on a multiplication of activity data and emission factors for different strata and carbon pools. Hence, sources of uncertainties for the estimation will be assessed separately for both components.

Sources of uncertainties of activity data

Identification of sources of uncertainties

Possible sources of uncertainties associated with the production of the historical AD for deforestation and production of the LULC reference map could be related to the quality of images used and the interpretation of operators for both and, the classification model for the LULC 2016 map.

- **Quality of satellite data**

The analysis of historical AD have been done for the entire country with images available in Collect Earth Tool (Google Engine) that allow to select best images available for the dates of interest. The images that were used are from Landsat sensors, mainly: Landsat 5, 7 and 8. When product from LANDSAT Global Land Survey products (GLS) were available, they were selected as a priority, as recommended by the GOFC GOLD. According to Gutman et al. (2008), these data have sufficient radiometric and geometric qualities to perform land use change analysis. As explained before, the entire area of the country is being visually assessed on a 4 x 4 km grid at national level using high and medium resolution imagery. The spatial assessment unit is almost the equivalent a 3 x 3 block of Landsat pixels (100 x 100 m), where a plot of same dimensions and an internal grid of 5 x 5 points is overlapped. This precise set of data that characterizes the LULC changes produced in the historical series will be used in this case to decide the training areas for the image stack of Landsat 8 OLI and Sentinel-2. Moreover, the use of images from different sensors with Collect Earth Tool guarantee the absence of cloud cover on the areas of interpretation of sampled points.

- **Point interpretation**

To analyze historical AD, the main key step is the interpretation of land use on sampled points. This step is done by photo-interpretation of points on different classes and, as such, it is based on the expertise of the operators. However, the use of various scripts programmed on Earth Engine Code facilitates the interpretation of the vegetation type and the determination of LULC changes. Specifically: the MOD13Q1 (NDVI 16-day Global Modis 250 m) graphic from 2001-2016, most recent Sentinel-2 image, most recent Landsat-8 pan sharpened image, Landsat-7 pan sharpened image (2000, 2004, 2008, 2012), etc.

- **Sampling design**

As the historical AD estimation is based on a point sampling analysis, the accuracy also depends on the design of the sampling. It is designed here on a regular basis on 4 x 4 km grid where squares of 100 x 100 m are defined. The sampling is not stratified and does not focus on the detection of changes - which can be used to produce wall-to-wall maps. The accuracy decreases with the distance between grids. Hence, as the deforestation can be concentrated on relatively small areas (it is related to the opening of 1 ha slash and burn fields for small scale farming) the distance between grids may be too high, but the procedures is constrained by available time and budget.

- **Classification algorithm accuracy**

For the production of the LULC 2016 reference map, an algorithm for the classification will be used based on the interpretation of training plots. This algorithm might be used in the future for monitoring. However, the algorithm has not been selected yet so it is not possible to assess its accuracy.

Assessment and contribution of sources of uncertainties

The main uncertainties are those related to the interpretation of sampling design. Systematic sampling is generally more efficient than simple random sampling to estimate areas, but less than a stratified one depending on the location of change areas. One-dimensional systematic sampling is optimal if the autocorrelation is positive, decreasing and convex, but the main drawback of systematic sampling is the absence of an unbiased estimator for the variance. Then, the variance estimation formulae for random sampling are used (IPCC, 2006, warns that it is an approximate formula). This, generally, overestimates the variance (the overestimation is much more for denser grids), so we can consider the application of this formula as a conservative option (other options are variance estimators that compare each sample element with neighbors, pair differences techniques, etc.). The results of this accuracy analysis are presented in the following section.

The errors related to the interpretation of sampled points would be systematic and random. Those uncertainties are related and cannot be analyzed independently. However, they are estimated with the analysis of the variance for the historical AD analysis based on a point sampling method. The estimation of the areas corresponding to land-use and land-use changes categories in the framework of this systematic sampling approach (based on the visual assessment of the nodes of a 4 x 4 km national grid) can be based on assessments of area proportions. The proportion of each land-use or land-use change category is calculated by dividing the number of points located in the specific category by the total number of points, and area estimates for each land-use or land-use change category are obtained by multiplying the proportion of each category by the total area of interest.

In future monitoring a stratified inference approach will be followed, where maps will be produced and reference data will be collected for each LULC strata which includes the different forest types.

Steps to minimize uncertainties

Uncertainties have been minimized through the application of QC/QA procedures. To reduce interpretation errors during creation of training plots or during the validation procedure, the following measures were taken:

- Interpretations are done by remote sensing experts, fully trained to these methods and knowing the field conditions;
- Several operators were mobilized to avoid bias due to wrong interpretation of an individual;
- The use of various scripts programmed on Earth Engine Code facilitate the interpretation of the vegetation type and the determination of LULC changes, specifically the MODIS NDVI trend.

The National Historical AD database is a very complete source of information on LULC changes during the last fifteen years (2001-2016) in Mozambique. The completeness of the series is guaranteed using RS products from medium resolution imagery repositories from 2001 (e.g. Annual TOA Reflectance Composite, Annual NDVI Composite, Annual EVI Composite, Annual Greenest-Pixel TOA Reflectance Composite, etc. from Landsat 5 TM) and the most recent Sentinel-2 image from 2016.

Sources of uncertainties of emission factors

Identification of sources of uncertainties

Emissions factors are the difference between average of carbon stocks pre- and post-deforestation. Uncertainties of these factors are therefore related to the estimation of carbon stocks.

- **Measurements errors**

These errors correspond to errors in the measurements of DBH and tree height (parameters used in the allometric equation) by field operators. They are random errors and the quantity of measurements (4,721 trees in forest and 342 in post-deforestation strata) allows reducing the error. Moreover, errors done at tree level would be averaged at plot level and, according to Picard et al. (2015), these errors are limited compared to other sources.

- **Standard factors used**

The allometric equation used also requires wood density of tree species identified in the inventory. These data were selected in the Global Wood Density Database[69]. Uncertainties related to those data exist but they are random and considered to be low.

To calculate BGB from AGB estimation, default factors of root-shoot ratio for tropical dry forest from IPCC (2006)[70] are used. Two factors are reported, depending on AGB biomass: 0.56 (if AGB<20 t/ha) with a range of 0.28 and 0.68 (standard error 0.086) and, 0.28 (if

[69] *Zanne AE, Lopez-Gonzalez G, Coomes DA, Ilic J, Jansen S, Lewis SL, Miller RB, Swenson NG, Wiemann MC, Chave J (2009) Data from: Towards a worldwide wood economics spectrum. Dryad Digital Repository. http://dx.doi.org/10.5061/dryad.234*

[70] *Table 4.4 of IPCC (2006), V4, Chapter 4 – Forest Land.*

AGB>20 t/ha) with a range of 0.27 and 0.28 (standard error 0.003). As they are global data, uncertainties are related to the estimation of the factor itself and to the application on local data but they are difficult to assess precisely. Picard et al. (2015) do not consider those uncertainties in their study on errors for the estimation of emission factors.

- **Allometric model error**

Uncertainties related to the allometric model are due to the errors of the model itself (coefficient and residual model error) and to the choice of the allometric model. First source is low with the model of (Chave et al. 2014b). Picard et al. (2015) estimated that the latter was the main source of errors in the Congo Basin. Other allometric equations exist in Mozambique for Miombo forest (Mercier et al., 2016) but they were not selected to calculate carbon stocks because they are either site specific, non-adapted to the measured range of DBH or do not account for tree height as a parameter.

- **Sampling error**

These errors are related to the sampling design: location of plots representative of the variability of the studied forest strata, the number of plots and the size of the plots to represent local conditions.

- **Representativeness of the inventory**

The inventory used here for the estimation of Emissions Factors was dedicated to the analysis of carbon stocks of Miombo Forest in the Province of Zambezia and for the present document, Miombo forest is considered as representative of semi-deciduous stratum. In the same way, data from literature from Montane forest are considered as representative of evergreen forest. This decision have been made on the basis of expert judgement of the NFI team and the value of EF will be replaced as soon as results from NFI will be available. However, this issue of representativeness of forest strata bring additional uncertainties to the estimation of EF. This would not represent a major impact on the overall uncertainty and in absence of data from NFI, it is difficult to estimate it. In the same way, the use of the same post-deforestation carbon stocks for all strata will add uncertainty to the estimation of EF although it does not seem to be a major contribution and it is difficult to quantify it.

Steps to minimize uncertainties

The measures to minimize uncertainties for the establishment of EF for the Program RL are the following:

- Measurements in the field were realized by a team that has significant experience on such inventories and composed of a botanic specialized in Miombo forest. A procedure manual was distributed to the team for the design of plots;
- The allometric equation was chosen after having compared the conditions of application of all available in order to choose the most suitable one;
- The sampling plan was designed (i) to have a minimum number of plots calculated to represent variability on carbon stocks with the tool developed by Winrock[71] and (ii) to be representative of the variability of conditions in the Miombo forest strata by spreading the most homogeneously plots on forests of the ZILMP accounting area

[71] *Winrock's CDM A/R Sample Plot Calculator Spreadsheet Tool, Walker, S.M., Pearson, T., Brown, S. 2007, 2014 Version*

and by distributing plots in transect of four in order to account for micro-topographic variations. Moreover, transect were randomly allocate in the sampling design.

- Some plots were randomly re-inventoried by another team to control the quality of the measurements. If too high errors were observed on plots, all the transect containing the plot has to be inventoried once again by another team (and a new control was made).

Assessment and contribution of sources of uncertainties

The uncertainties linked to measurements errors are considered as very low because they are random errors and they are minimized by quality control and quality assurance procedures. In the same way, errors linked to the use of default factors in the allometric equations are considered as negligible because it is based on a very complete international database. As a summary, the main errors would be those related to:

- The choice of the allometric model which, according to Picard et al. (2015) can represent 40% of the total error in forest of the Congo Basin. It was not precisely quantified here but to remain conservative, an additional error of 13% have been added to the uncertainty for EF estimation (see Table 67).
- The variability in biomass between plots which is taken into account in the calculation of overall accuracy by the calculation of standard deviation among inventoried plots (see Table 67).
- The sampling plan, the last being minimized by the number of plots and their spatial distribution and assessed by the tool developed by Winrock as presented previously, and the representativeness of carbon stocks used for the forest strata defined although it is not possible to quantify the contribution to the overall uncertainty..

12.2 Quantification of uncertainty in Reference Level setting

The uncertainties of the REL were calculated following the approach 1 of IPCC (2006) using the propagation of error method. Confidence intervals were assumed symmetrical in all cases. Two uncertainties were calculated for activity data and emissions factors before assessing global uncertainty related to the REL. The following equations were used for addition or multiplication.

For addition:

$$U_{total} = \frac{\sqrt{(U_1.x_1)^2 + (U_2.x_2)^2 + \cdots + (U_n.x_n)^2}}{|x_1 + x_2 + \cdots + x_n|}$$

Where:

U_i= percentage uncertainty associated with each of the parameters

x_i= the value of the parameter

U_{total}= the percentage uncertainty in the sum of parameters

For multiplication:

$$U_{total} = \sqrt{{U_1}^2 + {U_2}^2 + \cdots + {U_n}^2}$$

Where:

U_i= percentage uncertainty associated with each of the parameters

x_i= the value of the parameter

U_{total}= the percentage uncertainty in the sum of parameters

Calculation of uncertainties of activity data

The variance estimation formulae for random sampling are used (IPCC, 2006, warns that it is an approximate formula) to estimate the accuracy of the analysis of activity data. This, generally, overestimates the variance (the overestimation is much more for denser grids), so we can consider the application of this formula as a conservative option (other options are variance estimators that compare each sample element with neighbors, pair differences techniques, etc.).

The standard error (ha) of an area estimate is obtained as:

$$e = A\sqrt{pi(1 - pi)/(n - 1)}$$

Where, pi, is the proportion of points in the particular land-use category i
A, the known total area
n, the total number of sample points

The 90% confidence interval for Ai, the estimated area of a land use or land use change category i, will be given approximately by ±1.64 e, and the relative error as a percentage of the quotient 1.64 e/A. Results for deforestation in each stratum are presented in Table 38 and are summarized in the table hereafter. For the global rate of deforestation (21,320 ha/yr) on the ER Program accounting area, the 90% CI is 3,161 ha/yr corresponding to an error of +/- 14.83%.

In addition, it has been conducted a quality assurance of the AD visual assessment performed for reporting purposes in a random sample of a 10% of the nodes assessed by

different operators (4,889 nodes). This was done at a national level and to ensure to implementation of the QC procedures and SOPs.

Table 66: summary of uncertainty estimated for activity data of different forest strata

	Deforestation in Semi-deciduous forests	**Deforestation in Evergreen forests**	**Deforestation in Mangroves**	**Total**
Value of the parameter - ha/yr	16,983.90	4336.30	0	21,320.20
90% CI in ha	± 2,832	± 1,446	± 0	3,161
90% CI in %	16.68%	33.36%	0%	14.83

During the MRV, AD data estimation will be done through the production of a Land use change map based on LULC maps (with Sentinel and Landsat imagery following the same classification method as for the LULC 2016 map) and the collection of reference data to obtain a stratified estimate. This will be done following Olofsson et al. (2013) and summarized in the following box.

Accuracy estimation for the LULC maps that will be produced during MRV:

Accuracy parameters derived from a population error matrix o f q classes:

Map class/Reference class

	class 1	*class 2*	*class j*	*Total*
class 1	p_{11}	p_{12}	p_{1j}	$p_{1.}$
class 2	p_{21}	p_{22}	p_{2j}	$p_{2.}$
class i	p_{i1}	p_{i2}	p_{ij}	$p_{i.}$
Total	$p_{.1}$	$p_{.2}$	$p_{.j}$	1

Overall accuracy: $O = \sum_{j=1}^{q} p_{jj}$

User's accuracy of class i (the proportion of the area mapped as class i that has reference class i): $U_i = p_{ii}/p_{i.}$

Producer's accuracy of class j (the proportion of the area of reference class j that is mapped as class j): $P_j = p_{jj}/p_{.j}$

For overall accuracy, the estimated variance is: $\hat{V}(\hat{O}) = \sum_{i=1}^{q} W_i^2 \, \hat{U}_i(1-\hat{U}_i)/(n_{i.}-1)$

For user's accuracy of map class i, the estimated variance is: $\hat{V}(\hat{U}_i) = \hat{U}_i(1-\hat{U}_i)/(n_{i.}-1)$

For producer's accuracy of reference class j=k, the estimated variance is:

$\hat{V}(\hat{P}_j) = \frac{1}{\hat{N}_{.j}^2}\left[\frac{N_{j.}^2(1-\hat{P}_j)^2\hat{U}_j(1-\hat{U}_j)}{n_{j.}-1} + \hat{P}_j^2 \sum_{i\neq j}^{q} N_{i.}^2 \frac{n_{ij}}{n_{i.}}(1-\frac{n_{ij}}{n_{i.}})/(n_{i.-1})\right]$ where $\hat{N}_{.j} = \sum_{i=1}^{q} \frac{N_{i.}}{n_{i.}} n_{ij}$ is the estimated marginal total number of pixels of reference class j, $N_{j.}$ is the marginal total of map class j and $n_{j.}$ is the total number of sample units in map class j.

These variance estimator would not apply to a polygon assessment unit or to a mixed pixel situation.

Calculation of uncertainties of emission factors

Uncertainties related to sampling of the forest were estimated through the variability of carbon stocks calculated with the allometric equation and estimated with the standard deviation of results associated to the average used for both forest inventories for pre- and post-deforestation on Semi-deciduous forests (Miombo forest). On other forest strata, uncertainties are derived from standard deviation presented in the sources of the data (see section 7). As emission factors result from a difference between averages of carbon stocks, the equation for propagation of error in the case of addition was used. The results for the various forest strata that are accounted for in the ER Program are presented in the following table.

Concerning uncertainties related to the allometric model, it is considered more precise to account for tree height, and Chave et al. (2014) equation gave more conservative estimation than the other one with this parameter for Miombo forest. Moreover, according to Chave et al. (2004), the error related to the allometric model is estimated to be 13% when wood density is considered in the equation. This was estimated on plots in Panama but as no similar studies exist for Mozambique, it was applied to the estimation of the uncertainties of EF of the present program. The consideration of these errors is a conservative choice.

Table 67: summary of uncertainty estimated for emission factors of different forest strata

Semi-deciduous forests (Miombo forest)	AGB			BGB			Total EF
	Pre-deforestation	Post-deforestation	EF	Pre-deforestation	Post-deforestation	EF	
Carbon stock average - in tCO_2e/ha	241.6	34.8	206.7	67.6	12.5	55.2	**261.9**
90% CI	7%	47%	9%	7%	36%	8%	**7%**
allometric model error	13%	13%		13%	13%		
total error	15%	49%	14%	15%	38%	14%	**12%**
Evergreen forests (Montane forests)							
Carbon stock average - in tCO_2e/ha	347.7	34.8	313.2	93.9	12.5	78.6	**391.8**
90% CI	11%	47%	11%	11%	36%	11%	**9%**
allometric model error	13%	13%		13%	13%		
total error	17%	49%	16%	17%	38%	16%	**13%**

Calculation of uncertainties related to REL

The REL is the result of (i) the multiplication of activity data and emission factors for the estimation of emissions related to each forest strata and (ii) the addition of all emissions from different strata and sources. Uncertainties were calculated using the method of propagation of errors. **The overall level of uncertainties is 17% at the 90% confidence interval, corresponding to mean annual emissions of 6,487,447 tCO_2e/yr +/- 1,102,899.**

Table 68: summary of uncertainty estimated for REL

	Deforestation in semi-deciduous forests	Deforestation in evergreen forests	Deforestation in mangroves	Total
Activity data in ha	16,983.9	4,336.3	0	**21,320**
Emission factor in tCO_2e/ha	262	392	431	
Annual emissions in tCO_2e	4,681,417	1,806,030	0	**6,487,447**
90% CI	19%	35%	9%	**17%**

Calculation of uncertainties related to Emission Reductions

During monitoring events, ER and associated uncertainties will be calculated. To comply with FCPF MF requirements, indicator 9.2, those uncertainties will be quantified using a Monte Carlo analysis (approach 2 of IPCC). As described in IPCC (2006)[72], the following steps will be realized (illustrated in Figure 35):

- The different parameters to which uncertainties are associated will be identified and corresponding Probability Density Functions (PDF) will be defined (for activity data and carbon stocks, data distribution is usually normal) with mean and standard deviation;
- For each of these parameters, random values (at least 1,000) will be generated following the shape of PDF;
- Emissions will be calculated from those random values, for the same number of values, and, mean and uncertainties (90% CI) will be calculated from these estimations;
- The process will be repeated until mean and uncertainties of emissions remain stable

[72] *Vol 1, Chapter 3 - Uncertainties*

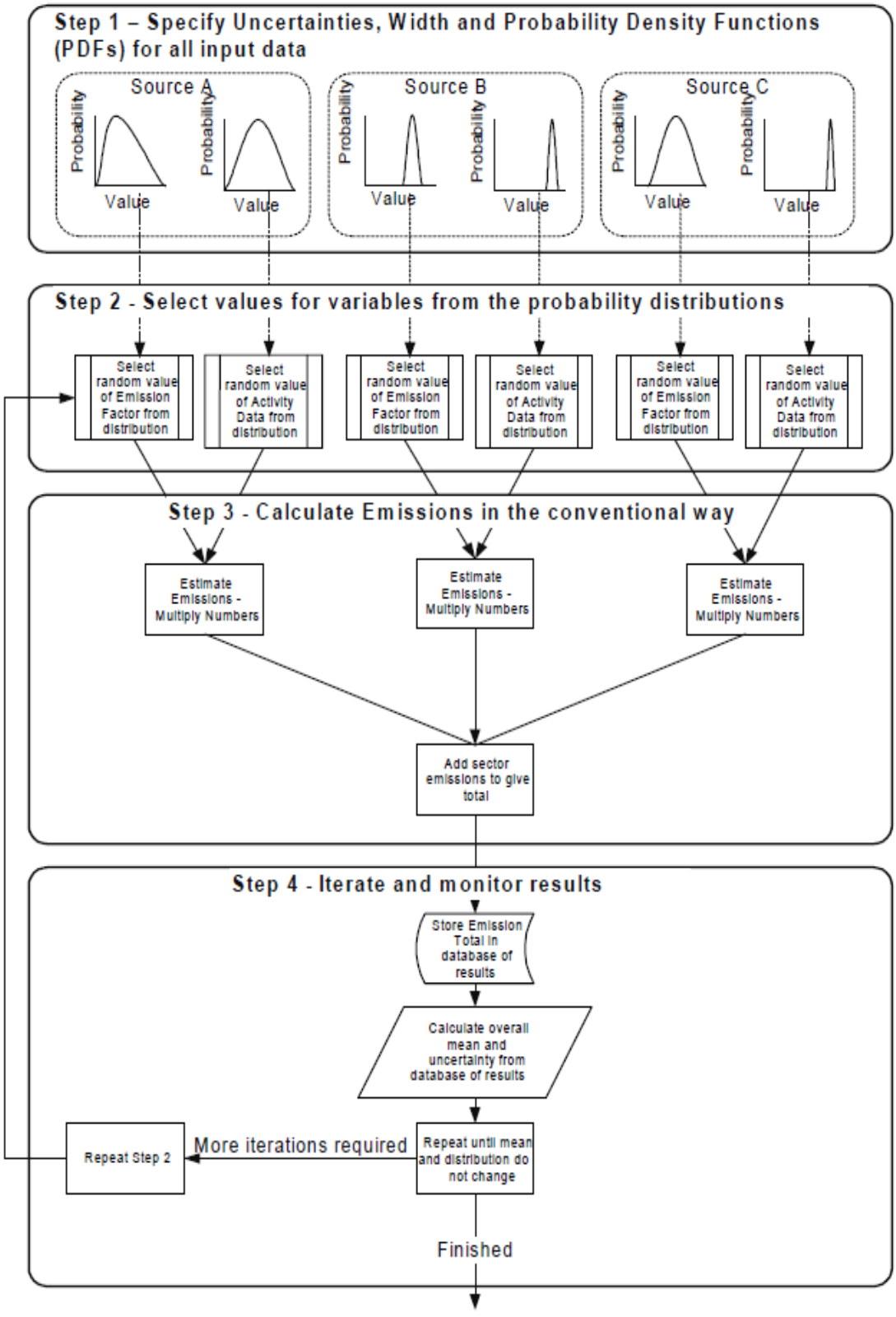


Figure 35: Illustration of Monte Carlo method (From IPCC, 2006)

13. CALCULATION OF EMISSION REDUCTIONS

13.1 Ex-ante estimation of the Emission Reductions

Emissions Reductions objectives of the ER Program are based on 2 different periods over the crediting period: 2018 - 2019 and 2020-2024. The level of effectiveness are relatively low in order to be conservative and realistic. **For the first period (2018-2019), the program aims at reducing deforestation by 30% below the reference level** (only the second semester of 2018 will be accounted for because the ERPA should be signed in the middle of 2018). For the second period, the efficiency of the ER Program is expected to increase because enabling and operational activities will have been developed for a few years already. Therefore**, for the second period of its implementation (2020-2024), the ER Program aims at reducing deforestation by 40% below the reference level**.

According to criterion 22 of the FCPF MF, the expected proportion of ERs to be set aside because of uncertainties would be 4% because the level of uncertainties is just at the threshold of 15%. This level will be estimated at monitoring events with the method presented in the previous section to estimate the buffer related to uncertainties. As shown in section 11, the proportion of ERs to be set aside because of possible reversals would be 30%.

The expected total level of Emission Reductions over the crediting period (mid 2018-December 2024) is estimated at 10,680,932 tCO_2eq.

Table 69: Ex-ante estimation of the ERs expected from the ER Program

ERPA term year t	Reference level (tCO_2e/yr)	Estimation of expected emission reductions under the ER Program (tCO_2e/yr)	Estimation of expected set-aside to reflect the level of uncertainties associated with the estimation of ERs during the Term of the ERPA (tCO_2e/yr)	Estimation of expected set-aside to reflect the level of possible reversals associated with the estimation of ERs during the Term of the ERPA (tCO_2e/yr)	Estimated Emission Reductions (tCO_2e/yr)
2nd sem. of 2018	3,243,724	2,270,606	38,925	280,258	653,935
2019	6,487,447	4,541,213	77,849	560,515	1,307,869
2020	6,487,447	3,892,468	103,799	747,354	1,743,826
2021	6,487,447	3,892,468	103,799	747,354	1,743,826
2022	6,487,447	3,892,468	103,799	747,354	1,743,826
2023	6,487,447	3,892,468	103,799	747,354	1,743,826
2024	6,487,447	3,892,468	103,799	747,354	1,743,826
TOTAL	**42,168,404**	**26,274,160**	**635,770**	**4,577,542**	**10,680,932**

14. SAFEGUARDS

14.1 Description of how the ER Program meets the World Bank social and environmental safeguards and promotes and supports the safeguards included in UNFCCC guidance related to REDD+

National framework for environmental and social management

In order to comply with the social and environmental requirement of the World Bank, Mozambique and the ER Program firstly rely on an overall progressive framework, based on an efficient land tenure, environmental and forestry legal framework, in which communities are given a central role. Admittedly, since the Rio Conference on Sustainable Development in 1992, Mozambique has been undertaking an enormous legal and institutional reform movement to improve the country ability to manage the environment and turn it into a more sustainable process. Those progress rely on:

- The adherence to and the adoption of a series of international and regional environmental protection and conservation conventions and protocols, which were described in section 4 and **Table 24**;
- The approval of a significant set of legislation with direct and indirect implications to environmental protection, which were detailed in section 4 and in **Table 23**;
- The creation of specific public institutions or strengthening of existing institutions dedicated to both environmental and social management.

As explained in sections 2 and 6, the recent institutional transformation in the management of the environmental components in Mozambique culminated with the establishment of the MITADER and the FNDS. Another important contribution is the recent updating of the Regulation on the Environmental Impact Assessment[73] (EIA).

The Environmental Impacts Assessment (EIA) Regulation, approved by Decree 54/2015 to regulate the same process

Mozambique has developed comprehensive regulations to cover the EIA process, which are included in the Regulation of the Process for Environmental Impact Assessment. The regulations are in line with the world's environmental and social management best practices, including World Bank recommendations and procedures. The new Decree (54/2015), which was enacted on the 1st of April 2016, has added a new category to the existing categories defining the scope of the Environmental and Social Impacts Assessment (ESIA) required prior to approval of interventions: the new A+ category, followed by a simple Category A. Whereas simple A projects are expected to be reviewed by the normal review process that

[73] Decree No 45/2004 has been replaced by Regulation 54/2015, as from 1 April 2016 (date of enactment after publication in January 2016).

has been in use[74], A+ projects should now be reviewed by independent (and more professional) assessors. Under the new Decree, the two A Category projects are required to assess their impact on biodiversity and present and plan to offset any potential biodiversity losses. Screening is done by DPTADER, while projects under Category A and A+ are then supervised by the central MITADER and Category B and C (exemptions) are the domain of the provinces. The new ESIA process in Mozambique is shown in Figure 36.

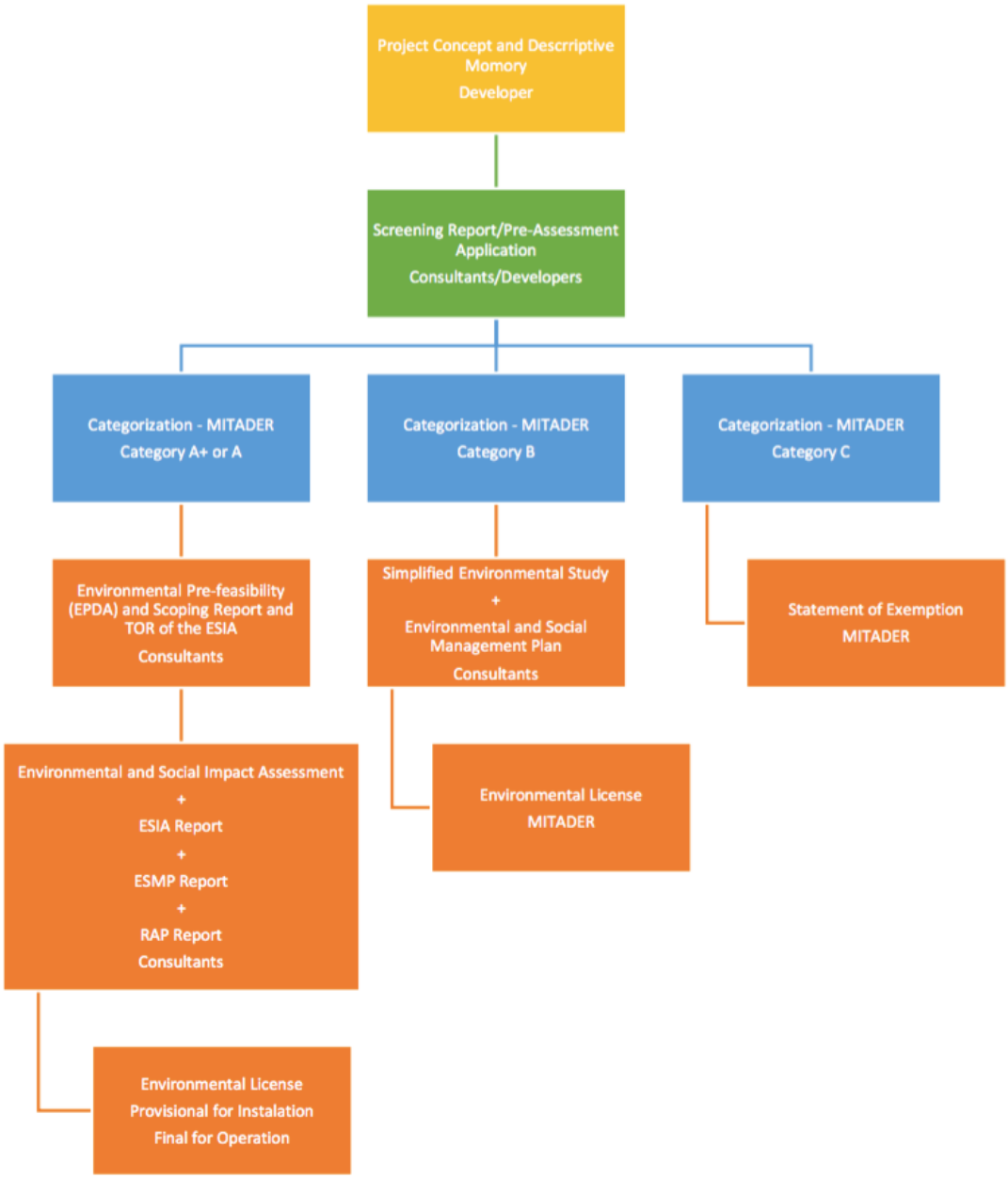


Figure 36: ESIA process in Mozambique

[74] *Comprising mainly MITADER technicians and those of other sectors (e.g. agriculture, mining, energy, fisheries, water, etc.) seen as relevant in each specific case.*

Safeguard plans that have been developed for the ER Program

In addition to this general framework, three specific safeguard documents were developed for the ER Program, with support from the FCPF:

- A Strategic Environmental and Social Assessment (SESA);
- An Environment and Social Management Framework (ESMF);
- A Process Framework (PF)[75].

They were prepared concurrently with this ER Program Document, as required by indicator 24.2 of the FCPF MF (FCPF, 2016) and completed a range of safeguard documents that had already been prepared for the ER Program associated projects, including a a Resettlement Policy Framework (RPF) that was prepared for the Sustenta project - *see* Table 70*.*

Table 70: List of the safeguard plans that have been developed

Safeguard document	State of approval	Public disclosure
Safeguard documents approved for the ER Program		
Strategic Environmental and Social Assessment **(SESA)**	Approved - November 2017	Available online (English)
Environment and Social Management Framework **(ESMF)** for REDD+ initiatives, MozFIP and MozDGM	Approved - January 2017	Available online (English)
Process Framework **(PF)** for National REDD+ initiatives, MozFIP and MozDGM	Approved - January 2017	Available online (English and Portuguese)
Other safeguard documents related to associated projects		
Resettlement Policy Framework **(RPF)** for the Agriculture and Natural Resource Landscape Management (Sustenta) Project	March 2016	Available online (English)
Environment and Social Management Framework **(ESMF)** for the Agriculture and Natural Resource Landscape Management (Sustenta) Project	March 2016	Available online (English)
Pest Management Plan **(PMP)** for the Agriculture and Natural Resource Landscape Management (Sustenta) Project	March 2016	Available online (English)
Environment and Social Management Framework **(ESMF)** for the MozBio project	July 2014	Available online (English)
Pest Management Plan **(PMP)** for the MozBio project	July 2014	Available online (English)
Process Framework **(PF)** for the MozBio project	July 2014	Available online (English)

[75] *Both the ESMF and the PF were approved in January 2017. The SESA was completed in November 2017.*

The SESA analyzes the strategic objectives and options for REDD+ in Mozambique and assesses them with a complete opportunity and risk analysis, comprising social impact, environmental impact and mitigation measures. It was based on a thorough literature review and on an extensive consultation process conducted at community, district, provincial and national levels in order to ensure a participatory and comprehensive approach and to identify in a transparent way the environmental and social issues that need to be addressed at sub-sector level - *see section 5 on consultations*. Based on those elements, it provides a synthesis of opportunities, risks, mitigation and enhancement measures for REDD+ strategies in Mozambique, which are crucial for the design of the ER Program.

Following the SESA, the ESMF helped to screen the proposed ER Program interventions, to ensure that they do not negatively affect natural and social environment. More precisely, the ESMF ensures that relevant World Bank Safeguard Policies and GoM environmental and social applicable regulations are strictly adhered to in REDD+ activities implementation – which includes the ER Program (MITADER, 2016d). According to the ESMF, given the nature, scale and scope of the proposed investments, their potential adverse environmental and social impacts are expected to be moderate, reversible and temporary (MITADER, 2016d).

Finally, although the ER Program will not support physical resettlement, a PF was conducted to deal with possible restricted access to and use of natural resources that may be anticipated because of the ER Program activities in the GNR and its buffer zone. This is in accordance with the WB broad conception of resettlement, which is not restricted to its usual meaning - that is "physical displacement": it also includes “economic displacement”, namely adversely affecting people’s livelihoods even when they do not have to relocate (MITADER, 2016d). Activities that may cause possible economic restrictions are monitored through the CDAP (Community Development Plan) contained in the PF.

Compliance with the WB safeguards and promotion of the safeguards included in UNFCCC guidance related to REDD+

As stated in the Mozambique REDD+ National Strategy (MITADER, 2016a), within REDD+ framework, safeguards are guidelines that aim at enhancing the positive impacts and reducing the negative impacts of REDD+ projects’ implementation activities. In this situation, they refer to the various measures that the GoM must adopt to manage potential risks in the design and implementation of the ER Program in Zambézia, in accordance with the World Bank social and environmental safeguards requirements. According to the FCPF Carbon Fund MF (FCPF, 2016a), in order to meet them, the ER Program should:

- Take into account the safeguard policies triggered during readiness preparation and the relevant social and environmental sustainability issues identified during the SESA process;
- Implement the Safeguards Plans prepared in accordance with the ESMF.

The ER Program fully complies with those requirements. The planned interventions and activities of the ER Program were designed in full alignment of the National REDD+ Strategy and taking into account the safeguard policies triggered during readiness preparation and the relevant social and environmental sustainability issues identified in the SESA and the ESMF.

Table 71: Compliance with UNFCCC guidance related to REDD+ (Cancun, 2010)

Safeguards for policy approach and positive incentives on issues relating to REDD+ - Appendix I of the Decision 1/CP.16 adopted by the UNFCCC	**Compliance of the ER Program**
Actions complement or are consistent with the objectives of national forest programs and relevant international conventions and agreements	**Yes** *See sections 2.2 & 4.3 & 4.5* *See SESA and ESMF*
Transparent and effective national forest governance structures, taking into account national legislation and sovereignty	**Yes** *See sections 2.2 & 2.3 & 4.5 & 6 & 9* *See SESA and ESMF*
Respect for the knowledge and rights of indigenous peoples and members of local communities	**Yes** *See sections 4.4 and 5* *See SESA, ESMF and PF*
Full and effective participation of relevant stakeholders, in particular indigenous peoples and local communities	**Yes** *See sections 5 & 6* *See SESA and ESMF*
Actions are consistent with the conservation of natural forests and biological diversity, ensuring that the actions (…) are not used for the conversion of natural forests, but are instead used to incentivize the protection and conservation of natural forests and their ecosystem services, and to enhance other social and environmental benefits	**Yes** *See section 4.3 & 16* *See SESA, ESMF and PF*
Actions to address the risks of reversals	**Yes** *See section 11* *See SESA, ESMF and PF*
Actions to reduce displacement of emissions	**Yes** *See section 10* *See SESA, ESMF and PF*

Social and environmental issues and risk mitigation measures

According to the ESMF, seven of the 10+2 World Bank Operational Safeguards Policies are expected to be triggered during REDD+ and the ER Program implementation.

Table 72: World Bank safeguard policies triggered by ER Program

World Bank Operational Safeguards Policies	**Triggered by ER Program**
Environmental Assessment (OP/BP 4.01)	X
Pest Management (OP 4.09)	X
Involuntary Resettlement (OP/BP 4.12)	X
Natural Habitats (OP/BP 4.04)	X
Forests (OP/BP 4.36)	X
Physical Cultural Resources (OP/BP 4.11)	X
Indigenous Peoples (OP/BP 4.10)	-
Safety of Dams (OP/BP 4.37)[76] - *preemptively*	X
Projects on International Waterways (OP/BP 7.50)	-
Projects in Disputed Areas (OP/BP 7.60)	-

[76] *Despite the project's association with agricultural and forestry development, no major water related infrastructure is expected, nevertheless the OP/BM 4.37 on Safety of Dams is triggered mainly as a precautionary measure.*

The ESMF has made provision to address potential concerns afferent to OP/BP 4.04 (Natural Habitats), OP/BP 4.36 (Forest), including possible impacts under OP/BP 4.11 (Physical Cultural Resources) based on “chance findings”. The PF prepared under the related MozBio Project covering the PAs in the program area was updated to meet the requirements of the Involuntary Resettlement (OP/BP 4.12) Safeguard Policy requirements related with ways of dealing with restrictions of access and use of natural resources by local people. The ESMF also contains elements of an Integrated Pest Management Plan (IPMP) to satisfy OP 4.09 requirements to streamline the best ways of dealing with the potential use of pesticides.

Environmental Assessment (OP/BP 4.01) - According the ESMF, all indications are that most of the activities of the ER Program will fall either under Category B or C as defined by the World Bank[77], meaning that: (i) the possible impacts of the ER Program are site - specific and easier to deal with; (ii) few if any of them are irreversible; and (iii) in most cases, appropriate mitigation measures can be readily designed.

In order to comply with OP/BP 4.01, the ER Program comprises the preparation and approval of a specific ESMF and a PF. All the projects comprised in the ER Program also were subject to specific safeguard plan, listed in Table 70.

Pest Management (OP 4.09) - As stated in the ESMF, the MozFIP and MozDGM projects - which are included in the ER Program - trigger OP 4.09 the World Bank Safeguard Policy on Pest Management, since certain forest operations foreseen under those projects - and under the ER Program - have the potential of being associated with the use of pesticides.

In order to comply with OP/BP 4.09, an Integrated Plan Management Plan (IPMP) was prepared to manage potential pest problems that may arise in the course of the ER Program implementation and to help ensure that the use of all pesticides, insecticides, herbicides, chemical fertilizers and other chemicals associated with the ER Program will be handled appropriately and in accordance with World Bank Operational Policy 4.09.

In particular, the ER Program will support agricultural development and post-harvest pest control to minimize post-harvest pest damage. Procurement of pesticides will not be financed until it becomes evident that local capacity exists to adequately manage their environmental and social impacts in compliance with OP 4.09, particularly with regards to health and safety aspects that are directly linked to human health conditions affecting women, the poor and most vulnerable groups of the community, such as toddlers, elderly and handicapped. More details on the IPMP are provided in the final ESMF (see MITADER, 2016d).

Involuntary Resettlement (OP/BP 4.12) - At this stage, it should be noted that land acquisition for public interest will systematically be avoided by the ER Program, as will all other activities discovered during subproject screening that might require resettlement or compensation. All the ER Program planned activities aim to be achieved through voluntary agreements with communities, interest groups or individuals according to specific provisions, rules and principles details in the ESMF.

---

[77] *Applying to "programs/projects with potential adverse environmental and social impacts on human populations or environmentally and socially important areas, including wetlands; forests, grasslands, and other natural habitats" (category B) and "programs/projects likely to have minimal or no adverse environmental and social impacts" (category C).*

However, the ER Program triggers OP/BP 4.12 of the World Bank Safeguard Policy on the basis that some of the ER Program planned activities may restrict communities from accessing and using natural resources in designated protected area: although physical resettlement will not be supported by the ER Program, economic displacement (restricted access to and use of natural resources) is anticipated, which may be caused by activities in the Gilé National Reserve and its buffer zone.

In order to comply with OP/BP 4.12, and as previously stated, an amended version of the PF for MozBio was prepared concurrently with the ESMF. Both documents were approved in January 2017 - see Table 70. This updated PF included lessons-learnt from the MozBio implementation of the PF and results of REDD+ public consultation - *see section 5*. Public consultation meetings were organized, during which the updated PF and clarification of the safeguards documents were disclosed and discussed.

Natural Habitats (OP/BP 4.04) - Accordingly to OP/BP 4.04 of the World Bank Safeguard Policy, the critical natural habitat to be considered by the ER Program are: legally protected areas, wetlands, riparian forests, forests with known high biodiversity value, sacred forests and areas with slopes of more than 25%. These formations must represent the program's Negative List of natural habitats to be negatively affected. Since the ER Program area extends over the Gilé National Reserve (GNR), the ER Program triggers OP/BP 4.04 of the World Bank Safeguard Policy: its impact may extend to natural habitats outside and inside protected areas.

In order to comply with OP/BP 4.04, the ESMF recommends a series of actions to ensure that adequate measures are taken to minimize the negative impacts that may occur, even where interventions will take place in conservation areas.

First, on the Gilé National Reserve, the main activities will be institutional support, technical assistance to forest sustainable management and law enforcement strengthening.

Second, no conversion of critical natural habitat will be financed and, as stated in the ESMF, eventual conversion of non-critical natural habitats (or fragments of non-natural habitats) or degraded natural habitats (including Miombo forests), due to activities on the ground (e.g., agro-forestry) must be with the objective to enhance sustainable development of the area/community, improving landscape and land use sustainable management. They must also include restoration of degraded areas as mitigation or compensation measures, hence enhancing ecosystem services. For the promotion agro-forestry, degraded areas (including degraded Miombo forest) will be prioritized through the use of GIS-based tools and participatory land use approaches.

Finally, agro-forestry activities considered under the ER Program must adopt a simplified management plan following internationally recognized forestry good practices to mitigate impacts and enhance environmental value.

Forests (OP/BP 4.36) - As previously stated, the ER Program aims at reducing deforestation. Of particular interest for the ER Program (in particular for activities comprised in MozFIP) is the fact that the Bank does not finance plantations that involve any conversion or degradation of critical natural habitats.

The ER Program will make concerted efforts to demonstrate that negative practices can be reversed and that forests resources can be used in an inclusive and sustainable manner and ultimately meet the core objectives of REDD+.

At this stage, it should be specified that the ER Program does not promote harvesting operations, but rather promotes agro-forestry. Only the activities pertaining to natural forests management (and not to plantation or agro-forestry activities) should be subject to OP 4.36's certification requirement. As part of the ER Program activities, technical assistance is being proposed on natural forest management, including to private sector operators towards obtaining forest certification (hence, in line with OP 4.36 requirements).

In addition, as stated in the ESMF, the FNDS has prepared maps, including for Zambézia, to identify potential sites for plantations ("go" areas, in opposition to "no-go" areas) based on satellite images - see Annex 8: Geographic prioritization of forest plantation and agro-forestry areas for Although the "go" areas do not contain significant forest cover (other criteria are: accessibility, proximity to forest fragments, and precipitation), due to pixel technical consideration (30 meters per 30 meters) there is a possibility of some forest fragments in these areas; hence, before any activity to be implemented, an on-the-ground High Conservation Value Forests (HCVF) assessment will be made by the service provider (or safeguard specialist) and will be monitored by the government. The "no-go" areas are protected areas, or areas with significant forest cover, in which no plantations can be forecasted.

Physical Cultural Resources (OP/BP 4.11) - Although no important physical cultural resources[78] exist in the ER Program area or are expected to be affected by the ER Program, a "Chance Find Procedure" is provided for in the ESMF. If an important artefact is found during ER Program implementation, the related construction activity should be stopped and the responsible Mozambican authorities be warned and involved in an investigation of the site. This especially includes the chance to find forests that have special value for local communities, groups or families in the ER Program area.

Safety of Dams (OP/BP 4.37) - Despite the ER Program's association with agricultural and forestry development, no major water related infrastructure is expected; nevertheless the OP/BM 4.37 on Safety of Dams is considered as triggered mainly on a precautionary note. As stated in the ESMF, precautionary measures need to be taken under this ER Program to ensure that where dams will be called upon, the defined safeguard regulations are ready to be put in place.

In any case where dams will be involved under this or other directly related programs/projects, these will be limited to small irrigation schemes upgrade and maintenance, rehabilitation of water storage facilities, and other types of priority water control structures that can be expected to cause minimal adverse impacts in the area. All precautions will still need to be taken not only to deal with the physical aspects but also the biological and social, such as maintaining environmental flows to preserve the health of the ecosystems and to avoid disturbance to the social activities (water for humans, livestock, etc.), downstream the infrastructures including avoiding interfering negatively with people's life styles and assets.

Implementation of safeguard plans in the course of the ER Program

The ER Program will be fully aligned with the recommendations formulated in the SESA, the ESMF, RPF and the PF documents, which have been conceived as strategic safeguards umbrellas to ensure that environmental and social considerations are integrated in the

[78] *Archeological sites, special architecture, important cemeteries, forests or where unique immaterial cultural resources.*

formulation of the REDD+ Strategy and in all other REDD+ related programs, including the Zambézia ER Program. In particular, the ESMF sets out the structures and procedures for undertaking environmental and social due diligence and for the management of future projects, policies and activities through which the refined REDD+ strategy is implemented.

Principles and rules for the implementation of safeguard policies

Basic safeguard principles and requirements will be applied throughout the expected lifetime of the proposed ER Program and will be taken into account in the definition and implementation of additional projects (MITADER, 2016a; 2016c). They were defined in the ESMF and are listed in Table 73. Those principles form an efficient social and environmental screening process that will help (i) determine if activities are likely to have potential negative environmental and/or social impacts; (ii) determine the level of environmental and social work required, including whether an ESIA/ESMP is required or not; (iii) determine appropriate mitigation measures for addressing adverse impacts; (iv) incorporate mitigation measures into the activities financed; (v) indicate the need for preparation of Community Development Action Plans in line with the PF; (vi) facilitate the review and approval of the subproject proposals; and (vii) create, enhance or protect the same type of natural resources at another suitable and acceptable location, compensating for lost resources.

Table 73: Safeguard principles and requirements for ER Program implementation (ESMF)

Systematic procedure of participatory screening for project sites and activities with environmental and social considerations
Step-by-step procedure for predicting the main potential environmental and social impacts of the planned activities and interventions
Typical environmental and social management plan for addressing negative externalities during activities implementation
Step by step monitoring and evaluation system for implementation of mitigation measures
Capacity building measures for environmental and social planning and monitoring of the activities
Budget to ensure that adequate resources are available, especially for the preparation and implementation of potential Environmental and Social Impact Assessments (ESIAs), Environmental and Social Management Plans (ESMPs) and Resettlement Action Plan (RAPs)

Where relevant, site specific ESIA with a budgeted Environmental and Social Management Plan (ESMP) will be prepared so that the planned activities (i) do not result in adverse environmental and social impacts on resources or areas considered as sensitive; (ii) prevent the occurrence of negative environmental and social impacts; (iii) prevent any future actions that might adversely affect environmental and social resources; (iv) limit or reduce the degree, extent, magnitude or duration of adverse impacts by scaling down, relocating, redesigning elements of the project; (v) repair or enhance affected resources, such as natural habitats or water resources, particularly when previous developments have resulted in significant resource degradation; (vi) restore affected resources to an earlier (and possibly more stable and productive) state, typically ‘background/pristine’ condition; and (vii) create, enhances or protects the same type of resources at another suitable and acceptable location, compensating for lost resources, including involving people potentially or actually experiencing restrictions of access to natural resources in protected areas in planning

alternative livelihoods activities as defined under WB OP/BP 4.12 on Involuntary Resettlement.

As part of the ESMF extensive publicity, awareness creation, capacity building, environmental and social clearance continuous assistance on the ground will also be given prominent position in the entire ER Program, projects and subprojects cycles. Community, landholders, micro and small enterprises and forest operators/concessionaries candidates will be carefully identified, trained and assisted to implement the ER Program activities, accordingly with the principles defined by the ESMF and listed in Table 73.

Arrangements for the implementation and monitoring of safeguard plans

As stated in section 6, safeguards implementation will build on the existing structure already in place in the FNDS, which has been recently strengthened in safeguards capacity at central level. These specialists will team up with the specialist of the PIU at provincial scale, to ensure that the ER Program implementation respect the environmental and social requirements, and will work closely with a focal point for environment and social issues identified within Zambézia DPTADER. The FNDS team will count on MITADER support at both central and provincial levels and relevant ministries for the timely and adequate handling of the environmental, social and communication dimensions of the Program throughout its life cycle. These staff will be trained by WB Safeguards Specialists, and in close collaboration with MITADER.

The safeguard specialists at central level and landscape level will have the overall responsibility for coordinating and monitoring implementation of the safeguards. They will ensure that: (i) all critical people/entities (at local, district and provincial) levels have the necessary knowledge and skills to perform their duties; (ii) all project activities are implemented per the environmental and social management requirements of the ESMF and PF and, where applicable, specific ESMPs; and (iii) problems arising during implementation are addressed early enough to avoid any spill-over that could subsequently hinder the outcomes of the ER Program - *see next sub-section of FGRM*.

Table 74: indicators of food safeguards implementation (National REDD+ Strategy)

Indicator	Description
Communities' participation and involvement	Compliance with the GoM guidelines and International Conventions on communities' participation and involvement
Validation process of the Environmental Management Plan	Compliance with environmental licensing requirements
Forests management plans	Compliance with the requirements of forest management plans in the areas in which the activities are implemented
Transparency and good governance	Good dissemination of key information
Poverty Reduction and Benefit Sharing	The economic and social benefits generated by REDD+ programs and projects are proportionally shared between stakeholders, with special attention to women integration and

	gender issues
Land use plans	Compliance with land use plans, mapping and zoning, including the zoning of specific areas - such as conservation areas (GNR)
Land Use Rights and Forest Resources:	Compliance with the national legal framework

Monitoring will therefore be fundamental to ensure that the objectives set forth in the ER Program and the safeguard plans are being achieved satisfactorily and, where there are nonconformities, timely corrective action can be taken. The components recognized as relevant indicators of safeguards implementation are set in the National REDD+ strategy (MITADER, 2016a) and listed in Table 74. The monitoring of the ER Program compliance with the risk mitigation measures during its implementation will be based on specific Mitigation Risk Mechanisms, including the PMRV, the SIS and the FRGM (described in the next sub-sections)[79]. The participation of communities in those mechanisms is central, especially in the PMRV.

Participatory (community-based) Measuring, Reporting and Verification (PMRV)

It is explicitly referred to in Mozambique REDD+ National Strategy that the standards, procedures and guidelines for monitoring and measuring REDD+ activities and results in Mozambique should be prepared considering the strategic objective that aims to ensure the active participation of local communities.

In this aim, the ER Program builds on a complete MRV system that was described in section 6 (*institutional arrangements*) and section 9 (*approach for measurement, monitoring and reporting)* and which is based on a participatory, or community-based, approach (PMRV). In this scheme, although the monitoring of datasets is realized at national level, on field information will be collected as a priority: at the lowest level of this MRV system, relevant forest information and socio-economic and environmental information will be collected at community level. In addition, projects or interventions will have their own monitoring systems to collect relevant information for feeding the Provincial and National MRV systems. The information will include for instance data reported by REDD+ projects (forest inventories, project areas, detailed mapping of LULC classes, etc.), data reported by M&E systems (planted areas, etc.) or other data (biomass surveys, etc.) (FNDS, 2017c).

Therefore, this PMRV is planned as an innovative participatory approach that aims at engaging various stakeholders, including forest-dependent communities, in monitoring and verification work, including for the implementation of safeguards plans. It implies to collect local carbon stock data to improve carbon accounting at the national level (in compliance with international standards) with the objective of increasing the participation of local communities to maximize the co-benefits of REDD+ (FNDS, 2017a). As a consequence, the PMRV will contribute to the good implementation of the social and environmental safeguard during the ER Program development. This PMRV is actually designed so as to include useful information for the definition of environmental indicators related to the reduction of deforestation and forest degradation and related emissions, economic and social indicators linked to integrated rural development, as well as the specific indicators of environmental and

[79] *Those mechanisms will be tested in 2018 in a pilot project covering 15 districts in Zambézia and Cabo Delgado.*

social safeguards, as set out in the ESMF.

14.2 Description of arrangements to provide information on safeguards during ER Program implementation

First, it should be noted that the approved safeguard instruments are available online on the Mozambique REDD+ website and at the World Bank Infoshop. Second, as explained in section 5, their design has been part of an extensive consultation process in Mozambique, which is continuous – *see section 5 for more details; it is also described in the ESMF document*. Finally, information on safeguards will also be achieved thanks to the PRMV and the REDD+ Safeguards Information System (SIS), developed in compliance with the principles and standards applicable to REDD+ implementation. The SIS is one of the key REDD+ information systems for REDD+ activities within the MRV system.

The Safeguard Information System (SIS)

As required in Decision 1/CP.16 adopted by the UNFCCC, Mozambique has developed a full range of key elements for the implementation of the ER Program[80], including a Safeguards Information System (SIS) that will be implemented to provide information on how safeguards are handled and respected throughout the implementation of the ER Program. This is a necessary requirement to obtain payment by results.

Functioning and principles

The functioning of the SIS is expected to be simple, accessible, inclusive, transparent, auditable, and comprehensive and to respect national legislation. Admittedly, the SIS is a new process in Mozambique that will demand a coordinated structure to enable the full participation of stakeholders (community, private sector, government and civil society) who are expected to take part in the process of collecting information (FNDS, 2017c). It order to do so, the SIS will be based on the following principles: (i) compliance with legislation and good governance; (ii) promotion of transparency and public and social responsibility; (iii) respect for local culture and traditions; (iv) significant participation of affected people and stakeholders (especially the most vulnerable); (v) act as a platform for hearing out grievances and act as a conflict resolution mechanisms; (vi) protection and conservation of forests, contributing to the improvement of the multiple functions of forests.

Methodology

The methodology to be used for the monitoring process of indicators includes interviews, questionnaires, direct observation and public consultations whenever necessary. Continuous dissemination programs will be part of the process to enable stakeholders to be actively involved, making an efficient and transparent implementation of REDD+ projects and initiatives, including in the ER Program area (FNDS, 2017c). The collection and recording of information for the SIS will be the responsibility of the FNDS at central level. Focal points have been identified in the relevant directorates. They will send the requested information to

[80] *The other elements required by the Decision 1/CP.16 adopted by the UNFCCC are the (i) national REDD+ strategy (approved by the GoM in November 2016); (ii) the national forest reference emission level (REL) and a forest reference level, as well the (iii) national forest monitoring system (currently being finalized).*

the responsible team at central level according to the schedule indicated in Table 75, before registration on the web platform - see Annex 9 - Characteristics of the Web portal for MRV REDD+ in Mozambique

For information related to cultural heritage indicator, data will be collected at the local level, with the local community or administrative and district councils, as well as service providers. The information must be validated at district level, with the community management officers in conservation areas (namely, for the ER Program, the GNR) being responsible for forwarding the information at central level, along with the Forestry Technical Assistants of the FNDS at the landscape level and with the support of DPTADER Community Officers.

The system will rely on the Web Portal for MRV REDD+ in Mozambique, which is being designed by the MRV team in the FNDS - technical characteristics of the portal are detailed in Annex 9 - Characteristics of the Web portal for MRV REDD+ in Mozambique, The SIS indicator registration platform will be updated on a biannual basis.

List of SIS indicators

The list of SIS indicators presented Table 75 is the consolidated proposal prepared after consulting with various institutions involved in the process, reviewing the technical notes for preparing the Project Appraisal Document (PAD) of MozFIP and MozDGM projects, as well as bibliographical revision with special attention to the guide of good practices to identify areas of high conservation value. The seminars for discussion and harmonization of safeguards indicators for SIS involved a technical team from the forestry, agriculture, rural development, conservation, and energy and environment sectors. This list if composed of indicators that have been proven to be easily monitored and optional indicators that could be monitored if possible and when data exist - not on an automatic basis.

Table 75: List of SIS indicators

Item	Sub item	Description	Scale	Frequency	Responsibility
GOVERNANCE AND TRANSPARENCY	Transparency	Record of public consultations linked to land tenure	Landscape and communities	Biannual	DINAT, SPGC, FNDS
		Publication of records of FGRM files	Landscape	Annual	FNDS
		Report on the evaluation of forest operators	National	Every 2 years	DINAF
		Publication of all relevant documentation (laws, decrees, etc.)	National, Landscape	Continual	FNDS, DINAF, ANAC, DINAS
	norms and procedures (law compliance,	Environmental licenses issued	National, Landscape	Annual	DINAF, DPTADER
		Forest concessions permits issued	National, Landscape	Annual	DINAF, DPTADER
		Management plans existing	National, Landscape	Annual	DINAF, ANAC

ENVIRONMENT		Environmental Management Plans	Landscape	Annual	DINAB, DPTADER
	Forest	Area of planted forest established (Reforestation)	National, Landscape	Annual	DINAS, DINAF, DPTADER
		Area of forest concessions under sustainable forest management	Landscape	Annual	DINAF
	Biodiversity	Registration of fragile ecosystems identified and preserved	Landscape	Annual	DINAT, ANAC, FNDS
		List of endangered species (fauna and flora)	National, Landscape	5 years	IUCN, DINAB
SOCIO CULTURAL AND ECONOMIC	Cultural heritage	Registry of existing and respected cultural rituals	Landscape, Communities	Annual	SDAE (district consultation council, local community and local population)
		Registry and preservation of sacred sites	Landscape, Communities	Annual	SDAE (district consultation council, local community and local population)
	Land tenure	Number of certificates issued	Landscape, Communities	Bi-annual	DINAT, SPGC
		Number of individual DUAT issued (per sex)	Landscape	Bi-annual	DINAT, SPGC
	Training	Number of community members and government involved in capacity building training in the context of reduction of deforestation (per topic, age range and sex)	Communities	Annual	FNDS
	Other	Number of smallholders who have adopted agro-forestry systems	Landscape, Communities	Annual	DINAF, DINAS
		Number of community delimitation (including data on population)	Landscape, Communities	Annual	DINAT

OPTIONNAL INDICATORS					
ENVIRONMENT	Use of pesticides	Record of projects using chemical products	Landscape	Annual	FNDS
	Water resource	Record of water course pollution due to excessive use of chemical products	Landscape	Annual	FNDS
	Forests	Record of wildfires (area)	Landscape	Bi annual	FNDS
		Areas where licensed charcoal producers have adopted improved production techniques	Landscape	Annual	FNDS
SOCIAL	Transparence	Communities aware about the FGRM (including population data)	Landscape, communities	Bi annual	FNDS
		Record of land conflicts and means of conflict resolution	Landscape, communities	Bi annual	FNDS
	Empowerment	Number of charcoal producers benefiting from improved techniques training	Landscape	Bi annual	FNDS
		Number of beneficiaries of safeguards training (with distinction between government, private sector, communities)	National	Annual	FNDS
PROCEDURAL	Performance evaluation	Environmental and social performance reports of the subprojects (classified into: land regularization, infrastructure, forest plantations and restoration; biomass; value chain: agriculture)	Landscape	Annual	FNDS
		Audits realized	Landscape	Every two years	FNDS

14.3 Description of Feedback and Grievance Redress Mechanism (FGRM) in place and possible actions to improve it

Assessment of existing FGRM (including customary FGRM) and action to improve FGRM for ER Program

Accordingly with criterion 26.1 of the FCPF MF (FCPF, 2016a), an assessment of existing Feedback and Grievance Redress Mechanisms (FGRMs), including any applicable customary FGRMs, was conducted and made public. Admittedly, the FGRM to be applied to the ER Program is based on existing FGRMs, including those that were previously established for the Sustenta and MozBio projects - to handle issues related to protected areas such as the GNR and its buffer zone.

During readiness phase, these mechanisms were tested, analyzed and discussed during public consultations at national level, described in the SESA and the ESMF. Those mechanisms were finally updated for REDD+ initiatives, which include the ER Program. The updated FRGM for REDD+, including for the ER Program, has firstly been described in the PF for REDD+ initiatives, MozFIP and MozDGM (MITADER, 2016e). Its overall scheme has been improved, in consultation with relevant stakeholders and under the lead of the MRV team in the FNDS (FNDS, 2017c; FNDS, 2017d). Its main features are described below.

The complete PRMV system for REDD+ and the ER Program, including the SIS and FGRM, will tested be as a pilot in 2018, in 15 districts of the provinces of Zambézia and Cabo Delgado. The FGMR has been designed to work on the REDD+ MRV web platform (see annex 9), which will be tested at the same time.

Preventive measures to avoid conflicts

As stated in the PF (MITADER, 2016e), conflicts and grievances generally arise from poor communication, inadequate or lack of consultation, inadequate flow of accurate information or restrictions that may be imposed on people through the implementation of REDD+ projects activities. In the case of the ER Program, grievances may be generated by:

- Mistrust generated by activities aimed to address anti-poaching and illegal logging and measures of Protected Areas (PA) and Forestry management, where community members may be caught between conflicting interests. This may generate tensions within the communities themselves and with PA rangers, Environmental Police (AQUA), Forestry Inspectors and forest concessionaires;
- Illegal exploitation of natural resources in which communities may be involved;
- Land speculation that could be generated by project activities related to forest plantations. This could undermine the transparency of the land acquisition process. Customary law and traditional systems on decision making could also favor traditional leaders' personal interests. *This situation should nevertheless be avoided by the planned process of land tenure regularization under the MozFIP and Sustenta projects, as part of the ER Program. Neither population displacements nor expropriation are forecasted in the ER Program.*

As preventative measures, awareness rising about the activities related to the ER Program will be continued throughout their implementation, in order to reduce misunderstanding and

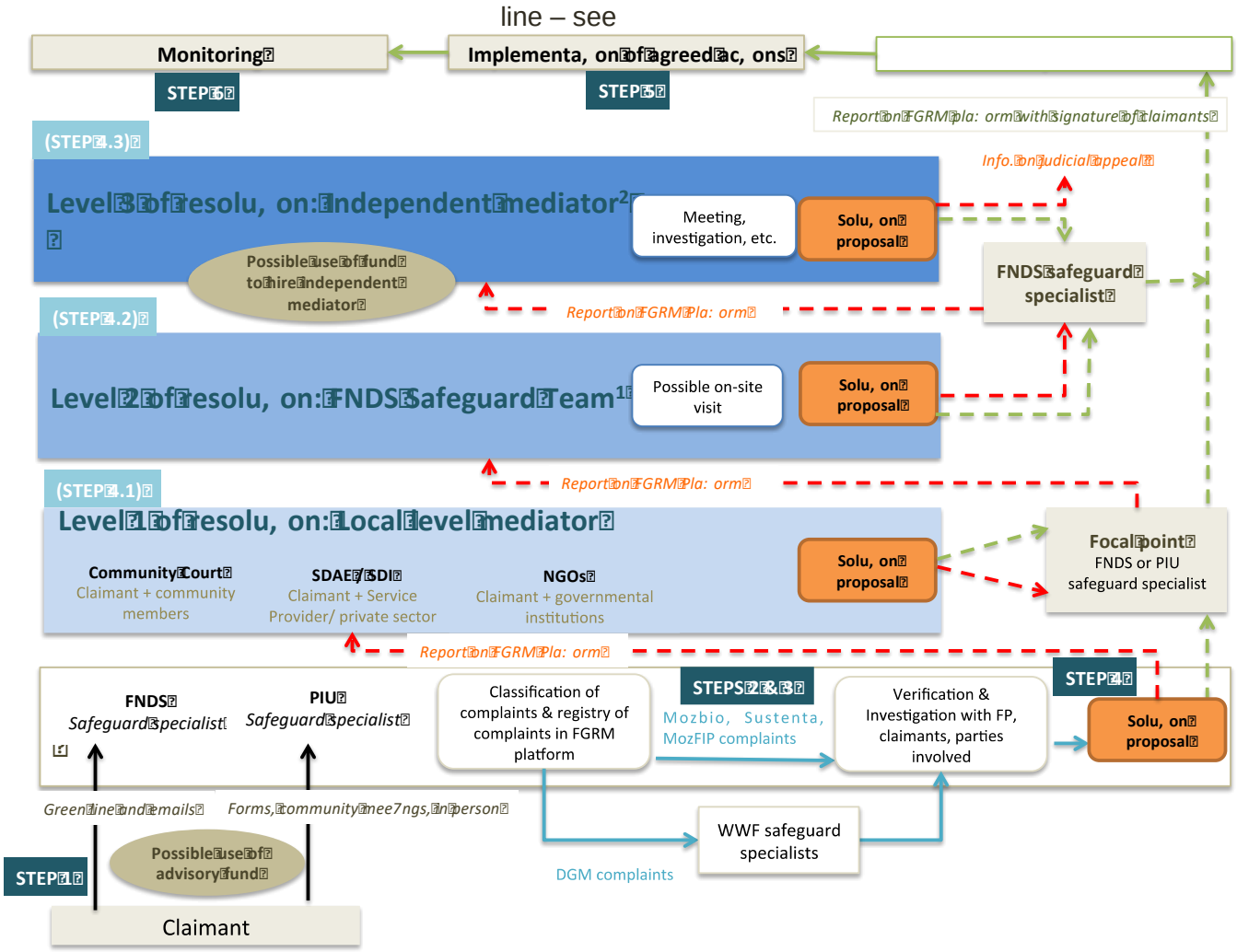
grievances. In particular, the consultations that were already started during Readiness phase will be carried on. This will also be enhanced by the action of the Zambézia MSLF. The participatory land use planning process (see EA-A2 - section 4.3), forest management planning and subsequent participatory action plan formulation - including through PMRV - will help identify potential conflicts and involve potentially affected people. Training for technical teams, CGRNs and local leaders in conflict management will also assist in minimizing the negative impact of conflicts. To empower communities, they will be involved in awareness-raising and training concerning their rights and obligations, how to obtain legal advice and representation, and how to seek redress against what they regard as unfair practices by investment partners, forest inspectors (*fiscais)* or others.

Main Actors of the FGRM

FNDS safeguard team: National supervision and coordination – The FNDS safeguard team, at central level, is responsible for ensuring the national supervision, coordination and monitoring of the FGMR system at every step of the process, from local to regional and national scale, for all projects that fall under the responsibility of the FNDS – which includes those funed by the WB in Zambézia province, namele Sustenta, Mozbio, MozFIP and DGM.

FNDS and PIU safeguard teams: Management of the FGRM – The FGRM focal points are located at two levels: (i) the FNDS safeguard team at central level; (ii) the PIU safeguard team at provincial level - the PIU being a representation of FNDS at landscape level.

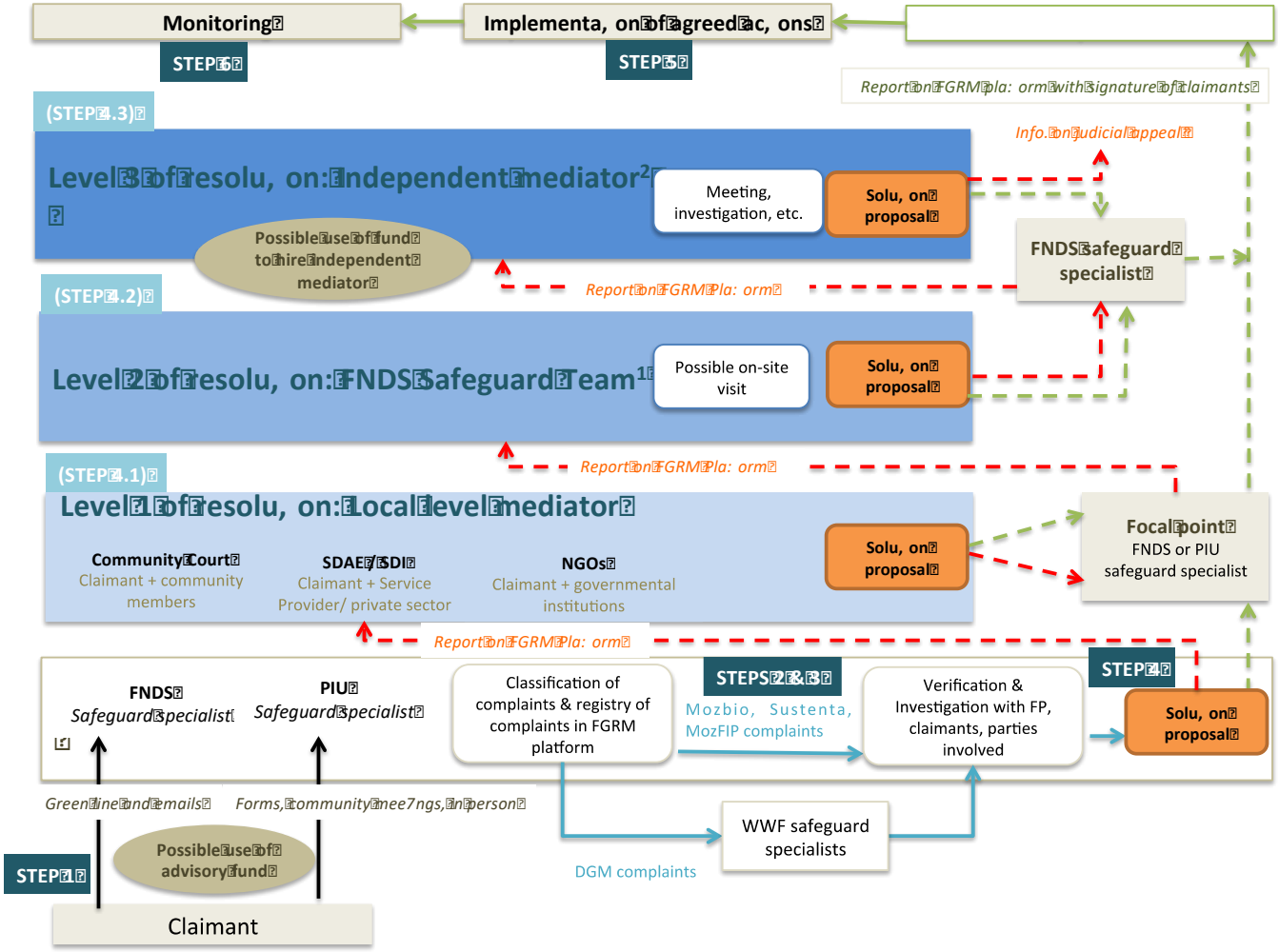
Both units are responsible for receiving, processing (classification of complaints) and investigating the complaints and queries that are sent to them, knowing that, at the beginning of the string, the PIU safeguard officers will receive the complaints addressed through specific forms, during community meetings or in person by complainants, while the FNDS safeguard officers will receive the complaints sent by emails or received through the green



1: For queries related to MozDGM project, Level 2 mediator is the DGM National Committee (NSC); **2**: For queries related to MozDGM project, Level 3 mediator is the Complaints Sub-committee of the DGM Global Committee (GSC).

Figure 37 and Table 86 (Annex 11).

Both units are also responsible for registering every step of the grievance resolution in the FGRM web platform, as shown in see



1: For queries related to MozDGM project, Level 2 mediator is the DGM National Committee (NSC); 2: For queries related to MozDGM project, Level 3 mediator is the Complaints Sub-committee of the DGM Global Committee (GSC).

Figure 37.

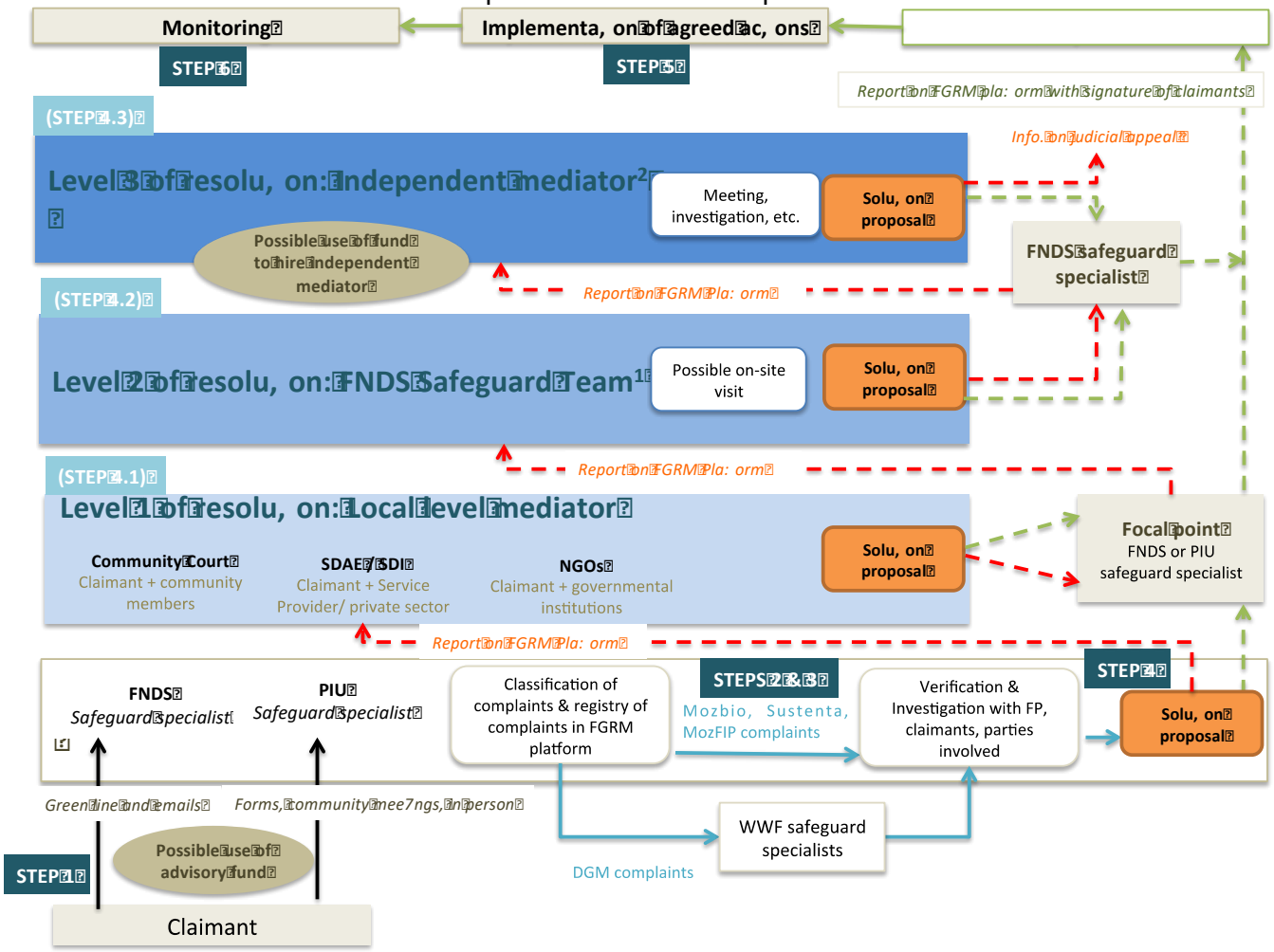
Mediators: Support for resolution – If a solution cannot be immediately reached and the process has to engaged in step 4.1, 4.2 or 4.3 (see figure 38), the FGRM focal points (safeguard officers in PIU at provincial level, or in the FNDS at national level) may also be supported by mediators at local level and by independent technicians, to assist in cases that could not be resolved at community level. A specific fund to cover their logistic cost is available within the FNDS.

FGRM procedures for the ER Program

Accordingly with criterion 26 of the FCPF MF (FCPF, 2016a), and as shown in the description of its procedures (see below), the FGRM for REDD+ and the ER Program will demonstrate: legitimacy, accessibility, predictability, fairness, rights compatibility, capability to address a range of grievances - including those related to benefit-sharing arrangements – and transparency. FGRM procedures are set in the PF and have recently been updated by the MRV team in FNDS - see FNDS (2017d).

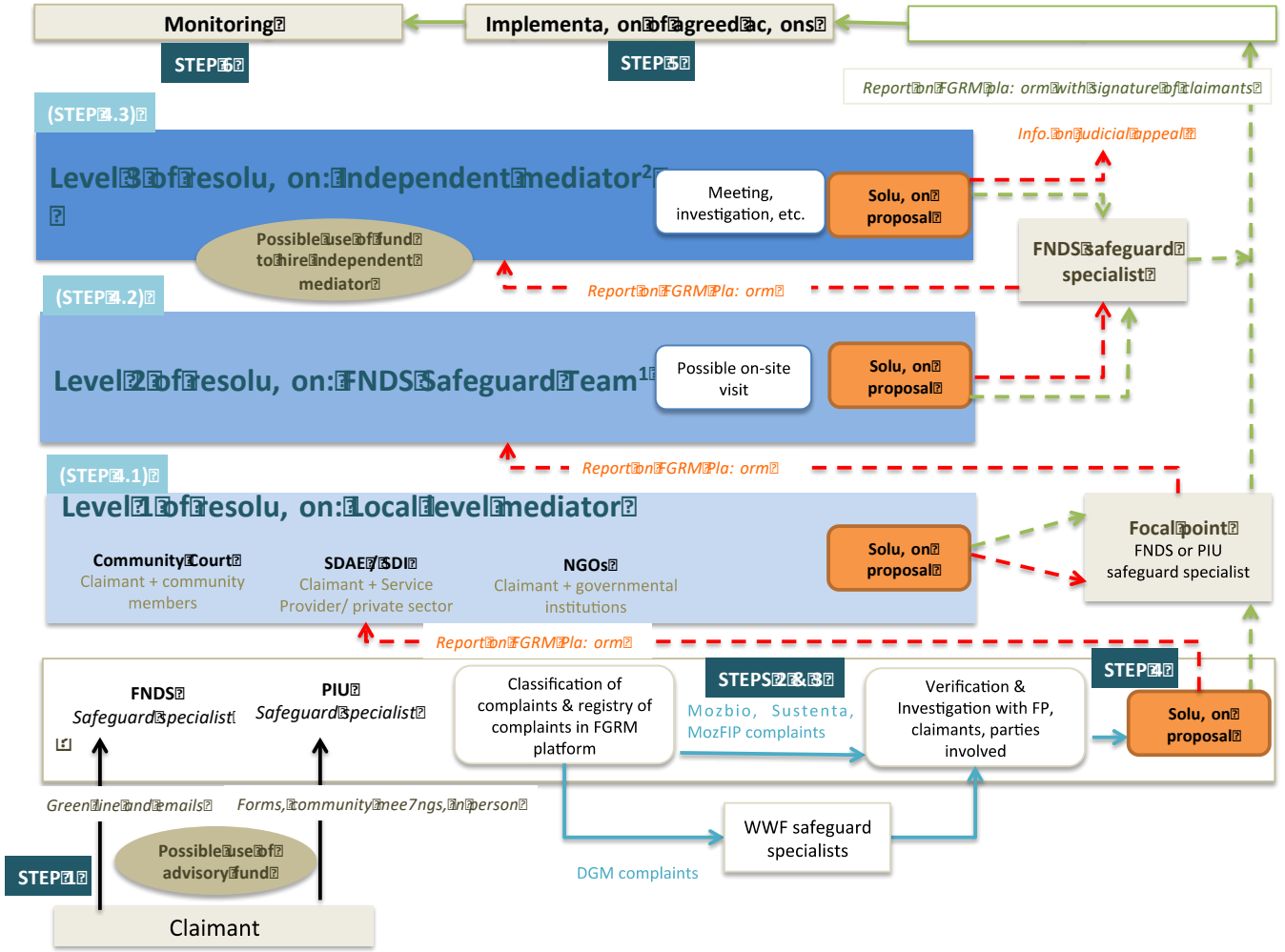
The FRGM fully respects the criterion of accessibility and fairness. Any person or group of people who has a relationship with the ER Program or is affected by its activities may submit a query or complaint, may they be communities, service providers, NGOs, local governments or any individual or group affected.

The successives steps of the FGMR are represented in



1: For queries related to MozDGM project, Level 2 mediator is the DGM National Committee (NSC); 2: For queries related to MozDGM project, Level 3 mediator is the Complaints Sub-committee of the DGM Global Committee (GSC).

Figure 37 and described after.



1: For queries related to MozDGM project, Level 2 mediator is the DGM National Committee (NSC); 2: For queries related to MozDGM project, Level 3 mediator is the Complaints Sub-committee of the DGM Global Committee (GSC).

Figure 37: FGRM system for the ER Program and responsibility of main actors

Step 1: Gather suggestions and complaints

Those suggestions, queries and complaints can be sent to the PIU safeguard team (provincial focal point) or to the FNDS safeguard team (national focal point) according to the means available to the complainants. Four main channels can be used. Two of them are managed by the FNDS safeguard team at central level (meaning that the focal point to whom the complaint is sent is the FNDS safeguard team), while the three others are managed by the PIU safeguard team at provincial level (meaning that the focal point to whom the complaint is sent is the FNDS safeguard team):

- **The use of a "Green Line" (free call)** ***(complaints managed by the FNDS safeguard team)***: claimants will receive a text message or an email for them to be able to follow up the complaint;
- **The use of emails** ***(complaints managed by the FNDS safeguard team)***: claimants will receive a text message or an email for them to be able to follow up the complaint;
- **The use of specific forms** ***(complaints managed by the PIU safeguards team)****:* they will be placed in strategic places in order to be easily accessed (headquarters of Conservation Areas, CGRN headquarters, schools) where a responsible authority (president, secretary, teacher, etc.) will be identified; (see Annex).
- **Community meetings** ***(complaints managed by the PIU safeguards team)***: complaints may also be presented at meetings with traditional community leaders or CGRNs. A secretary must be appointed to record the suggestions and complaints.
- **Personally** ***(complaints managed by the PIU safeguards team)***: the FGRM team, community officials, service providers, NGO staff and local government technicians will be able to assist people with difficulties writing or without access to the phone to complete the forms and submit complaints.

For step 1, a small advisory fund, managed by the FNDS, is available for highly vulnerable claimants who need support to present their cases. Claimants in need of such support should ask for it to the FGMR focal point (PIU or FNDS safeguard team).

Anonymous complaints are accepted. The FP will carry out the research, including with independent experts if necessary and, if possible, seek a solution. It will be included in the platform and shared through community meetings, local radio, etc. or implemented in the most effective manner and protecting the claimant's identity.

Step 2: Registration and Categorization of suggestions and complaints

When receiving the queries and complaints, the FGRM focal points (safeguard officers in PIU at provincial level, or in the FNDS at national level) will classify them into various categories and register them in the FGRM web platform. For the ER Program, those categories are[81]:

[81] *The FGRM is intended to be upscales at national scale and, as such, two other categories might be used (i) Conservation areas: applies to suggestions and complaints linked to conservation areas (expect those involved in the MozBio project), to be forwarded and managed by the Conservation Areas administration; (ii) Other: applies to suggestions and complaints that are not concerning the MozBio, Sustenta, MozFIP and MozDGM projects and which should be forwarded and managed by the relevant institution, depending on the nature of the subject.*

- ***Zambézia projects***: Suggestions and complaints concerning the MozBio, Sustenta and MozFIP projects (ER Program activities) will be classified in three main sub-categories:
  - Environment: this category applies to suggestions and complaints concerning the impact of ER Program activities on the environment, such as disappearance of specific species, deforestation, erosion, contamination of water, etc.;
  - Social: this category applies to suggestions and complaints regarding the impact of project activities on community life, such as restrictions on access to natural resources, protection of sacred sites, disputes related to land use rights, etc.;
  - Project performance: this category applies to suggestions and complaints regarding the performance of the ER Program and associated project and their staff, such as lack of presence of staff on the ground, poor supervision of activities, delays in delivery of funds and materials, etc.;
- ***DGM:*** Suggestions and complaints concerning the MozDGM project will be forwarded and managed by the National Executing Agency[82].

Step 3: Confirmation

After classification and registry of queries and complaints, the FGRM focal point (safeguard officers in PIU at provincial level, or in the FNDS at national level) will inform the claimants (through text messages, letter or in person) on the reception of their claims, according to the type of queries and complaints received:

- *For inappropriate suggestions or claims:* applicants will be informed within 5 working days after receiving the complaint regarding the reasons for the invalidity and, if relevant, other channels of resolution will be suggested;
- *For suggestions or requests for clarification*: applicants will be contacted to clarify the doubts or questions presented and, if relevant, indicate the follow-up actions that should be agreed with applicants and relevant actors of the project, along with respective deadlines. This process must be carried out within 10 working days after receiving the query.
- *For grievances and complaints*: applicants will be informed that their case has been registered within 5 working days after receiving the complaint. ***The FGRM focal point then proceeds to step 4.***

Step 4: Verification, investigation, action of complaints

For relevant grievances and complaints, the FGRM focal point (safeguard officers in PIU at provincial level, or in the FNDS at national level) organizes a meeting together with the complainant and the other parties involved (service provider, contractors, project coordinator, etc.) in order to carry out an investigation, and verify the validity of the complaint and seek a friendly solution. The meeting should take place within 5 working days after notification

[82] *The MozDGM project is a special case, with the technical and administrative execution being the responsibility of WWF as the National Executing Agency (NEA). WWF has expressed an interest in using the FGRM described in this section but with some modifications in Step 4, described in footnotes n. 85 and n. 86.*

If the claimant is satisfied, the FGRM focal point (safeguard officers in PIU at provincial level, or in the FNDS at national level) prepares a report that has to be signed by the parties and downloads it onto the FGRM web platform.

If the claimant is not satisfied, the FGRM focal point informs the complainant about the different levels of resolution of the complaint, including the judicial appeal, and on the delay for its query to be treated[83]. **The case then moves to the first level of resolution (level 1):**

- **LEVEL 1: LOCAL LEVEL OF RESOLUTION** – step 4.1
  - The FGRM focal point (safeguard officers in PIU at provincial level, or in the FNDS at national level) informs the relevant mediator of the nature of the complaint, the results of the investigations and the proposed solutions and results. Those mediators can be: (i) *Community Court*: for disputes arising between individuals or groups of individuals; (ii) *District Service for Economic Activities (SDAE) or District Service for Planning and Infrastructures (SDPI)*: for disputes arising between individuals or groups of individuals or community and service provider, private sector or ER Program staff; (iii) *NGO not attached to the ER Program*[84]: for disputes arising between individuals or groups of individuals or the community and governmental institutions.
  - The mediator attempts to reach an amicable solution within 15 working days (or other period agreed by the parties).
  - *If the claimant accepts the proposed solution*, the FGRM focal point (safeguard officers in PIU at provincial level, or in the FNDS at national level) prepares a report that has to be signed by the parties and download it onto the FGRM web platform. *The case moves to step 5 (implementation of agreed actions)*.
  - If the claimant does not accept the proposed solution, the FGRM focal point (safeguard officers in PIU at provincial level, or in the FNDS at national level) prepares a report explaining the reasons of the refusal, downloads it onto the FGRM web platform and refers the case to the FNDS Safeguards Department. *The case moves to Level 2 of resolution*.

- **LEVEL 2: TECHNICAL LEVEL (FNDS - DEPARTMENT OF SAFEGUARDS)**[85] – step 4.2
  - The FNDS safeguards department assigns the processing of the complaint to a safeguards officer who carries out the analysis based on all the information available in the FGRM web platform;
  - At the request of the complainant, or if considered as necessary, the FNDS safeguards officer responsible for the case will arrange a site visit to hear the parties involved;
  - The FNDS safeguards department has a maximum of 20 days to report on its findings and propose a solution;

---

[83] *The default time frime is 15 days but an alternative time frame can be agreed between the parties concerned.*

[84] *For mediators who are not part of the government (NGOs), the FNDS will assume the financial costs of their actions in the FGMR, as planned in the the financial operationalization of the FGRM.*

[85] *For queries related to MozDGM project, Leval 2 mediator is the DGM National Commitee (NSC).*

- *If the claimant accepts the proposed solution*, the responsible FNDS safeguards officer prepares a report that has to be signed by the parties, downloads it onto the FGRM web platform and informs the FGRM focal point at provincial level of the results. *The case moves to step 5 (implementation of agreed actions)*.
- *If the claimant does not accept the proposed solution*, the responsible FNDS safeguards officer prepares a report explaining the reasons of the refusal and downloads it onto the FGRM web platform. *The case moves to Level 3 of resolution*.

- **LEVEL 3: INDEPENDENT (NEUTRAL AND INDEPENDENT MEDIATOR)**[86] – step 4.3
  - The case is presented to an independant mediator[87] who carries out the analysis of the complaints based on all the information available in the FGRM web platform;
  - If necessary, the independant mediator may call the parties involved to a meeting or request additional documentation or investigations;
  - The independent mediator has a maximum of 20 working days to deliberate and propose another solution;
  - *If the claimant accepts the proposed solution*, the FNDS safeguards officer who was responsible for the case in level 2 prepares a report that has to be signed by the parties, downloads it onto the FGRM web platform and informs the FGRM focal point at provincial level of the results. *The case moves to step 5 (implementation of agreed actions)*.
  - *If the claimant does not accept the proposed solution*, the FNDS safeguards officer who was responsible for the case in level 2 follows the same process and additionally informs the complainant of his rights and the means of appeal against the mediator's decision in court.

The judicial system – it should be reminded that, although the use of judicial remedies should be avoided as much as possible due to delays in resolving cases, the judicial system does exist parralel to the FGMR and remains an available option for all complaints regarding the ER Program. It should be reminded to claimants from the beginning of the process that it can be used at all time in the process if the Claimants requires it.

If community interests are nullified or invalidated by other government actions, there are legal provisions to appeal to a higher level, such as national directors and ministers. Finally, all citizens have the right to refer their complaints to the Public Prosecutor, the responsible institution to ensure that the law is correctly applied.

[86] *For queries related to MozDGM projet, Level 3 mediator is the Complaints sub-committee of the DGM Global Commitee (GSC).*

[87] *For this level of conflict resolution, a fund, managed by the FNDS, is available to hire the services of the independent mediator. This fund will cover the logistic costs of its intervention. The FNDS safeguard team will manage the use of the fund.*

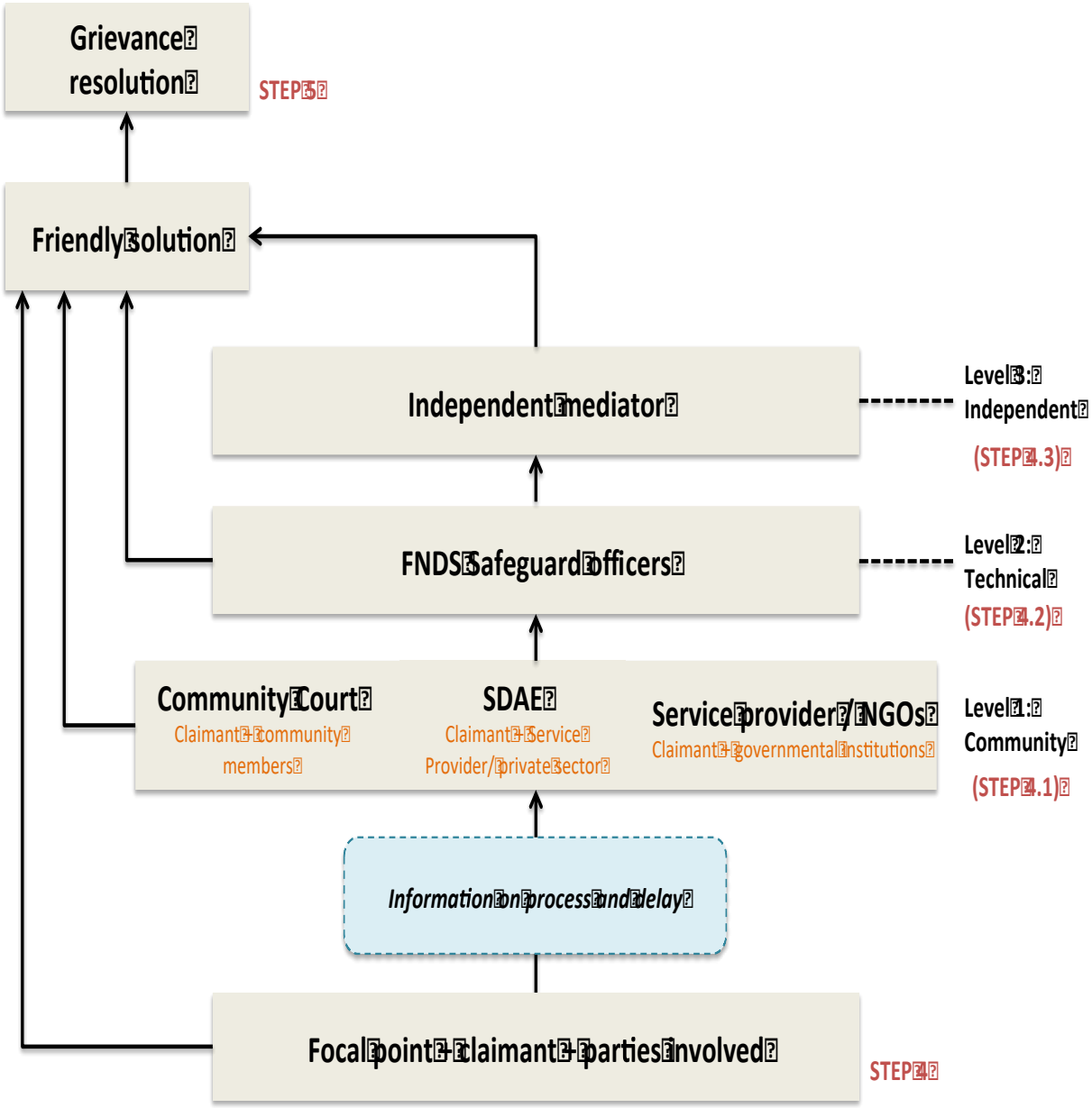


Figure 38: level of resolution within step 4 of the FGRM

Step 5: Implementation of agreed actions

Upon completion of each process, the FGRM focal point (safeguard officers in PIU at provincial level, or in the FNDS at national level) will take the necessary actions to implement the agreements reached within 15 working days after the signature of the agreement. For agreements requiring permanent modifications of projects and/or processes, or measures requiring more time, the agreement should include an action plan with a timetable. It should also indicate the budget required for its implementation and the actors responsible for each activity. Agreed actions should be communicated upon through various channels, including local radios, internet, and the use of the Zambézia MSLF – *see next sub-section*.

Step 6: Monitoring and Evaluation

The FNDS safeguard staff will carry out the monitoring of the FGRM at central level. Monitoring will follow-up of the complaints and their resolution, in order to (i) monitor the

number and type of complaints to take proactive action to avoid future claims; and (ii) monitor the effectiveness of the FGRM in terms of use (number, type, origin of cases, trends), efficiency of response (answers and conclusions in time) and overall effectiveness (level of satisfaction of users).

In order to assess the effectiveness of monitoring and resolution of complaints, the following indicators will be used:

- Number of complaints registered;
- Percentage of complaints answered within the deadlines;
- Level of community and users satisfaction regarding the FGRM (perception survey).

The monitoring will generated lessons- learnt and should actually help to make strategic and operational decisions in the implementation of the ER Program and subprojects, as well as political decisions, which may avoid actions resulting in similar claims in the future.

The key results of the system and monitoring will be disseminated among communities to increase transparency, credibility and confidence in the system, trough the use of brochures, community radio messages and meetings with communities.

Communication on the FGRM

While the system is being operationalized and the main actors (focal points, community officials, SDAE technicians and service providers) are being trained in the management of the FGRM mechanism, an information campaign will be organized in the ER Program area through its associated projects in order to present (FNDS, 2017e):

- The type of complaints that may be submitted;
- The channels to submit complaints and the Green Line number;
- The progressive process and step of actions, including and deadlines;
- The options that claimants have if they are not satisfied with results (including legal);
- The opportunity to solve problems with ER Program and subprojects staff;
- The seriousness of the system and the importance of putting together documents and information and presenting grievances in good faith and before any escalation; etc.

The disseminaton of information and of the results of the FGMR process will be ensured, all along the process, through the web platform that records and manages information in real time (as shown in Figure 34) with full public access. **In addition, because not all the stakeholders have access to internet, communication will also be made in locally relevant languages and use appropriate channels for the messages to reach the most marginalized groups**, at community level, including through community radio, videos, community meetings and meetings of the Zambézia MSLF, posters, specific meetings with focal point and community leaders, local leaders, etc.

15. BENEFIT-SHARING ARRANGEMENTS

Please see the separate document.

16. NON CARBON BENEFITS

16.1 Outline of potential non-carbon benefits and identification of priority non-carbon benefits

The ER Program is expected to be associated with high non-carbon value, which should be generated during its implementation and which is expected to continue after the terms of the ERPA. Admittedly, the ER Program aims to initiate innovative and sustainable practices in its area of implementation that will have positive impact in the long run. As such, all the planned activities under the proposed ER Program will be aligned with MITADER's overall mission to promote rural development.

This section starts with a description of the various non-carbon benefits that the ER Program is expected to generate, before focusing on five priority non-carbon benefits that have been identified and that will be monitored through specific measures. At the end of the section, **Table 78** describes more precisely how the ER Program will generate and enhance the priority non-carbon benefits - *For more details on interventions associated to each non-carbon benefit, see section 4.3.*

Outline of potential non-carbon benefits

The non-carbon benefits are numerous. They have primarily been identified during consultations with stakeholders that were organized at national level and in Zambézia province, related to the REDD+ strategy and associate projects - such as MozFIP, MozBio and the Sustenta project - on safeguards and on the ER Program design – *see section 5 on public consultations.*

Table 76: Outline of all potential non carbon-benefits associated with the ER Program

Direct non carbon benefits improving rural population's livelihood
♦ Sustainable use and long-term access to forest resources
♦ Increase and diversification of income and employment opportunities
♦ Alternative and sustainable energy sourcing and health benefits
♦ Adaptation of agricultural practices to climate change to increase agricultural production
♦ Clarified land tenure
Strengthening of forest management and governance
♦ Increased transparency in the forest sector
♦ Long-term engagement of multiple stakeholders in forest management with strong role of Local Communities
♦ Reduction of unsustainable practices and illegal logging
♦ Improvement of business environment in forestry sector

Long term environmental benefits
♦ Soil conservation
♦ Protection of ecosystems
♦ Maintenance of high-value biodiversity
♦ Rehabilitation of degraded lands

Direct non carbon benefits improving rural population's livelihood

Securing sustainable use and long-term access to forest resources - As explained in section 3, the rural population leaving in the ER Program area is highly dependent on natural and forest resources. Yet, ongoing deforestation and forest degradation in the "without project scenario" is expected to eventually reduce their access to such resources that will become scarcer, especially with high population growth and subsequent increased anthropogenic pressure on forest. *Section 4.1 already underlined the link between population growth and deforestation*. Through reducing deforestation, the ER Program as a whole is therefore expected to generate the most important non-carbon benefit: the maintaining of forest cover and associated natural resources, helping communities to secure their long-term access to resources they highly depend on.

Long-term increase and diversification of income and employment opportunities - One of the main objectives of the proposed ER Program is to help promote a range of intertwined income-generating activities for local population, linked to conservation agriculture, sustainable charcoal production and NTPFs management. The promotion of conservation agriculture in the ER Program area is based on the use of various crops and on improving market access. This component provides for the integration of smallholders into improved supply chains for local, regional and global markets, which is expected to generate new employment opportunities – with increased production and transformation potential - and to reduce reliance on "slash and burn" agriculture (UT REDD+, 2015a). By improving the position of smallholders in value chains and helping them certify their crops through fair trade schemes, the ER Program is expected to allow smallholders to sell their products with premium prices and get extra income. In the same way, the ER Program interventions focusing on adding value to NTPFs should also contribute to increase revenues and profits for local communities.

Admittedly, long-term employment opportunities and the direct increase of income for smallholders will be enhanced by the ERI-D2, aiming at structuring key sustainable supply chains for cash crops production, based on (i) support to commercial agricultural development in the forestry zone and (ii) the development of value-chains for non-timber forest products and commercial cultures, notably through financing agri-business.

In this context, commercial agriculture refers to agricultural production of which the outcomes are not only used for self-consumption: it has a market orientation and focus on private sector delivery in common, such that the share of production that is consumed at home is reduced. In the ER Program, commercial agriculture is a private sector driven model, relying on the identification and support to entrepreneurial individuals with grassroots-level networks that enable business-based delivery of inputs.

Such model involves supporting the Small Emerging Commercial Farmers (SECF) network, including

through agribusiness finance to value-chain actors, which can here be defined as services increasing their access to credit and assistance to prepare viable and bankable business plans enabling them to establish their business. This may encompass training in best practices related to agronomy, business development, risk mitigation and marketing; support to the development of business plans that enable access to finance from commercial finance institutions; enabling linkages with key financial institutions supporting agriculture in the ER Program area and provide advice related to mutually beneficial arrangements; facilitate linkages between SECFs and output buyers and markets, etc.

The model is based on the identification of lead farmers with entrepreneurial drive, who are supported to develop business linkages with 80–250 rural households. **Far from creating any type of inequalities, the SECF-based model enables covering a wider number of smallholders and aims to promote sustainability after the ER Program's implementation period**, because of its private sector driven nature (profit-making incentive for both the smallholder and SECF).

In addition, **any risk of creating inequality is considered as covers by the Safeguard plans that were prepared for the ER Program** – *see section 14*. In particular, it should be reminded that the Involuntary Resettlement (OP/BP 4.12) policy was triggered, since this ERI could necessitate involuntary land acquisition, such as land delimitation and/or expansion, land-use planning, rehabilitation of small-scale irrigation schemes for agriculture, construction/rehabilitation of small-scale infrastructure (storage and administrative facilities), possibly resulting in the involuntary resettlement of people and/or loss of (or loss of access to) assets, means of livelihoods, or resources. **This risk was acknowledged and, in order to ensure that proper mitigation measures were set forth, a Resettlement Policy Framework (RPF) was prepared to guide the preparation of site-specific Resettlement Action Plans (RAPs)**. Similar to the Environmental and Social Management Framework (ESMF) and Integrated Pest Management Plan (IPMP), the RPF was fully consulted upon, reviewed, and cleared by the World Bank, and publicly disclosed both in-country and in the Bank's InfoShop before the appraisal of the Sustenta project – *see section 14 for more details on Safeguard plans*. **Should any unforeseen social, economic and environmental outcome negatively impact the ER Program area, it is expected to be efficiently dealt with through the FGRM** (see section 14), which will enable quick adaptation of ER Program activities, if deemed necessary.

Securing alternative and sustainable energy sourcing and health benefits - The ER Program provides for the promotion of sustainable biomass use and production that could decrease deforestation and forest degradation, improve forest management and generate health benefits. This component includes energy plantations and the dissemination of improved charcoal production techniques. Through addressing the unsustainable exploitation of wood for energy, the ER Program will reduce possible forest degradation in rural areas and maintain a reliable source for domestic use, in the long term – which is coherent with the first non-carbon benefit ("Securing sustainable use and long-term access to forest resources"). In addition, with more efficient charcoal-making technology and the promotion of alternative sources of energy, health risks linked to traditional cook stoves may be reduced - using charcoal and fuel wood for cooking implies a high incidence of acute respiratory infections due to air pollution (UT REDD+, 2015a).

Adaptation of agricultural practices to climate change to increase agricultural production - Mozambique is extremely vulnerable to climate variability and change – *see section 3.2*. Zambézia is a heavily affected province, facing unpredictable climatic conditions - including intense droughts, unpredictable rains, floods and uncontrolled fires. As many communities depend on the productivity of their crops for their subsistence, the promotion of

conservation agricultural techniques and climate smart techniques can generate substantial change in increasing their ability to adapt to climate change – including through reducing their vulnerability to drought – thereby securing long-term agricultural production. In addition, by promoting the formation of cooperatives or other types of agricultural associations, the ER Program seeks to generate knowledge exchange between smallholders and to help them combine their sales in order to obtain better prices (UT REDD+, 2015a).

Clarified land tenure – Land tenure regularization and community delimitation are important components of the ER Program that will contribute to securing local population's rights on the natural resources that are present in the ER Program area. As explained in section 4.3, 4.4 and 11, secure tenure right is a pre-requisite to on-gong participation of stakeholders in the ER Program and in ensuring the long-term change of unsustainable behaviors based on the over-exploitation of forest and natural resources. It therefore a necessary base for much of the other non-carbon benefits – depending on the success of ER Program implementation.

Strengthening of forest management and governance

Increased transparency in the forest sector – The ER Program is expected to increase the overall transparency of the forest sector in Mozambique, through various means including better involvement of local population in the monitoring of forest resources. Transparency in terms of business activities and illegal income generating activities is also crucial in order for all participants to be on an equal basis for the use of natural resources and in the receiving of carbon (and no carbon) benefits. Increased transparency is also meant to secure long-term and sustainable practices with regard to forest management that will be able to continue after the terms of the ERPA, making all stakeholders be accountable for their behavior in the ER Program area. This will be achieved, inter alia, through the establishment of national and provincial Monitoring, Reporting and Verification (MRV) offices, the creation and maintaining of online forest management platform and the improvement of land use planning and registration. This benefit is strongly linked with the long-term engagement of multi stakeholders in forest management – see below.

Long-term engagement of multiple stakeholders in forest management with strong role of Local Communities - The proposed ER program will promote a transparent and participatory decision making process that aims to: (i) increase local communities' rights to land and forest resources; (ii) promote land use planning; and (iii) implement benefit sharing mechanisms. The proposed interventions will not only improve community-based forest management, by promoting community organization and capacity building, it will also help ensure the participation of various entities in the area, ranging from community organizations, civil society and the private sector to provincial and district governments - *For more details, see also section 5.*

Reduction of unsustainable practices and illegal logging - In the ER Program, improved implementation and enforcement of legislation (and transparency) are expected to reduce unsustainable and illegal practices and to increase revenues for the GoM. Stronger enforcement will also increase the legally stipulated benefits to communities, and provide a basis for long-term and sustainable production of timber products that can provide a lasting stimulus to rural economy. Various interventions, including land tenure regularization, are aiming at this benefit.

Improvement of business environment in forestry sector - Improving law enforcement is also the key to generating revenues for legitimate private sector operators. It will help

reducing the unfair competition of the forest concessionaires, simple license holders and informal loggers who manage to avoid the costs of complying with the law on forest activities, industry regulations, taxes and trade duties. The ER Program focuses on those issues in order to make illegality be more “expensive” and to valorize legal and transparent behaviors in the forestry sector.

Long term environmental benefits

Eventually, the ER Program is also expected to provide significant environmental benefits that will be enhanced by sustainable management of forests. It should be recalled that the environmental services provided by forests are innumerable. Sustainable management of forest ensures that ecosystems’ functions and services are maintained at an optimum, including watershed protection, water regulation, soil fertility, erosion and flooding control and wildlife habitat protection. The ER Program is fully aligned with this strategy.

Soil conservation - The promotion of conservation agriculture and improved agricultural techniques in the ER Program area will contribute to enhance soil conservation and to increase land productivity. Its sustainable forest landscape management approach should create a sensible link between forest and agriculture that will eventually generate opportunities in rural areas, especially for forest and agriculture dependent communities, of whom many are women and vulnerable groups.

Protection of ecosystems - Conservation agriculture will partly be based on improved fire management, reducing wildfires in biologically critical ecosystems while avoiding the emissions of GHG. As stated in section 4.1, Mozambique is highly affected by wildfires, which have negative implications for communities and Miombo forest ecosystems. By implementing fire management activities, The ER Program is expected to protect communities from fires and to reduce the loss of valuable forest and wildlife resources that provide income-generating activities, while helping endemic species to regenerate.

Maintenance of high-value biodiversity - As previously explained, Zambézia Province is home to one of the most well preserved patch of Miombo forests in the country: the GNR. Through improving the management of forests, the ER Program will help to conserve and maintain the local environment and associated ecosystems in and around the GNR. It will also make ecosystems be less vulnerable to adverse impacts of human pressure and climate change (UT REDD+, 2015a).

Rehabilitation of degraded lands through reforestation - Land degradation is an increasingly severe problem in Zambézia, threatening wildlife habitat, grazing lands and community livelihoods. As explained in section 4.3, the project includes forest plantations and the promotion of agroforestry systems. They will contribute to addressing this issue.

Identification of priority non-carbon benefits

Among those non-carbon benefits, priority ones have been identified and classified in two main categories: (i) the improvement of rural population's livelihood and (ii) the strengthening of forest governance and forest resources management. In those two groups, a total of five priority non-carbon benefits have been identified. They monitoring will be realized through the MozFIP monitoring plan (already approved) and the SIS - *see SIS indicators in section 14* - so as to make sure they actually be assessed along the implementation of the ER Program.

Table 77: Priority non-carbon benefits associated with the ER Program

Improvement of local livelihood through securing long-term access to forest resources and environmental benefits	
Priority NCB n°1	Increase of land areas under sustainable landscape management practices
Priority NCB n°2	Long term adoption of sustainable land use practices
Priority NCB n°3	Clarified land tenure
Forest Governance and Management	
Priority NCB n°4	Improved forest governance and transparency
Priority NCB n°5	Enhanced participatory forest and land use management

Improvement of local livelihood through securing long-term access to forest resources and environmental benefits

NCB 1: Increase of land areas under sustainable landscape management practices - This non-carbon benefit is related to land area that, as a result of the ER program activities, benefits from improved sustainable landscape management practices. This NCB 1 can be described as a spatial achievement of the objectives of the ER Program in the landscapes and reflects several project outcomes, namely the restoration of degraded areas, reduced pressure on natural forests for agriculture and charcoal production, improved forest resources management, sustainable production and use of forest resources, and effective forest monitoring and control, including of conservation areas (GNR). Environmental benefits, especially in terms of soil conservation and rehabilitation of degraded lands, are linked to it. Areas that come under sustainable landscape management practices are defined as:

- Areas of planted forests, established under the Planted Forest Grant Scheme (these areas comply with a Forest Management Plan, which is a criterion for eligibility for the Scheme);
- Areas of agroforestry systems established;
- Area of forest concessions under sustainable forest management (national forest certification);
- Conservation areas and protected areas under improved management plans and law enforcement, as measured by the Management Effectiveness Tracking Tool. This should include the area of the Gile National Reserve[88].

NCB 2: Long-term adoption of sustainable land use practices - This non-carbon benefit is related to the number of people who have adopted sustainable land use and land management practices thanks to the ER Program. This NCB2 can be described as a

[88] *Area brought under improved management is accounted for when their METT score moves up by one level. The levels are: Level 1: 0-35%; Level 2 - 36% and 45%; Level 3 - 46% and 55%; Level 4- 56% and 65%; Level 5 - 66% and 75%; Level 6 - > 76% of total possible score. The methodology is a rapid assessment based on a scorecard questionnaire.*

successful change of behaviors and practices of people in the ER Program area and enhancement of the sustainability of their land use practices. Just like for NCB 1, significant environmental benefits are linked to those practices. Users adopting sustainable land management practices include:

- Planted forest landholders under the Planted Forest Grants Scheme who comply with their Forest Management Plans;
- Agroforestry system holders;
- Charcoal producers;
- Forest concession holders whose concessions are certified under the national forest certification standard.

NCB 3: Clarified land tenure - As explained in section 4.3, 4.4 and 11, secure tenure right is a pre-requisite to the on-gong participation of stakeholders in the ER Program and in ensuring the long-term change of unsustainable behaviors based on the over-exploitation of forest and natural resources. As a necessary base for much of the other non-carbon benefits – depending on the success of ER Program implementation - it is, therefore, a top priority non-carbon benefit.

Forest Governance and Management

NCB 4: Improved forest governance and transparency - This non-carbon benefit is related to the improvement of the enabling environment for transparent and effective governance in the forest sector, including through (i) the adoption of the National Land Use Plan[89], which is expected to foster proper land use planning, with land use decisions being based on transparent information and a consultative process on land use priorities; and (ii) the operationalization of the National Forest Information System, which is expected to improve information availability, accessibility and transparency, contributing to an effective forest monitoring and control. This NCB 4 also comprises the improvement of the capacity of the forest administration and forest law enforcement authorities in terms of control, enforcement of regulations and promotion of sustainable use of forest resources and improved forest management practices - this includes annual inspection of forest concessions to check the compliance of forest operators with management plans and other legal and basic sustainability requirements (fiscal obligations, social security, qualified rangers, concession contract, availability of statistical information, industrial plans, technical capacity, delimitation of area and harvesting blocks, etc.).

NCB 5: Enhanced participatory forest and land use management - This non-carbon benefit relates to the ability of the local population living in the ER Program area to engage and participate in forest and land-use decisions, whether through specific interventions or as a result of the expansion of such opportunities generally in the landscapes. This NCB 5 comprises improved overall governance and access to information. It also includes enhanced landscape-level dialogue and multi-stakeholder decision-making on the use of natural

[89] The National Land Use Plan (NLUP), supported by MozFIP (see section 4.1), is currently being developed and actually is comprised as an enabling activity of the ER Program (EA-B2, see section 4.3). It is not in force yet: the Spatial Planning Directorate (DINOTER) of the MITADER, in charge of developing it, is currently hiring consultants who will help the GoM to design the NLUP. It is expected to start by the end of January 2018, and should be fully operational in two years.

resources, contributing to integrated landscape management, through the well functioning of the Zambézia MSLF. Eventually, their ability to participate in decisions over natural resources can empower stakeholders and bring additional long-term benefits for resource management.

All in all, **non-carbon benefits do include a genuine improvement in livelihood, which can be measured in various elements described above, showing that non-carbon benefits associated with the ER Program are realized positively with an improvement of actual living conditions**.

For instance, the promotion of alternative and sustainable energy sourcing is linked to real health benefits which, combined with the environmental benefits forecasted in the ER Program area through soil conservation and the maintenance of high-value biodiversity and of forest resources, are expected to contribute improving the quality of life of forest-dependent communities in the ER Program area on the long-run, helping them to secure their long-term access to resources they highly depend on. In the same way, the clarification of land tenure is an important component and non-carbon benefit, which will be measured in the number of DUAT and community delimitations issued as part of the ER Program. Also, the diversification and actual increase of income for beneficiaries engaged in ERI-D2, as well as the diversification and increase of agriculture production for beneficiaries engaged in ERI-D1 are considered as concrete measures of livelihood improvement in the ER Program area.

Granted, those could have been valorized through the definition of an indicator that would enable to properly monitor the increase in income of the local population, specifically farms households. However, it was indeed not decided to integrate an indicator to assess the income of local population, as this may to too difficult for both financial and technical reasons. However, the actual improvement of livelihood in the ER Program area will be monitored through proxy-indicators that are defined in the Result Frameworks of the WB projects that compose the ER Program (MozBio, Sustenta, MozFIP and MozDGM). They include, for instance, the number of community delimitation certificates issued, the assessment of smallholders' satisfaction with services provided by SECFs, the number of value chain development business plans implemented by SECFs, the monitoring of smallholder yields in priority value chains, the perception of improved access to markets, etc.

Such indicators are expected to be good proxies to assess the efficiency of the ER Program in terms of key value chains structuring, which is the main ERI aiming at increasing smallholders' revenues in the ER Program area. In the same way, section 14 provides a list of indicators that will be monitored as part of the Safeguard Information System (SIS) and which will help to assess the non-carbon benefits associated to the ER Program.

16.2 Approach for providing information on priority non-carbon benefits

Information on generation and enhancement of non-carbon benefits

According to criterion 35 of the FCPF MF (FCPF, 2016a), information on the generation and/or enhancement of priority Non-Carbon Benefits should be provided during ER Program implementation. At this stage, although there is no specific communication strategy for non-carbon benefits, benefits as a whole (carbon and non-carbon) of the ER Program are largely presented to the stakeholders and, especially, to local population during public consultations related to the implementation of the ER Program.

Preferred methods for collecting and providing information

The monitoring of the generation and enhancement of non-carbon benefits should be based on an approach utilizing methods available at the time to collect and provide information on priority Non-Carbon Benefits. In this approach, it should be reminded that the FCPF recognizes that community participation, proxy indicators and information drawn from or contributing to the SIS are relevant (FCPF, 2016a). The main instruments planned to be used for collecting information on non-carbon benefits are the:

(i) Multi-stakeholders platforms – such as the Zambézia Multi-Stakeholders Landscape Forum – in which stakeholders can provide direct information;

(ii) The Feedback and Grievance Redress Mechanism, which is also expected to be useful in analyzing the impacts of the ER Program on local population and the way its non-carbon benefits are perceived.

(iii) The PMRV (see section 14) that, while being primarily used to collect local carbon stock data, is also useful to get environmental and social information and impacts of REDD+ implementation directly from local population;

(iv) The SIS, which will also be used to provide relevant information on how safeguards are handled and respected to enhance non-carbon benefits. The proposed SIS indicators actually are good indicators of non-carbon benefits. As explained in section 14, this process will involve various partners from base community organizations, government and civil society organizations, following an extensive participatory approach. In addition to public consultations, interviews, questionnaires and direct observation will be used. *The indicators of the SIS are described in section 14 and* Table 75*.*

Table 78: Non-carbon benefits and associated ER Program interventions

Priority Non-carbon benefits And associated non-carbon benefits	**To be generated and/or enhanced by** ER Program interventions (non-exhaustive list – *see section 4.3*)
Improvement of rural population's livelihood through securing long-term access to forest resources and environmental benefits	
Priority NCB 1 - Increase of land areas under sustainable landscape management practices **&** **Priority NCB 2 - Long term adoption of sustainable land use practices**	
Maintaining of forest cover and associated natural resources	○ Promotion of sustainable practices to address the main drivers of deforestation and forest degradation, especially itinerant agriculture and charcoal production - see below; ○ Restoration of degraded areas and planted forest through the Planted Forest Grant Scheme; ○ Value chain development of non-timber forest products (NTFP) and of cash crops, including through agri-business finance (support to access credit, support to lowering the risk exposure of participating financial institutions, implementing a weather-based agricultural index insurance scheme, etc.);
Alternative and sustainable energy sourcing and health benefits	○ Reducing the impact of charcoal production on forest and health through the introduction of improved production techniques and more efficient kilns, the plantation of fast growing trees for energy purpose and the introduction of natural assisted regeneration techniques;
Adaptation of agricultural practices to climate change to improve agricultural production	○ Support to agro-forestry systems, including with the development of cashew orchards in relevant areas; ○ Support to sustainable cash crops (sesame, cashew, etc.) with the provision of technical assistance and inputs (seeds, equipment);

	○ Value chain development of non-timber forest products (NTFP) and of cash crops, including through agri-business finance (support to access credit, support to lowering the risk exposure of participating financial institutions, implementing a weather-based agricultural index insurance scheme, etc.);
Preservation of ecosystem functions, high value biodiversity and soil conservation	○ Support to safeguards management and implementation; ○ Training to fire management; ○ Introduction of sustainable practices for agriculture and charcoal production; ○ Improving the management regime of protected areas of native forests (RNG) - hotspot of biodiversity; ○ Restoration of natural forests and planting of trees for various purposes, including through the Planted Forest Grant Scheme.
NCB 3 - Clarified land tenure	○ Improving land use planning and registration with a process of community delimitation, issuance of individual DUATs, the development of Community Land Use Plans (CLUPs) and the strengthening of CGRNs that can be charged with basic land and natural resources management functions.
Strengthening of forest governance and management	
NCB 4 - Improved forest governance and transparency	
Increased transparency in the forest sector *Improved forestry business environment* *Reduction of illegal logging*	▪ Adoption of the national land use plan (NLUP); ▪ Establishment of national and provincial Monitoring, Reporting and Verification (MRV) offices; ▪ Improvement of land use planning and registration – see above; ▪ Operationalization of the National Forest Information System; ▪ Annual inspection of forest concessions; ▪ Improvement of law enforcement and good governance and of the management regime of protected areas of native forests (RNG);

NCB 5 - Enhanced participatory forest and land use management	
Long-term engagement of multi stakeholders in forest management with strong role of Local Communities	▪ Creation and maintaining of the Zambézia Multi-Stakeholders Landscape Forum; ▪ Introduction of community based forest monitoring with the strengthening of CGRNs in forest monitoring.
Other	
Long-term increase and diversification of income; *Employment opportunities.*	▪ Support to the establishment of commercial agriculture in areas with no forest cover, especially to the cashew and sesame sector with: o Market study on the economic potential of various cash-crops; o Training of producers on quality issues for the products to meet quality (international) standards; o Implementation of a market information platform to support producers, with the diffusion of information on markets dynamics and prices through SMS; ▪ Value chain development of non-timber forest products (NTFP) and of cash crops, including through agri-business finance (support to access credit, support to lowering the risk exposure of participating financial institutions, implementing a weather-based agricultural index insurance scheme, etc.).

17. TITLE TO EMISSION REDUCTIONS

17.1 Authorization of the ER Program

Name of entity	Ministry of Economy and Finance (MEF)
Main contact person	The Mozambican Ministry of Economy and Finance (MEF) is responsible for managing and coordinating national financial planning process. It aims to ensure the integrated and balanced economic and social development of the country, through consolidating an integrated system of planning and implementing a sustainable and decentralized development strategy. . In the ER Program context, the MEF will be in charge of signing the ERPA and managing ER titles transactions
Title	
Address	Praça da Marinha Popular – C.P. 272 - Maputo
Telephone	
Email	
Website	www.mpd.gov.mz

Reference to the decree, law or other type of decision that identified this entity as the national authority on REDD+ that can approve ER Programs	The position of the MEF as the national authority o REDD+ that can approve ER Programs is confirmed in the new REDD+ Decree (approved by the GoM in April 2018), which clearly: (i) establishes State property over all ERs generated in Mozambique (Article 10); (ii) establishes that that ER titles "may be disposed of, transferred to national and international exchanges of environmental and financial assets" and that they "may also be transferred and offset in future under the international agreements concluded by the State of Mozambique" (Article 15); (iii) in that purpose, requests that "all ERs generated by REDD+ Programs and Projects that the GoM wish to dispose of in a legally permissible manner, including for commercialization purpose (be) registered with the Ministry responsible for the Financial sector" (Article 26); (iv) and consequently defines the MEF ("Ministry responsible for the financial sector") as the "legitimate issuer and manager of the titles of Emission Reductions", repsonsible for their "validation, verification, emission, transfer, transaction, disposal and withdrawal (...) at national and international level" (Artcile 6).

17.2 Transfer of Titles to ERs

This sub-section aims to assess the ability of the Government of Mozambique (GoM) and, more precisely, of its Ministry of Economy and Finance (MEF) to transfer titles over ERs generated by the ZILMP to the FCPF, according to the terms of the ERPA.

Assessment of the GoM's ability to transfer Titles to ERs to Carbon Fund

Establishment of the ability of the State to transfer titles to ERs

Carbon is State properties - Carbon is a constituent element of forests. If carbon is seen a constituent part of all natural resources, which exists *per se*, current constitutional and sectorial legislation is adequate for establishing that ownership over carbon resides with the State. The starting point is Article 98 of the CRM, of which the clause 1 clearly states: "Natural resource in the soil and the subsoil, in inland waters, in the territorial sea, on the continental shelf and in the exclusive economic zone shall be the property of the State". In addition, Article 102 of the CRM goes on to say that "The State shall promote the knowledge, surveying and valuing of natural resources, and shall determine the conditions under which they may be used and developed subject to national interests" - *for more details, see Tanner (2017c).*

The concept of "use and development" of natural resources - The intention of the Constitution in this overall context is clear: the State as owner shall determine how natural resources are "used and developed" and, further, this determination can include selling the natural resource once it has gone through this process of "use and development". In other words, the carbon can be sold if it is subject to some sort of conversion or transformation into a marketable commodity (Tanner, 2017c).

In the specific context of natural forests, which are State property, and which are in the public domain, the key legislation is the 1999 Forest and Wildlife Law (Law 10/99), which gives

mandated agencies in the Government the right to assess requests to "use and develop" natural resources. Since 2015, the mandated agency is the MITADER, with two basic forms of use and development allowed: licenses and concessions.

ERs are products of "use and development" of carbon natural resources - Precisely, ERs can be seen as a product of this "use and development" process. ERs are not a natural resource, conversely to carbon: they are the outcome of a decision by the State and/or others with rights over natural resources, and can only be produced by a transformational process or action implying to reduce deforestation and forest degradation. As such, they could be considered as "environmental commodities", identifiable and marketable in their own right. As a consequence, the CRM and existing natural resources laws are sufficient for determining ownership of ERs through the application of the "use and development" concept: the "user and developer" of the natural resources (in this case, forest carbon stocks) implements activities that result in ERs being produced.

Once is has been established that ERs are generated by a process of "use and development", the question remains to know "who owns these products"?

Ownership of ERs generated in conservation areas - The ownership of ERs as the results of developing and using carbon stocks in conservation areas, such as the Gilé National Reserve, is affirmed in the 2014 Law on Conservation and Biodiversity[90]. While the focus of this legislation is on conservation areas, the principles it establishes regarding the possession of the right to use and benefit from carbon stocks are clear and can be extended to other areas of public domain land, providing that: "*The right of use and benefit over the carbon stocks existing in a conservation area and its respective buffer zone belong to the entity which manages this conservation are, and the marketing of this right can be carried out in collaboration with other public and private entities"* (Decree Law 16/2014, Article 11).

What about ownership of ER generated outside of conservation area? Until recently, State ownership of ERs was only clearly established by law for those generated within conservation areas. Although this right seems clealy established for conservation areas such as the GNR where, in principle there will be few, if any, other pre-existing rights or claims over the resources in question, this may not have been true for other types of areas. In this situation, potential claims of rights on the ERs could have led the GoM to negotiate partnership or intermediation agreements with potential DUAT holder (see section 4). Given the unfamiliar nature of the carbon and ER issues, it was therefore forecasted that specific legislation could greatly clarify the question of title and ER sales.

The recently approved (april 2018) **new REDD+ Decree closes this gap and clearly establishes State property on all ER generated in the country (Articles 4 and 6)**: although non-state DUAT holders and communities will have to benefits from the sale of ERs generated in the country, through specific benefit sharing plans, no formal agreements will need to be reached between each individual DUAT holders or local communities and the State. However, they will have to be properly consulted, as per national law, as described in the Land Tenure Assessment and the ER-PD (see section 4.4).

[90] *Approved by Decree No 16/2014 of 20 June*

Ownership ERs generated through REDD+ projects - Decree 70/2013 was primarily about non-State REDD+ projects in which the "user and developer", may it be a firm, individual, or a collective entity such as a Local Community or Association, has ownership of title over the ERs that are produced. In this context, the State can only sell ERs in two scenario: (i) the State sells ERs on behalf of the "use and developer"; or (ii) the State has retained its rights over the ERs generated by a third party - meaning that the State has agreed to the commercial activity but the ERs that result from sustainable forest use are still State property. In both cases, this has to be clearly established through agreements and contract between the State and the third party. However, the State can also act in the role of user and developer of its own resources and, in this case, the ERs that result from a publicly-implemented REDD+ project would be the property of the State. This is true for the ZILMP ER Program, where the State as owner of the natural resources and the carbon they contain intends to instruct its agents and service providers to carry out activities that will reduce deforestation and thus produce ERs over a specified period of time. These ERs, as an outcome of the process of use and development initiated by the State through carrying the ER Program, belong to it and can be sold by it to a third party through a nominated agency. This approach is confirmed in the new REDD+ Decree, as explained below.

State ownership on all ER generated in the country is confirmed in the new REDD+ Decree – In the prolongation of this reasoning, the new REDD+ Decree officially establishes the State property over all ERs generated in Mozambique (Articles 4 and 6). As such, the new REDD+ Decree clarifies the **"legitimacy and ownership of the State in the creation, generation, emission, validation, verification and withdrawal of emission reductions and corresponding titles of emission reductions"** (Article 4). As such, in the current ER Program, the State retains control over the remaining natural forests and ownership over the ERs that are generated and the GoM, promoting behavioral change on the part of forest users, and is therefore free to sell the titles over these ERs, following the arguments presented above.

Furthermore, **the ability of the State of Mozambique to dispose of ER titles as financial products that can be traded is established in the new REDD+ Decree**, which states that ER titles "may be disposed of, transferred to national and international exchanges of environmental and financial assets, under the applicable laws and standards and within the limits of the current national legislation" and that such ER titles "may also be transferred and offset in future under the international agreements concluded by the State of Mozambique within the framework of its international competences and its commitments and cooperation programs with public and private entities" (Article 15). In the same way, Article 7 of the new REDD+ Decree confirms that, for the implementation of rEDD+ programs and projects, "the government can sign compensation agreements with international partners".

MEF's authority to enter into an ERPA

Admittedly, the overall ability of the State to transfer the titles over ERs requires these ERs to be monitored, reported, verified and certified accordingly with UNFCC procedures and FCPF CF methodological guideline. This process has been explained in other sections of the ER-PD and is expected to be fully operational. Two registry systems - *see section 18* - will help to structure and secure the process of transferring ERs.

The discussion of certification and negotiations underlines how the MEF is really the entity able to enter into international negotiations over ER titles transfers, however the ERs are

generated. As stated in the New REDD+ Decree, “The Ministry responsible for the finanical sector is the legitimate issuer and manager of the Titles of Emission Reductions, being able to create and manage property rights, including the validation, verification, emission, transfer, transaction and withdrawing of the titles of emission reductions at national and international level” (Article 6).

In the context of the ER Program, the MEF will therefore be the ER Program entity authorizing the ER Program and signing the ERPA with the FCFP. As such, the MEF will be responsible for all discussions and negotiations about the funding of REDD+ projects, and the sale of ERs to the Carbon Fund.

18. DATA MANAGEMENT AND REGISTRY SYSTEMS

The only project that has planned to transfer ERs to other GHG mitigation initiatives (so-called FFEM project) ended in September 2017 and has a different crediting period. **Consequently, there is no nesting under the ER Program and the risk of double payment is considered as inexistent.**

18.1 Participation under other GHG initiatives

Registration of part of the ER Program under other level standards (VCS)

Although two other projects located in the ER Program area are registered under other level of standards, only one of them is planning to transfer ERs to other GHG mitigation initiatives. **However, since the crediting period of this project is different from the ER Program, the risk of ER double accounting is considered as low. It will be further minimized by the existence of an efficient ER Program Data Management System managed by the FNDS, as explained below.**

REDD+ Pilot project to mitigate deforestation and forest degradation in the GNR and its surrounding (2014 - 2017) - FFEM project

As stated in section 3, the ER Program accounting area includes the Gilé National Reserve (GNR) – *see section 3 for the map of the accounting area*. Since a few years, the GNR and its surroundings are part of the Gilé REDD+ Pilot project to mitigate deforestation and forest degradation. The Gilé REDD+ pilot project definitively ended in September 2017. It was financed by the FFEM with a total budget of EUR 2 millions.

The goal of this project was to implement, with local communities, agro ecological techniques that foster both food security and forest conservation. Along with improved surveillance and management of the GNR, those activities contributed to lower deforestation rate in the buffer zone of the GNR, promoting both economic development and forest conservation.

This project has registered to the CCB and VCS standards to sale carbon credits on the voluntary carbon market, under the project ID PL1674. The project was registered on the Markit registry under the ID 104000000012419 and is currently listed as "under validation" on the VCS site, where the project description documents are made public. After validation of the final report of the project by Ecocert SA, 358,000 credits will be available for sale on the voluntary carbon market (at each sale of credits, one part is retained by the register - from 0.10 to 0.15 $ - and By the standards: $ 0.10 / credits for the VCS and $ 0.05 / credit for the CCB).

It should be noted that the FFEM project is complementary to the ER Program, which was partly designed as an upscale of this pilot project. Most of the activities that were comprised in the FFEM project are now carried on by the MozBio project, as part of the ER Program,

which furthers and extends them over the two districts of Gilé and Pebane.

Of importance for the ER Program is that the reference period of the FFEM project goes from 01/01/2012 until 31/12/2016 - that is, before the start of the ER Program (2018) and before the application of any ERPA. **Consequently, from 2018 onwards, the ERs generated in the GNR and its surrounding will be fully and exclusively accounted for in the ER Program accounting area**.

Neither double counting nor multiple claims to ERs titles linked to the GNR project are therefore expected to arise and no nesting is needed. Any remaining risk of double accounting will, finally, be mitigated by the planned implementation of an efficient Data Management and Registry Systems by the FNDS - *see section 18.2*

Improved cook stoves for rural families in Gile Reserve Zambezia (2016 - 2020) - CarbonSink project

Around the GNR, another project financed by the European Union (EU) - under the Thematic Program for Environment and Sustainable Management of Natural Resources (ENRTP) - started in 2016 for four years. The "Strengthening Financial Sustainability and Biodiversity in the National Reserve of Gilé" project focuses on the introduction of new financial mechanisms to protect biodiversity in the GNR. A component of this project, implemented by COVS and CarbonSink, is based on the distribution of 4,000 efficient cook stoves in rural communities located around the GNR, in order to reduce wood consumption and generate health positive effect. The project aims to be registered with Gold Standards as a micro-scale domestic energy efficiency project. For now, it is listed in the Markit Registry under the ID 103000000005747.

Although this project will be monitored according with carbon standard methodologies to provide a certified and transparent data on potential emission reductions achievable with efficient cooking technologies, it has been agreed with FNDS and the WB that **no credit issuance will be claimed in the upcoming years under this project**, in order to avoid possible double counting with the ER Program.

Transfer of ER to other GHG mitigation initiatives outside of the ER Program area

The projects that are currently registered in the Markit Registry (Plan Vivo, VCS, Gold Standard) are listed in Table 79. Currently, beside the FFEM project (see above), four other projects that are located outside of the ER Program area are registered in the Markit Registry to transfer ERs to other GHG mitigation initiatives. Three of them are implemented by co2Balance UK Ldt, based on the promotion of domestic energy efficiency (improved cook stoves) and registered for the Gold Standards. Credits have already been issued. The fourth one is located in Sofala and implemented by Envirotrade Carbon Limited and registered under the Plan Vivo initiative. It is under the status "active" but has not started to transfer any ERs yet.

The projects that are currently registered in the VCS project database are listed in Table 80. Currently, beside the FFEM project (see above), two other projects that are located outside of the ER Program area are registered in the VCS database for the CCB standards. Although the Sofala Community Carbon Project, implemented by Envirotrade, was registered, its

validation has already expired. The Niassa Forest Project, implemented by Green Resources, has been approved.

Table 79: Carbon projects in Mozambique in the Markit Registry (FNDS, 2017f)

GS1247 Improved Kitchen Regimes Multi-Country PoA Master Project VPA 23 Improved Kitchen Regimes: Improved Cook Stoves in Chamanculo C						
103000000000028	co2balance UK Ltd.	Maputo (Mozambique)	Energy Efficiency – Domestic	Gold Standard	Issued	Validator: Internal Validation/Verification. Project Size: Micro-scale Project Registration Type: Normal Average Annual Volume of Credits: 10000 Project Stream: VER Fee structure: SOP Crediting Period: 7 Years Renewable
GS1247 VPA 52: Improved Cook Stoves in Chamanculo C, Maputo (Mozambique) phase II						
103000000010320	co2balance UK Ltd.	Maputo (Mozambique)	Energy Efficiency – Domestic	Gold Standard	Issued	Ide
GS1247 VPA 53: Improved Cook Stoves in Chamanculo C, Maputo (Mozambique), phase III						
103000000010321	co2balance UK Ltd.	Maputo (Mozambique)	Energy Efficiency – Domestic	Gold Standard	Issued	Ide

Sofala Community Carbon Project (formerly the N'hambita Community Carbon Project)						
100000000000169	Envirotrade Carbon Limited	Sofala (Mozambique)	Forest	Plan Vivo	Active	Validator: Rainforest Alliance

Table 80: Carbon projects in Mozambique registered in the VCS project database

CCB1638	Sofala Community Carbon Project	Envirotrade	Mozambique	ARR	Second Edition	Climate Gold, Community Gold, Biodiversity Gold	Validation expired
CCB1617	Niassa Forest Project	GREEN RESOURCES	Mozambique	ARR	Second Edition		Validation approved

18.2 Data management and Registry systems to avoid multiple claims to ERs

In the context of REDD+ Readiness under the FCPF, the Registries for REDD+ have focused on a tool to support the operation of a REDD+ implementation framework and country specific solutions need to be found to define the role of the participants in REDD+ transactions. However, regardless of the country context, information on the implementation framework should be comprehensive and made publicly accessible through a national geo-referenced REDD+ information system (or registry), containing all relevant information to operate future national and international REDD+ implementation frameworks (FNDS, 2017f).

Accordingly with criterion 37 and criterion 38 of the FCPF MF (FCPF, 2016a), the ER Program design implies the selection of appropriate arrangements, based on national needs and circumstance, to: (i) avoid having multiple claims to an ER Title and (ii) ensure that any ERs from REDD+ activities under the ER Program are not generated more than once and that any ERs from REDD+ activities under the ER Program sold and transferred to the Carbon Fund are not used again by any entity for sale, public relations, compliance or any other purpose.

A such, concrete progress have been made in the past few months for designing both the

REDD+ Program and Project Data Management System and the ER Transaction Registry, under the lead of the MRV team in FNDS. They are described below and their complementary functioning is represented in Figure 39.

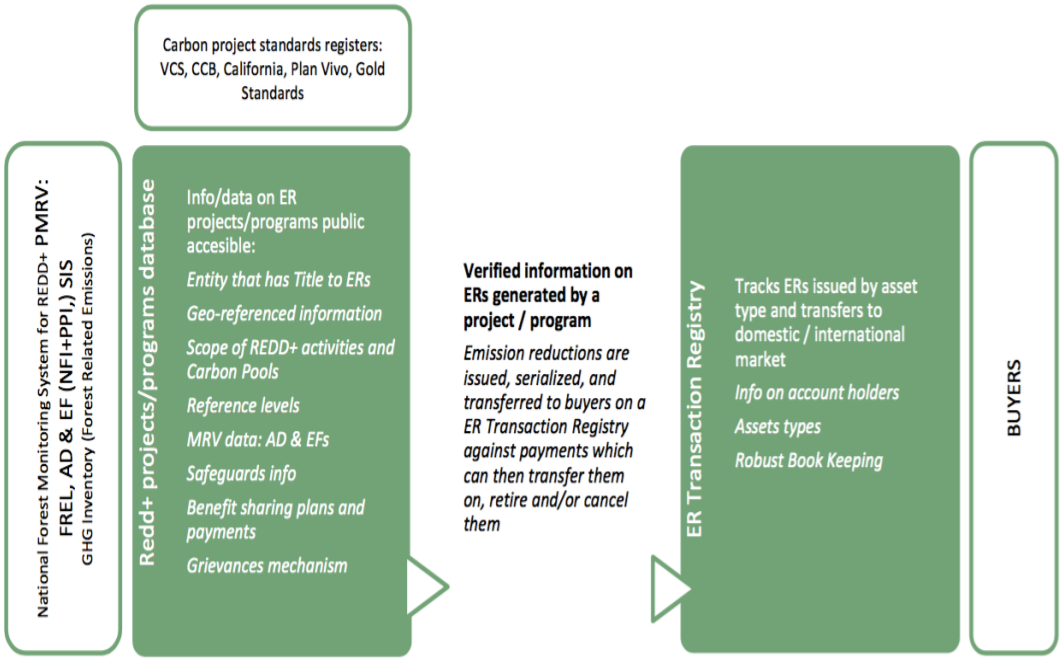


Figure 39: Data management system architecture for REDD+ in Mozambique

REDD+ Program and Project Data Management system

REDD+ Program and Project Data Management System within the FNDS

In order to register and report on REDD+ projects/programs in the country the GoM has, accordingly with criterion 37.1 of the FCPF MF (FCPF, 2016a), decided to maintain its own comprehensive national REDD+ Program and Projects Data Management System: **Mozambique will implement and maintain its own comprehensive national REDD+ Program and Projects Data Management System**, linking this system with:

- The National Forest Monitoring System for REDD+, specifically with the Participatory MRV System, to check consistency regarding national/program/project FRELs, MRV data (AD and EFs), and Safeguards Information;
- The GHG Inventory, to check consistency on Forest related emissions;
- The National Appropriate Mitigation Actions (NAMA) and Clean Development Mechanism (CDM) Registries, to track other mitigation initiatives, thus avoiding double accounting;
- The carbon project standards registries, including:
    - The Markit Registry, providing tool for managing global carbon, water and biodiversity credits. The Markit Registry enables to track environmental projects and to issue, transact and retire serialized credits. Markit Registry

includes: Plan Vivo, VCS and Gold Standard.

- VCS (Verified Carbon Standard) projects database, acting as a central storehouse of information on all VCS, CCB (the Climate, Community & Biodiversity Standards) and California projects managed by VCS.

As stated the new REDD+ Decree (April 2018), **the FNDS is responsible for (vi) managing the national REDD+ Programs and Projects Data Management System** and for (**vii) communicating to the entity in charge of the ER Transactions Registry all information related to ERs generated by REDD+ projects**.

Admittedly, the REDD+ Program and Project Data Management System is considered as part of the REDD+ MRV system in Mozambique and will for be located on the same web platform, along with the NFMS, PMRV, SIS and FGRM mechanisms - see Annex 9 - Characteristics of the Web portal for MRV REDD+ in Mozambique. If it is necessary, it will easily be transferred to another institution later on.

Administrative procedure for the REDD+ Program and Project Data Management System

Indicator 37.4 of the FCPF MF requires administrative procedures to be defined for the operations of a national or centralized REDD+ Programs and Projects Data Management System. Although a dedicated document establishing such procedure is not yet available, the MRV team within FNDS is currently working on it and should make it available in the coming months. In the same way, the new REDD+ Decree (Governo de Moçambique, 2017) specifies the content that the Registry should comprise (see below) and give responsibility to the FNDS for its management and hosting, in cooperation with DINAF for information gathering. The information that will be made available in the REDD+ Programs and Projects Data Management System are related to the PMRV process, of which the administrative procedures were defined in section 6.1 and 9.2 of this ER-PD.

In addition, Indicator 37.4 of the FCPF MF also requires an audit of the operations to be carried out by an independent third party periodically. This will have to be agreed on with the FCPF during ERPA negotiations.

Content of the REDD+ Program and Project Data Management System

The REDD+ Program and Project Data Management System will cover the whole country and, therefore, it is clear that the information and non-double counting mechanisms will cover the ER Program Area. The REDD+ Program and Project Data Management System will comprise the following functionalities:

- Registering and Managing official approvals and collecting/distributing information on REDD+ project/program proponents;
- Checking, evaluating and validating this information with reference to other records from other linked registries related to emission reduction projects and programs.

As required by criterion 37.2 of the FCPF MF (FCPF, 2016a), the information collected and distributed via the Internet MRV platform will include:

- The entity that has Title to ERs produced (the full legal and beneficial title and exclusive right to ERs contracted for under the ERPA);
- Geo-referenced information on the location of REDD+ projects/programs (boundaries, buffers, zoning, areas of intervention, etc.);
- The scope of REDD+ activities and Carbon Pool;
- The reference levels at different scales;
- MRV data to specific REDD+ projects/programs;
- Safeguards plans in specific REDD+ projects/programs;
- CF payments and benefit sharing for specific REDD+ projects/programs.

Accordingly with criterion 37.3 of the FCPF MF (FCPF, 2016a), the information contained in this system will be made available to the public via the Internet, in Portuguese (national official language in Mozambique). However, this will only be achieved by next year.

ER transaction registry

Administrative procedures for the ER Transaction Registry

In order to handle the process of issuing offsets units with unique serial numbers, once the information on ERs generated by a project / program has been verified through the REDD+ Program and Projects Data Management System, the GoM is currently designing the scheme of its ER Transaction Registry, with the support of the MRV team in FNDS.

Indicator 38.4 of the FCPF MF requires operational guidance to be in advanced stage of preparation to clarify the roles and responsibilities of the entities involved in the national or centralized ER transaction registry, as well as rules for operation of the registry. Although administrative procedures are not yet finalized, the new REDD+ Decree (April) already set the main administrative framework for such as process, stating that **all ERs generated by REDD+ Programs and Projects that the GoM wish to dispose of in a legally permissible manner, including for commercialization purpose, should be registered with the Ministry responsible for the Economy and Finance – MEF.**

This process starts with the Registration of ERs within the REDD+ Programs and Projects Data Management System, managed by the FNDS, after verification by an external audit. After communication by the FNDS of the verified ERs, the MEF is responsible for issuing the ER Titles, for managing their transfer to possible buyers and for managing the subsequent ER payments. FNDS is responsible for channeling them to appropriate beneficiaries, according to the procedures defined by the new REDD+ Decree. Such procedures comprise the registration, reporting and verification of ER by a third party, when deemed necessary under the methodology applicable to the REDD+ Program and Project Data management System; and the allocation of a serial number to each verified ER, with:

- The definition of unique serial number associated with each unit as they are definitely issued;
- The compiling of verified ERs' data and of their verification reports in the ER Transaction Registry;
- The organization of a double entry accounting system, ensuring that the

collection from one account of a given series is systematically associated with the debit of the same series from another account;

- The permanent removal of ER units, so that they can not be transferred and used again, to avoid double counting.

FCPF ER Transaction Registry to be used

However, at the time of writing, this Registry was not yet operational and is not expected to be ready by the start of the ERPA. As a consequence, as required by criterion 38.1 of the FCPF MF (FCPF 2016a), the GoM has decided to use a centralized ER Transaction Registry managed by a third party on its behalf: **the GoM will use the FCPF ER Transaction Registry.** As such, criterion 38.2 and 38.3 of the FCPF CF are expected to be automatically met.

REFERENCES

African Union. 1969. *African Convention on the Conservation of Nature and Natural Resources.* January 17th 1969. Addis Ababa, Ethiopia. Revised Edition (2003) available on: http://kenyalaw.org/treaties/treaties/4/AFRICAN-CONVENTION-ON-THE-CONSERVATION-OF-NATURE-AND

D'Annunzio, R.2017. *Preparation for the land use / land cover map 2016*. Technical report for FNDS.

Baudron, F. 2009. *Farming Systems in the Buffer Zone of the Gilé National Reserve: Constraints & Opportunities*. Paris: IGF.

Baudron, F., Andersson, J.A., Corbeels, M., Giller, K.E. 2012. "Failing to Yield? Ploughs, Conservation Agriculture and the Problem of Agricultural Intensification: An Example from the Zambezi Valley, Zimbabwe." *Journal of Development Studies,* n° 48 (3): 393–412.

Beta, Nemus. 2015. *Análise do Quadro Legal e Institucional para Implementação do REDD*+. Moçambique: FUNAB.

Breiman, L. 2002. "Manual on Setting Up, Using, and Understanding Random Forests v3. 1." *Statistics Department University of California Berkeley.* USA.

Brugiere, D. 2013. *Rapport d'évaluation final éco-gestion de la Réserve Nationale de Gilé et de sa périphérie*. BRL.

Broadhead, J., O'Sullivan, R., Costebader, J., Pritchard, L., and Conway, D. 2014. "Integrated REED+ Accounting Frameworks: Nested National Approaches." *USAID Lowering emissions in Asia's forests*. USAID, LEAF.

Campbell, BM (ed.), 1996. *The Miombo in Transition: Woodlands and Welfare in Africa*. Centre for International Forestry Research, Bogor, Indonesia.

Chave, J., Réjou-Méchain, M., Búrquez, A., Chidumayo, E., Colgan, M.S., Wellington B.C. Delitti, Duque, A., et al. 2014. "Improved Allometric Models to Estimate the Aboveground Biomass of Tropical Trees." *Global Change Biology*, n°20 (10): 3177–90. doi:10.1111/gcb.12629.

Chidiamassamba, C. 2012. *Estudo do impacto do Diploma Ministerial No 93/2005 de 4 de Maio sobre os mecanismos que regulam a canalização dos 20% das taxas de exploração florestal e faunística às comunidades*. Maputo, Ministry of Agriculture, National Directorate of Land and Forests, Final Report.

CITES. 1973. *Convention on International Trade in Endangered Species of Wild Fauna and Flora*. 3 March 1973. Washington DC, United States. Amended at Bonn, on 22 June 1979. Amended at Gaborone, on 30 April 1983. Available on: https://cites.org/eng/disc/text.php

Cohen, J. 1960. "A Coefficient of Agreement for Nominal Scales." *Educational and Psychological Measurement*, n°20 (1): 37–46.

Congalton, R.G. 1991. "A Review of Assessing the Accuracy of Classifications of Remotely Sensed Data." *Remote Sensing of Environment*, n°37 (1): 35–46.

DPCI. 2014. *Anuário de Estatísticas Agrárias 2012-2014*. Moçambique: Ministério da Agricultura e Segurança Alimentar.

EIA. 2014. "First Class Crisis. China's Criminal and Unsustainable Intervention in Mozambique's Miombo Forests". *Environmental Investigation Agency publication*.

Encosta Sul, Lda. 2017. *Programa de Gestao Integrada da Paisagem de Zambézia. Relatorio de Progresso das Actividades de Outubro e Novembro 2017*. Relatorio de Acompanhamento da Plataforma.

Etc Terra. 2014*. Rapport d'activités 1er semestre 2014. Janvier – Juin 2014*. Projet pilote de lutte contre la déforestation et la dégradation de la forêt de Miombo dans la Réserve Nationale de Gilé et sa périphérie.

Deffontaines, J.-B. 2012. *Biodiversité et Suivi Écologique - Réserve Nationale de Gilé, Province du Zambèze, Mozambique - janvier 2011 à novembre 2012*. Fondation IGF

Delbergue, A. 2015. *Evaluation de la méthode du système de suivi de la grande faune de la Réserve Nationale de Gilé: Bilan et Perspectives d'avenir, Province du Zambèze, Mozambique*. Fondation IGF.

DPCI. 2014. *Anuário de Estatísticas Agrárias 2012-2014.* Mozambique: Ministério da Agricultura e Segurança Alimentar.

EIA. 2014. *First Class Crisis. China's Criminal and Unsustainable Intervention in Mozambique's Miombo Forests*. Environmental Investigation Agency.

Ekamn, S-MS., Wenbin, H., and Langa E. 2013. *Chinese Trade and Investment in the Mozambican Timber Industry: A Case Study from Cabo Delgado Province.* Working Paper 122. CIFOR, Bogor, Indonesia.

Falcão, M.P. 2008. *Charcoal Production and Use in Mozambique, Malawi, Tanzania and Zambia: Historical Overview, Present Situation and Outlook*.

Falcão, M.P., Bila, A. and Remane, I. 2015. *Avaliação das Perdas de Receitas Devido a Exploração e Comércio Ilegal de Madeira em Moçambique no Período 2003 – 2013*. WWF, presentation.

Falcão, M.P, Noa, M. 2016. *Definição de Floresta, Desmatamento e Degradação Florestal no Âmbito do REDD+*. Outubro de 2016. Governo de Moçambique.

FAO. 1995. Land Resource Inventory of Mozambique. Rome, Italy.

FAO. 2002. Conservation Agriculture: Case Studies in Latin America and Africa. FAO Soils 17 Bulletin, FAO, Rome. Retrieved from: ftp://ftp.fao.org/agl/agll/docs/sb78.pdf

Fusari A., Lamarque F., Chardonnet P., Boulet H. 2010. *Reserva Nacional do Gilé : plano de maneio 2012 – 2021*. Direcção Nacional de Áreas de Conservação, Mozambique.

FCPF. 2015. *ER Programs Buffer Guidelines*. December 11th, 2015. Available on: https://www.forestcarbonpartnership.org/sites/fcp/files/2016/Feb/FCPF%20ER%20Program%20Buffer%20Guidelines.pdf

FCPF. 2016a. *FCFP Carbon Fund Methodological Framework*. Revised Final, June 22, 2016.

FCPF. 2016b. *REDD+ Annual Country Progress Reporting (with semi-annual update)*. Country: Mozambique. Period: August 2015 – March 2016. Available at:

https://www.forestcarbonpartnership.org/sites/fcp/files/2016/May/FCPF%20Country%20Progress%20Reporting_March%202016_FINAL%20Moz.pdf

FNDS. 2016. *Public consultations for REDD+ activities and MozFIP/MozDGM Projects*. Summary Report. MITADER. Government of Mozambique.

FNDS. 2017a. *R-Package Multi-Stakeholder Self-Assessment of REDD+ Readiness in Mozambique.* MITADER. January 2017.

FNDS. 2017b. Salvaguardas ambientais e sociais para implementação de iniciativas REDD+: proposta de indicadores para o sistema de informação de salvaguardas (SIS). MITADER. June 2017.

FNDS. 2017c. Participatory MRV system for Mozambique. MITADER. June 2017.

FNDS. 2017d. Mecanismo de dialogo e Reclamações (MDR) para implementação de Iniciativas REDD+ e Projectos FNDS/Banco Mundial. MITADER. September 2017.

FNDS. 2017e. *REDD+: Transforming Livelihood in Mozambique*. Presentation of the R-Package. March 28, 2017.

Fondation IGF, 2011. *Cogestion de la Réserve Nationale de Gilé et sa Périphérie*. Rapport annuel 2011.

Fondation IGF, 2013. *Cogestion de la Réserve Nationale de Gilé et sa Périphérie*. Rapport annuel 2013.

Fonds Français pour l'Environnement Mondial (FFEM). 2011. *Projet pilote de lutte contre la déforestation et la dégradation de la forêt de Miombo dans la Réserve Nationale de Gilé et sa périphérie*. Note d'engagement de projet. Paris, France.

Fusari A., Lamarque F., Chardonnet P., Boulet H., 2010. Reserva Nacional do Gilé : plano de maneio 2012 – 2021. Direcção Nacional de Áreas de Conservação, Mozambique.

Gibbon, A., Pearson, T., Walker, S., and Andrasko, K. 2014. "Integrating REDD+ Accounting within a Nested Approach." *USAID Lowering emissions in Asia's forests* (USAID LEAF).

Gonzalo, J. 2016a. *Participatory MRV Report for UT-REDD*. April 2016.

Gonzalo, J. 2016b. *Components 3 and 4 of the R Package*. Preliminary draft. December 2016.

Governo de Moçambique. 1995. Resolução n° 10/95, de 17 de Outubro – *Aprova a Política Nacional de Terras*. Maputo, Mozambique.

Governo de Moçambique. 1997a. Lei n° 20/97, de 1 de Outubro – *Lei do Ambiente* . Maputo, Mozambique.

Governo de Moçambique. 1997b. Lei n°19/97, de 1 de Outubro – *Lei de Terras*. Maputo, Mozambique.

Governo de Moçambique. 1999. Lei n°10/99, de 7 de Julho – Lei de Florestas e Fauna Bravia. Maputo, Mozambique.

Governo de Moçambique. 2002. Diploma Ministerial n°145/2002, de 11 de Setembro - *Aprova o Regulamento sobre Pesticidas*. Maputo, Mozambique.

Governo de Moçambique. 2004. *Constituição da República de Moçambique.* Maputo: Assembleia da República, 16 de Novembro de 2004.

Governo de Moçambique. 2005a. Diploma Ministerial n°93/2005, de 4 de Maio – *Define os Mecanismos de Canalização e Utilização dos Vinte Por Cento do Valor das Taxas, Consignadas a Favor das Comunidades Locais, Cobradas ao Abrigo da Legislação Florestal e Faunística*. Maputo, Mozambique.

Governo de Moçambique. 2005b. *Perfil do Distrito de Gurué – Província da Zambézia*. Ministério da administração Estatal. Edição 2005.

Governo de Moçambique. 2005c. *Perfil do Distrito de Mocuba – Província da Zambézia*. Ministério da administração Estatal. Edição 2005.

Governo de Moçambique. 2007. Lei n°19/2007, de 18 de Julho – *Lei do Ordenamento do Território*. Maputo, Mozambique.

Governo de Moçambique. 2008. Decreto n°25/2008, de 1 de Julho – *Aprova o Regulamento para o Controlo de Espécies Exóticas Invasoras*. Maputo, Mozambique

Governo de Moçambique. 2011a. *Plano estratégico para o desenvolvimento do sector agrário 2011- 2020*. Maputo: Ministério da Agricultura.

Governo de Moçambique. 2011b. Diploma Ministerial n°158/2011, de 15 de Junho – *Define Procedimentos Específicos para a Consulta Comunitária*. Maputo, Mozambique.

Governo de Moçambique. 2012a. Estratégia Nacional de Adaptação e Mitigação das Mudanças Climáticas. Maputo: MICOA.

Governo de Moçambique. 2012b. Decreto n°30/2012, de 1 de Agosto – *Altera Decreto n°o 12/2002*. Maputo, Mozambique.

Governo de Moçambique. 2013. *Decreto de Regulamento dos Procedimentos para Aprovação de Projectos de Redução de Emissões por Desmatamento e Degradação Florestal (REDD+)*. Maputo, Moçambique.

Governo de Moçambique. 2014. Lei n°16/2014, de 20 de Junho – *Lei da Conservação da Biodiversidade*. Maputo, Mozambique.

Governo de Moçambique. 2015a. Estratégia Nacional de Desenvolvimento Sustentável. Maputo: MITADER.

Governo de Moçambique. 2015b. *Plano Quinquenal do Governo 2015-2019*. Maputo: Conselho de Ministros, 4a Sessão Ordinária, 17 de Fevereiro 2015.

Governo de Moçambique. 2015c. Decreto n°54/2015, de 31 de Dezembro - *Regulamento sobre o Processo de Avaliação do Impacto Ambiental*. Maputo, Mozambique.

Governo de Moçambique. 2016. Decreto n°6/2016. *Criação do Fundo Nacional de Desenvolvimento Sustentável*. Boletim da República. I Série - Número 23. Quarta-Feira, 24 de Fevereiro de 2016.

Governo de Moçambique. 2017. *Proposta Regulamento para Projectos inerentes à Redução de Emissões por Desmatamento e Degradação Florestal Conservação e Aumento de Reservas de Carbono (REDD+)*.

Griffon F. 2016. Value chains assessment and market information service implementation in the Zambézia Province. Mission report for the MozBio Gilé project. Etc Terra.

Grinand, C., Rakotomalala F., Gond, V., Vaudry R., Bernoux, M., and Vieilledent, G. 2013.

"Estimating Deforestation in Tropical Humid and Dry Forests in Madagascar from 2000 to 2010 Using Multi-Date Landsat Satellite Images and the Random Forests Classifier." *Remote Sensing of Environment*, n°139 (December): 68–80. doi:10.1016/j.rse.2013.07.008.

Gutman, G, Byrnes, R., Masek, J., Covington, S., Justice, C., Franks, S., and Headley, R. 2008. "Towards Monitoring Land Cover and Land-Use Changes at a Global Scale: The Global Land Survey 2005." *Photogrammetric Engineering and Remote Sensing*, n°74 (1): 6–10.

Hankins, M. 2009. *A Renewable Energy Plan for Mozambique*. Available at: https://www.internationalrivers.org/files/attached-files/clean_energy_for_mz_30_9_09.pdf

Instituto Nacional de Estatística (INE). 2007a. *Recenseamento Geral da população e habitação 2007 Indicadores sociodemográficos, Província da Zambézia*. Governo de Moçambique.

Instituto Nacional de Estatística (INE). 2007b. *População projectada por distritos. Zambézia: 2007 – 2040*. Governo de Moçambique.

Instituto Nacional de Estatística (INE). 2010. Relatório Final do Inquérito ao Orçamento Familiar- IOF 2008/09. Governo de Moçambique.

Instituto Nacional de Estatística (INE). 2014. *Estatísticas e Indicadores Sociais, 2013-2014*. Governo de Moçambique.

International Development Association (IDA). 2016a. *Project Appraisal Document on a Proposed Grant in the Amount of SRD 18.5 million (USD 26.0 million Equivalent) and Proposed Credit in the Amount of SDR 9.8 million (USD 14.0 million Equivalent) to the Republic of Mozambique for an Agriculture and Natural Resources Landscape Management Project* – Project 1. June 9, 2016.

International Development Association (IDA). 2017. Mozambique Forest Investment Project. Project Appraisal Document (PAD) - Report No: PAD1913. Post negociations draft.

IUCN. The IUCN Red List of Threatened Species 2016. Available at: http://www.iucnredlist.org/

Kamusoko, C, Gamba, J., and Murakami, H. 2014. "Mapping Woodland Cover in the Miombo Ecosystem: A Comparison of Machine Learning Classifiers." *Land* 3 (2): 524–40. doi:10.3390/land3020524.

Leonardo, W.J., Van de Ven, G.W.J., Udo, H., Kanellopoulos, A., Sitoe, A. and Giller, K.E 2015. "Labor Not Land Constrains Agricultural Production and Food Self-Sufficiency in Maize-Based Smallholder Farming Systems in Mozambique." *Food Security* 7 (4): 857–74. doi:10.1007/s12571-015-0480-7.

Mackenzie, C. 2006. *Forest Governance in Zambézia, Mozambique: Chinese Takeaway!* Final report for Fongza.

Mackenzie, C., and Ribiero, D. 2009. *Tristezas Tropicais: More Sad Stories from Forests of Zambézia*.

Mansur, E., Cuco, A., *Building a community forestry framework in Mozambique: local communities in sustainable forest management*. Second International Workshop on Participatory Forestry in Africa Defining the Way Forwards: Sustainable Livelihood and

Sustainable forest Management Through Participatory Forestry. FAO. pp. 1°5 – 120. Available on: http://www.fao.org/3/a-y4807b/Y4807B09.pdf

Marzoli, A., 2007. *Inventário Florestal Nacional. Avaliação Integrada de Florestas em Moçambique – AIFM*. Direção Nacional das Terras e Florestas, Departamento de Inventário de Recursos Naturais. Mozambique.

Maurice, J., and M. Le Crom. 2014. *Carbonisation et Commercialisation Du Makala Produit À Partir Des Plantations de Puits de Carbone Agro forestier d'Ibi Batéké En Périphérie de Kinshasa (RDC)*. SalvaTerra.

Mercier C., Grinand C., Randrianary T., Nourtier M. and Rabany C. 2016. *Background study for the preparation of the Zambézia Integrated Landscapes Management Program.* Report for the Government of Mozambique and FCPF. Etc Terra.

Mésochina, P., Renaud, P.C., Prin, T., Houlette, A., Langa, F., Nkavandu, A., Chardonnet, P., 2010. *Preliminary survey of large herbivores in Gilé National Reserve and its Buffer Zone, Zambézia province, Mozambique*. IGF Foundation.

Ministério da Energia. 2013. *Estratégia de conservação e uso sustentável da energia da biomassa*. Maputo, Moçambique.

Ministry for the Coordination of Environmental Affairs (MICOA). 2007. *National Adaptation Program for Action (NAPA)*. Approved by the Council of Ministers at its 32nd Session, December 04, 2007.

Ministry for the Coordination of Environmental Affairs (MICOA). 2014. *Fifth National Report on the Implementation of Convention on Biological Diversity in Mozambique*. Maputo. MICOA.

MITADER. 2015. *Intended Nationally Determined Contribution (INDC) of Mozambique to the United Nations Framework Convention on Climate Change (UNFCCC).*

MITADER e Unidade Técnica do REDD+. 2016. *Mecanismo de Doação Dedicado para Comunidades Locais.* Moçambique.

MITADER. 2016a. *Estratégia Nacional para a Redução de Emissões de Desmatamento e Degradação Florestal, Conservação de Florestas e Aumento de Reservas de Carbono Através de Florestas (REDD+) 2016-2030*. Governo de Moçambique.

MITADER. 2016b. *Plano de Acção de REDD+ (2016-2030)*. Governo de Moçambique.

MITADER. 2016c. Environmental and Social Management Framework (ESMF) for the Mozambique Forest Investment Project (MozFIP), Dedicated Grant Mechanism to Local Communities (MozDGM) and REDD+ Initiatives. Final draft. January 2017. Government of Mozambique.

MITADER. 2016d. Environmental and Social Management Framework (ESMF) for REDD+ under the Mozambique Forest Investment Project (MozFIP) – Resettlement Policy Framework (RPF). Government of Mozambique.

MITADER. 2016e. Addendum. MozBio Process Framework updated to cover the National REDD+ Initiatives: the Mozambique Forest Investment Project (MozFIP) and the Dedicated Grant Mechanism to Local Communities (MozDGM). Final draft. Januray 2017. Government of Mozambique.

MITADER. 2016f. *Fundo Nacional de Desenvolvimento Sustentável*. Apresentação.

Moye, M., Nazerali, S. 2010. *Feasibility Study: Sustainable Financing of Protected Areas in Mozambique*. Prepared with support from UNDP-GEF. World Wide Fund for Nature (WWF), Maputo, Mozambique.

Nhantumbo, I., Salomão, A. 2009. *Biofuels, Land Access and Rural livelihoods in Mozambique.*

Ntumi, C., Monjane, N., Tafula, I., and Massinga, J. 2012. *Determinação preliminar do tamanho da população de elefantes da Reserva Nacional do Gilé, Moçambique.*

Prin, Thomas. 2008. *Typologie de la Végétation de la Réserve Nationale de Gilé : Étude Préalable à la Réintroduction de Grands Mammifères*. IGF.

República de Moçambique. 1975. *Constituição da República Popular de Moçambique de 20 de Junho de 1975.* Maputo, Moçambique.

República de Moçambique. 2014. *Estratégia Nacional de Desenvolvimento (2015 – 2035).* Maputo, Moçambique.

Ryan, C. M., William, M., and Grace, J. 2010. "Above- and Belowground Carbon Stocks in a Miombo Woodland Landscape of Mozambique." *Biotropica*, 1–10.

Pereira, C., Cossa, A. 2001. *A transformação do licenciamento de corte de carvão dos transportadores para os productores.* Paper presented at the 2nd National Conference on Community-based Natural Resources Management (CBNRM), 29 May–1 June 2001. Maputo, FAO, DNFFB/UMC, IUCN.

PROFOR. 2017. *Assessing Forest Governance in Mozambique. Identifying key challenges and interventions to strenghten governance*. Summary report prepared by the World Bank's Environment and Natural Resources Management team in Mozambique.

Ramsar Convention. 1972. *Final Act of the International Conference on the Conservation of Wetlands and Waterfowl*. Ramsar, Iran, 30 January - 3 February 1971. Slimbridge, UK: International Wildfowl Research Bureau. Available on: http://www.ramsar.org/sites/default/files/documents/library/final_act_ramsar_conference1971.pdf

Ryan, C.M., and M. William. 2011. "How Does Fire Intensity and Frequency Affect Miombo Woodland Tree Populations and Biomass." *Ecological Application* 21 (1): 48–60.

Siikamäki, J., Sanchirico, J.N. and Jardine, S.L. 2012. "Global Economic Potential for Reducing Carbon Dioxide Emissions from Mangrove Loss." *PNAS* 109 (36): 14369–74.

Sitoe, A., Salomão, A., and Wertz-Kanounnikoff, S. 2012. "The Context of REDD+ in Mozambique: Drivers, Agents and Institutions." *Occasional Paper 79. CIFOR, Bogor, Indonesia.*

Sitoe, A., Guedes, B., Argola, J., Puna, N., Michonga, E., and Monteiro, J. 2001. *Estudo de Biomassa Florestal Numa Floresta Aberta de Miombo No Distrito de Báruè, Manica.* Departamento Engenheira Florestal. Universidade Eduardo Mondlane.

Sitoe, A., Guedes, B., e Nhantumbo I. 2013. *Linha de Referência, Monitoria, Relatório e Verificação para o REDD+ em Moçambique*. Relatório do pais. IIED, Londres.

Stringer, E., Trettin, C., Zarnoch, S., and Tang, W. 2015. "Carbon Stocks of Mangroves

within the Zambezi River Delta, Mozambique." *Forest Ecology and Management* 354: 139–48.

Taquidir, M. 1996. Quantificação das queimadas nos diferentes tipos de vegetação em Moçambique. DNFFB-MADER Report.

Southern Africa Development Community (SADC). 1999. *Protocol on Wildlife Conservation and Law Enforcement*. August 18th, 1999. Maputo, Mozambique. Available on: http://www.sadc.int/documents-publications/show/Protocol%20on%20Wildlife%20Conservation%20and%20Law%20Enforcement%20(1999)

Tanner, C., De Wit, P., and Norfolk, S. 2009. *Participatory land delimitation: an innovative development model based upon securing rights acquired through customary and other forms of occupation*. Rome, FAO Land Tenure Working Paper 13. Available on: www.fao.org/publications

Tanner, 2010. "Land Rights and Enclosure: Implementing the Mozambican Land Law in Practice". In Anseeuw, W. and Alden, C., 2010. *The Struggle over Land in Africa: Conflicts, Politics and Change.* Chapter 6. LSE/Pretoria and Human Sciences Research Council HSRC. HRSC Press, Cape Town, South Africa.

Tanner, C. and Bicchieri, M. 2014. *When the Law is not enough: paralegals and natural resources governance in Mozambique*. Publication of the Food and Agriculture Organization of the United Nations. Roma, Italy.

Tanner, C. 2016. *Community Land Rights Delimitation, Natural Resources Management and Rural Land Taxation in Mozambique: Significance and Implications for Sustainable and Inclusive Development*. Maputo, The World Bank. A Synthesis Report for the World Bank's Non-Lending Technical Assistance.

Tanner, C. 2017a. *Land Tenure Assessment for the ER-PD*. Support to the Preparation of the Zambézia Integrated Landscape Management Program. CTC Consulting Report for Etc Terra. Wales, United Kingdom.

Tanner, C. 2017b. *Assessment of Government Capacity to Transfer Titles over Emissions Reductions: Preliminary Synthesis of Findings*. CTC Consulting Report for Etc Terra. Wales, United Kingdom.

Tanner, C. 2017c. *Assessment of Government Capacity to Transfer Titles over Emissions Reductions: Final Report*. CTC Consulting Report for Etc Terra. Wales, United Kingdom

Trindade, J-C, and Dos Santos, B. 2004. *A paisagem da justiça em Moçambique*. Coimbra, Center for Social Studies and Maputo, Center for Legal and Judicial Training (CFJJ)

United Nations. *The United Nations Permanent Forum on Indigenous Issues.* Factsheet. Available on: http://www.un.org/esa/socdev/unpfii/documents/5session_factsheet1.pdf

United Nations. 1992a. *The United Nations Framework Convention on Climate Change (UNFCCC)*. May 9th, 1992. New York, United Stated. Available on: http://unfccc.int/files/essential_background/background_publications_htmlpdf/application/pdf/conveng.pdf

United Nations. 1992b. *United Nations Convention on Biological diversity*. June 5th, 1992. Rio de Janeiro, Brazil. Available on: https://www.cbd.int/doc/legal/cbd-en.pdf

United Nations. 1994. *United Nations Convention to Combat Desertification in Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa*. June 17th, 1994. Paris, France. Available on: http://www.unccd.int/en/about-the-convention/Pages/Text-overview.aspx

United Nations. 1998. *Kyoto Protocol on the United Nations Framework Convention on Climate Change (UNFCCC).* Kyoto Protocol – amended in 1997. Kyoto, Japan. Available on: http://unfccc.int/resource/docs/convkp/kpeng.pdf

United Nations. 2015. Paris *Agreement on the United Nations Framework Convention on Climate Change (UNFCCC)*. Paris Agreement. Conference of Parties (COP) 21. December 12th, 2015. Paris, France. Available on: http://unfccc.int/files/meetings/paris_nov_2015/application/pdf/paris_agreement_english_.pdf

UT-REDD+. *Spreadsheet on Consultation events*. Continuous Updating. Available on: https://docs.google.com/spreadsheets/d/1LOo1dvQyUOXMHOU20Djq61E3ECM7OgDbJEhf68jPZ5c/edit#gid=862126948

UT REDD+. *Summaries and documents available on all consultations with stakeholders*. Continuous updating. Available on: https://www.dropbox.com/sh/suxo9ki0a595qle/AAAeRtyQSmBi_uxT9nFbJ1dba/Relat%C3%B3rios%20das%20consultas?dl=0

UT-REDD+. 2015a. *Zambézia Integrated Landscapes Management Program*. Emissions Reduction Project Idea Note (ER-PIN). Mozambique.

UT-REDD+. 2015b. *Zambézia Integrated Landscapes Management Program. Early Idea.* Government of Mozambique. Presentation at the twelfth meeting of the FCPF Carbon Fund. Paris, April 28-30, 2015.

VCS. 2012. *Jurisdictional and Nested REDD+ Requirements*. V3.0.

Walker, S., Pearson, T., and Brown. S. 2007. *Winrock's CDM A/R Sample Plot Calculator Spreadsheet Tool*. Version 2014.

Wertz-Kanounnikoff S., Falcão M.P., and Putzl L. 2013. "Facing China's Demand for Timber: An Analysis of Mozambique's Forest Concession System with Insights from Cabo Delgado Province." *International Forestry Review* 15 (3).

White, F. 1983. *The vegetation of Africa*. UNESCO, Paris.

Winrock International and Centro de Estudos de Agricultura e Gestão de Recursos Naturais. 2015. *Identificação e Análise dos Agentes e Causas Directas e Indirectas de Desflorestamento e Degradação Florestal em Moçambique*.

The World Bank. 2010. *Policy Note: Community Land Delimitation and Local Development*. Washington DC, The World Bank, Agricultural and Rural Development Sector Unit, Africa Region, November 2010. A report by Simon Norfolk and Paul De Wit.

The World Bank and the Government of Mozambique. 2015. *Letter of Intent: Potential Purchase of Emission Reductions from the 'Zambezia Integrated Landscapes Management Program (ZILMP) in Mozambique*.

Zolho, R. 2005. *Effect of Fire Frequency on the Regeneration of Miombo Woodland in Nhambita, Mozambique.* University of Edinburgh, United-Kingdom.

ANNEXES

Annex 1: Lists of mammals and reptiles in the GNR and its buffer zone

Table 81: Consolidation of main mammals identified in the GNR and its buffer zone and their relative abundance, classified by Order

English name	Scientific name	AKIe in the GNR / buffer zone
Artiodactyla		
Natal red duiker	*Cephalophus natalensis*	
Hippopotamus *	*Hippopotamus amphibius*	
Sable antelope	*Hippotragus niger*	0,148
Waterbuck	*Kobus ellipsiprymnus*	0,276
Suni	*Nesotragus moschatus*	
Klipspringer	*Oreotragus oreotragus*	
Warthog	*Phacochoerus aethiopicus*	
Bush pig	*Potamochoerus porcus*	0,195
Southern reedbuck	*Redunca arundinum*	0,275
Common duiker	*Sylvicapra grimmia*	4,39 / 0,320
Bushbuck	*Tragelaphus scriptus*	0,831 / 0,416
Greater kudu	*Tragelaphus strepsiceros*	0,294 / 0,656
Carnivores		
African clawless otter	*Aonyx capensis*	
Marsh mongoose	*Atilax paludinosus*	
Bushy-tailed Mongoose	*Bdeogale crassicauda*	
Side-striped jackal *	*Canis adustus*	
African civet	*Civettictis civetta*	
Spotted Hyaena *	*Crocuta crocuta*	
Wild cat	*Felis silvestris*	
Miombo genet	*Genetta angolensis*	
Common genet	*Genetta genetta*	
Blotched genet	*Genetta tigrina*	
Dwarf mongoose	*Helogale parvula*	
Ichneumon mongoose	*Herpestes ichneumon*	
White-tailed mongoose	*Ichneumia albicauda*	
Striped polecat	*Ictonyx striatus*	0,341
Serval*	*Leptailurus serval*	
Spotted-necked otter	*Lutra maculicollis*	

African wild dog *	*Lycaon pictus*	
Ratel	*Mellivora capensis*	
Banded mongoose	*Mungos mungo*	
African palm civet	*Nandinia binotata*	
Lion *	*Panthera leo*	
Leopard *	*Panthera pardus*	
Cetartiodactyla		
Lichtenstein Hartebeest	*Alcelaphus lichtensteinii*	
African buffalo	*Syncerus caffer*	
Eulipotyphla		
Shrews	*Crocidura sp.*	
Hyracoidea		
Southern tree hyrax	*Dendrohyrax arboreus*	
Bush hyrax	*Heterohyrax brucei*	
Rock hyrax	*Procavia capensis*	
Lagomorpha		
Scrub hare	*Lepus saxatilis*	
European rabbit	*Oryctolagus cuniculus*	
Natal red rock hare	*Pronolagus crassicaudatus*	
Smith's Red Rock hare	*Pronolagus rupestris*	
Four-toed sengi	*Petrodromus tetradactylus*	
Chequered sengi	*Rhynchocyon cirnei*	
Pholidota		
Temminck's ground pangolin	*Smutsia temminckii*	
Primates		
Grivet monkey	*Cercopithecus aethiops*	
Samango monkey	*Cercopithecus mitis*	
South African galago	*Galago moholi*	
Brown greater galago	*Otolemur crassicaudatus*	
Yellow baboon	*Papio cynocephalus*	
Proboscidea		
African elephant	*Loxodonta africana*	
Rodentia		
Spiny mouse	*Acomys spinosissimus*	0,36
Rats	*Aethomys sp.*	
Lord Derby's anomalure	*Anomalurus derbianus*	
Long tailed pouched rat	*Beamys hindei*	
Forest giant pouched rat	*Cricetomys emini*	
African dormouse	*Graphiurus* sp.	

Silvery mole rat	*Heliophobius argenteocinereus*
Mutable sun squirrel	*Heliosciurus mutabilis*
African porcupine	*Hystrix africaeaustralis*
Single-striped mouse	*Lemniscomys rosalia*
Natal multimammate mouse	*Mastomys natalensis*
Mices	*Mastomys sp.*
Ethiopian striped mouse	*Muriculus imberbis*
Typical Vlei Rat	*Otomys typus*
Smith's bush squirrel	*Paraxerus cepapi*
Striped bush squirrel	*Paraxerus flavovittis*
Red squirrel	*Paraxerus palliatus*
Black rat	*Rattus rattus*
Gerbils	*Tatera sp.*
Lesser cane rat	*Thryonomys gregorianus*
Greater cane rat	*Thryonomys swinderianus*
Tubulidentata	
Aardvark	*Orycteropus afer*
AKIe: Abundance Kilometre Index of species	
** Those species have not been directly spotted for a long time so they are rare or are not considered to be permanent in the GRN despite records on their crossing in the area.*	

Based on *(Deffontaines, 2012); (Mésochina et al., 2010); (Fusari et al., 2010)*

Table 82: Main reptiles identified in the GNR and its buffer zone

Scientific name	Common name
Snakes	
Bitis arietans	African puff adder
Crotaphopeltis hotamboeia	White-lipped herald snake/Red-lipped snake
Dasypeltis scabra	Common egg eater
Dendroaspis polylepis	Black mamba
Dendroaspis angusticeps	Eastern green mamba
Dispholidus typus	Boomslang
Naja annulifera	Snouted cobra
Naja melanoleuca	Forest cobra
Naja mossambica	Spitting cobra
Philothamnus hoplogaster	South Eastern green snake/Green water snake
Philothamnus natalensis	Natal Green Snake/Eastern green snake
Philothamnus semivariegatus	Spotted bush snake
Psammophis phillipsi mossambicus	Olive whip snake
Psammophis subtaeniatus orientalis	Eastern stripe-bellied sand snake

Python natalensis	South African python
Python sebae	African rock python
Telescopus semiannulatus	Tiger snake
Thelotornis capensis	Twig snake
Thelotornis mossambicanus	Eastern twig snake
Lizards and monitors	
Gerrhosauros validus	Giant plated lizard
Platysaurus sp.	Flat lizard
Varanus albigularis microsticus	Rock monitor
Varanus niloticus	Nile monitor
Hemidactylus sp.	The house gecko
Crocodiles	
Nilo Crocodylus niloticus	*Nilo Crocodylus niloticus*

Based on (Fusari et al., 2010); (Mésochina et al., 2010); (Fondation IGF, 2013)

Annex 2: Prioritization of interventions according to the National REDD+ Strategy – Action Plan

Actions	Priority 1	Priority 2	Priority 3
SO1			
Design and implementation of relevant systems and tools for planning, implementing and monitoring REDD+			
Reinforcement of the land use planning system with focus on the identification of forests to be conserved and areas to be restored			
Train partners and extension agents (capacity building)			
Assess the need to adjust the national legislation to reinforce actions to reduce deforestation and forest degradation			
Research on REDD+ implementation techniques, technologies and policies and their impact on society			
Evaluate the implementation of fiscal and non-fiscal incentives to promote the reduction of emissions from deforestation and forest degradation and the increase of carbon stocks through forests			
Establish an M & MRV and SIS system			
SO2			
Improvement of the productivity and of the conservation of soils through the reduction of itinerant agriculture			
Transfer of technology and organization of agricultural producers			
Valorization of post-harvesting operations: marketing, processing and storage of agricultural products			
Promotion and support of partnerships between large, medium and small producers			
Planting of multiple use trees in agricultural areas and promotion of agroforestry systems			
Restoration and rehabilitation of degraded areas			
SO3			
Sustainable use of biomass energy in urban areas			
Improving access to alternative energy sources to biomass in urban and peri-urban areas			
National production of improved stoves			
Sustainable biomass energy production (biomass production and coal processing)			

Formalization of the coal business in large cities	
SO4	
Review and re-qualification of conservation areas	
Establishment of sustainable business in conservation areas	
Attracting funding and other sources of income to conservation areas that are compatible with biodiversity conservation	
SO5	
Review and strengthening of forest governance and monitoring system	
Forest statistical information system for the registration, control and public disclosure of forest operations	
Forest inventories and forest management plans for productive timber areas	
Establishment of standards for wood products and improvement of the efficiency and integral use of wood; Diversification of products and services within areas of forest concessions	
Classification of wood in the customs tariff	
Training of forestry operators (in matters of forest operations, use of the management plan and use of wood)	
Model Forest Concessions	
SO6	
Facilitate and simplify procedures for access, security and land tenure for the establishment of industrial, community and family forest plantations, as well as for the restoration of degraded forest areas	
Network for testing species and provenances of multiple use trees in the main agro-ecological zones	
AUM species germplasm bank (seeds and clones)	
Restoration of degraded forests using ROAM techniques	
Industrial forest plantations	
Small and medium-scale forest plantations (communities and families)	
Markets for forest products and services	

Annex 3: analysis of the emissions due to illegal logging in the ZILMP area

The present analysis, about emissions related to legal and illegal logging in the ZILMP implementation area (forest degradation), have been made for the background study in preparation of the ER PD development (Mercier et al., 2016). It was realized at this time on 7 districts that constitute initially the boundary of the program. Emissions related to this activity are therefore compared to emissions on the same area and it appeared that it is less than 10% of those. Main results of the analysis are summarized hereafter.

Emissions due to forest exploitation were estimated with data relating to the total volume that is officially exploited in the program area and to the estimated share of illegal logging. The result is emissions of 37,945 tCO_2eq/yr. Great uncertainties exist about those volumes: a field survey would be necessary to improve the analysis. It will however remain difficult to access data on illegal logging. It was impossible to gather data on the roads created for wood extraction out of the logging area. Hence, some emissions are not part of this estimation, which is therefore conservative. Furthermore, since there are no available estimates on the areas impacted by roads or wood parks for the Zambézia province, activity data could not be established.

Context of logging in the ZILMP area

Logging in Mozambique can occur in two types of land uses that obey to different regulations:

- Concessions: lands are allocated to companies for 50 years. To obtain the administrative authorization to exploit those concessions, a management plan is required. Companies also need to be in possession of timber processing facilities. They are prohibited from exporting unprocessed log of first class species[91].
- Simple licenses: they consist of a 5 years permit that limit the maximal harvesting amount to 500 m^3 per year, on an area that should not exceed 10 000 ha. They are available for Mozambican citizens only and require simplified management plan.
- Forest concessions were introduced in 1999 to guarantee the sustainability of exploitations. Although they were, initially, supposed to replace simple licenses, the latter still exist: as they imply fewer responsibilities and represent a higher part of production (about two third of the authorized volume, according to Sitoe et al. (2012), they still are more appealing.

The main legal instruments that define forest exploitation in Mozambique are the following (Falcão et al. 2015):

- The Forestry and Wildlife Regulations (2002), which recognizes forest concessions as a new regime of land use to promote sustainability.
- Conservation law (2014).

[91] *22 species of which Jambire (Millettia stuhlmannii), Chanfutta (Afzelia quazensis), Umbila (Pterocarpus angolensis) and Pau-Ferro (Swartzia madagascariensis)*

- Environment law (1997).
- Policy and strategy for the development of the Forestry and Wildlife sector (1997).
- The moratorium on *pau-ferro* (*Schwartzia madagariensis*) exploitation and on the deliverance of new forest concession and simple licenses (1st of January 2016).

In 2015, 31% and 21% of program area was ruled, respectively, by operational concessions and simple licenses (Figure 40). In 2011, operational concessions and simple licenses represented, respectively, 15% and 4% of the program area showing an important increase in area under forest exploitation in the period. The percentage of forest covered by simple licenses is inferior to the percentage of the ZILMP area covered by simple licenses, we can conclude that licenses are surprisingly attributed in area where there is low forest cover. 31% of delimitated concessions are currently operational. The final approval for the attribution of the remaining 69%, which is still being analysed by the administration, will depend *inter alia* on the approval of the management plans. Concerning simple licenses, currently 58% are operational and the status of the other is pending.

In order to assess the share of deforestation that occurs inside concessions and simple licenses areas, data were extracted from deforestations maps produced for the background study (Table 83). They were analysed in light of the past deforestation data from the 2010 – 2013 period and of the 2011 delimitations of concession and simple licenses areas.

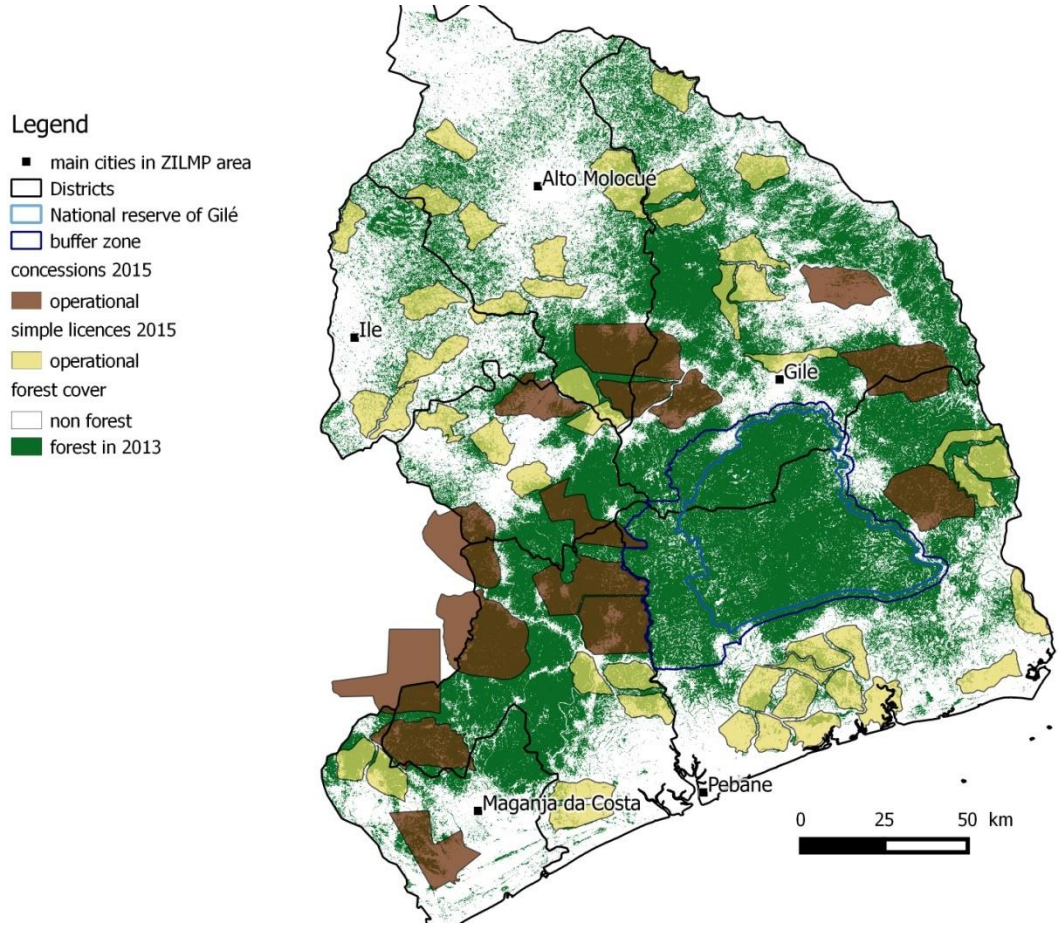


Figure 40: **Map of operational forest concessions and simple licenses in the ZILMP area in 2015 (Source: SPFFB Zambézia, retreatment by Etc Terra)**

Without any restriction on land use by households in logging concessions, it is not possible to differentiate deforestation what would have been caused, exclusively, by logging or by "slash and burn" agriculture. However, to the contrary of agricultural practices, it is very likely that logging leads to degradation rather than deforestation: exploitation pressure being concentrated on few species only. Whereas deforestation rates in concession areas are similar to those of the overall program area (Table 83), they are higher in simple licenses areas, highly above the program area rate: 0.86 %/yr. This may be explained by fast attribution of lands, leading to a rapid exploitation of the available timber, with lower selection of tree species (Table 83). Given this, we can infer that logging concessions or licenses do not mitigate deforestation dynamics.

Table 83: **Proportion of forests in the program area that was under concession or simple license status in 2011 and in 2015 and corresponding deforestation rate during the recent period 2010-2013**

Land cover classes	ZILMP	2011		2015	
		Concessions	Simple licenses	Concessions	Simple licenses
Total area	3,865,062	594,925	157,794	1,208,748	799,292
Proportion of the ZILMP area	100%	15%	4%	31%	21%
Forest cover in 2013	1,983,784	461,045	82,829	766,025	348,119
Proportion of the forest	100%	23%	4%	39%	18%
Historical deforestation rate between 2010-2013	-0.86%	-0.39%	-1.12%	-1.09%	-1.75%

In Mozambique, and in Zambézia province especially, current practices are based on short cutting cycles that jeopardize logging sustainability: although it is acknowledged that a 30 years rotation would be necessary in the Miombo forest to ensure regeneration (Mackenzie and Ribiero 2009), management plans are usually based on a 20 years rotation, or less (often, 5 to 10 years rotation). EIA (2014) estimates that, with a linear evolution of the 8% exploitation growth rate, the exploited species stocks would be exhausted within 15 years.

Official data estimate exploitation volumes in Zambézia (German and Wertz-Kanounnikoff, 2012; Mackenzie and Ribiero, 2009):

- In 2009, in Zambézia, licensed volumes were 18 046 m^3 for concession areas and 22 345 m^3 for simple license areas. That was the second highest production of Mozambique, just after Sofala province (source: DNFT as reported by German and Wertz-Kanounnikoff 2012).
- In 2007, 14 simple licenses and 99 concessions licenses were issued in Zambézia province for a total volume of 36 693 m^3, close to the 2009 amount (Mackenzie and Ribiero, 2009).

Exported quantities are higher than licensed quantities: most exports are illegal and, therefore, excluded from official reports – as explained hereafter (Mackenzie 2006; Mackenzie and Ribiero 2009). Hence, estimates given by official data should be far below timber exploitation real rates.

Significance of Illegality in the logging sector

Today, 50% of the quantities of timber shipped out of Zambézia is believed to be illegal (Ekamn et al., 2013; Mackenzie 2006; Mackenzie and Ribiero 2009). In Mozambique, this share could reach 76% to 93% of timber production (EIA 2014). Most of the wood (about 80%) is exported towards China (Ekamn et al. 2013; Mackenzie and Ribiero 2009). Yet, Mozambican reports of exportations towards China do not correspond to the Chinese importation level from Mozambique (Figure 42), giving an indicator of illegal exportation.

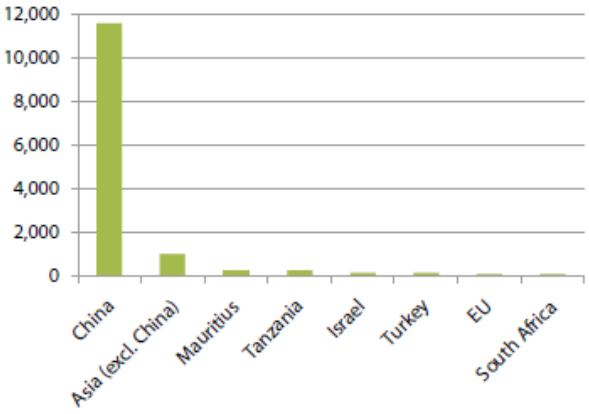


Figure 41: **Exports of wood from Cabo Delgado province of Mozambique by destination during the year 2010 in m³ (From (Ekamn, Wenbin, and Langa E. 2013)**

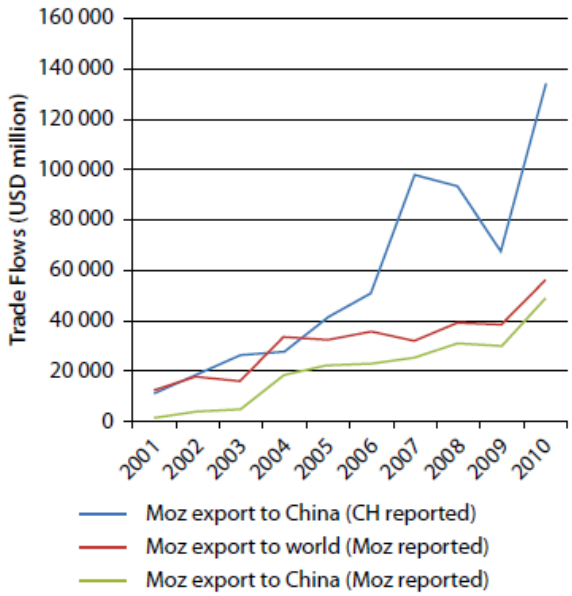


Figure 42: **Value of timber exports from Mozambique (Moz) to China (CH) and to the world as reported by the respective countries (Source: UN COMTRADE as presented in (German and Wertz-Kanounnikoff 2012))**

Illegality lies in different practices, from illegal harvest that do not respect management plans to violation of labor laws, violation of transport laws and illegal exports of unprocessed timber for first class species (Ekamn et al. 2013; Mackenzie 2006; Wertz-Kanounnikoff et al. 2013). Again, whereas Mozambican authorities declare that 20% of exportations are composed of unprocessed logs, in accordance with the law, China declares 75% of unprocessed log imports in 2010, underlying illegal practices in timber processing (German and Wertz-Kanounnikoff 2012; Ekamn et al. 2013). A study of Falcão et al. (2015) shows that companies that export unprocessed logs can reach a 2,430 USD benefit per container, against 530 USD per container for legal wood, because (i) cost is not related to processing and (ii) logs are sold at a higher price in China. According to (EIA 2014), uncollected taxes related to illegal logging accounted for approximately 146 millions USD between 2007 and 2012 between 3 and 6 USD per log are usually paid to the loggers hired in villages.

Widespread illegality in logging sector is enhanced by weak law enforcement, as illustrated by the limited number of fines - 177 in Zambézia province in 2007 - compared to the extent of the illegality phenomenon, and a high degree of corruption along the value chain (Mackenzie 2006; Mackenzie and Ribiero 2009). In Zambézia province, the main agents of logging are Mozambican and Chinese companies (German and Wertz-Kanounnikoff 2012; Mackenzie and Ribiero 2009).

Estimations of emissions due to forest degradation by legal and illegal logging

Estimates of emissions due to forest exploitation (legal and illegal) can be based on exported quantities from Zambézia and on several hypotheses about exploitation methods and impacts. To do so, we followed the VM0011 VCS methodology for improved forest management “Logged to protected forest: calculating GHG Benefits from preventing planned degradation”, developed by *Carbon Planet Limited* and approved by VCS in 2011. For emissions sources and removals, the methodology is as follows:

- **Emissions from the dead wood pool** composed of residual from stand damage, branches and trimmings left in soil after logging. Carbon from this pool is gradually emitted while the biomass is degrading. In this pool, carbon can be estimated with factors detailed in literature and correlated to carbon stocks in merchantable quantities. However, the lack of data on forest exploitation in Mozambique prevented us from following this methodology. Instead, dead wood pool carbon stocks were considered as a difference between carbon stocks in the estimated total biomass and merchantable biomass (i.e. biomass in logs). The decay rate was considered similar to the one recommended by IPCC for belowground biomass (i.e. 10%/yr).
    - **Total biomass** is estimated with expansion factors for conversion of wood removals (BCEF) as recommended by the (IPCC 2006).
    - **Merchantable biomass** is estimated with a relation between wood density and exploited volume as recommended by IPPC. For wood density, an average for the main exploited species was used.

- **Emissions from long term harvested wood products** (ltHWP), composed of emissions from the decomposition or burning of processing residues and from the oxidation of long-lived wood products. The first component was conservatively set to zero wood, since it is mostly not processed in Mozambique and few relevant data are available about processing techniques. The second component was estimated as precious wood from forest exploitation in Mozambique, as it is mostly used to form planks and pieces of furniture. According to VM0011 methodology, fraction of carbon

remaining in ltHWP can be estimated with the following equation (k being the rate of oxidation of ltHWP and t the elapsed time since wood processing):

Equation 1:

$$F_{ltHWP_{remain},t} = e^{-k_{ltHWP}t}$$

- **Removals from regrowth after selective logging** have to be assessed with annual growth rates. However, since it is not possible to assess the areas that have actually been impacted by selective logging, the total biomass would be retrieved with a delay considered in a 5% regrowth rate - which means that 20 years would be necessary to ensure post-logging regeneration (Mackenzie and Ribiero 2009).

Data and hypothesis are summarized in Table 84. The result is an estimation of 0.04 $MtCO_2eq$ over a period of 10 years (Table 85). This represents a proportion of 1.2% of emissions due to deforestation in the 7 districts of the ER Program implementation area, 3.3 $MtCO_2eq/yr$, as assessed by the baseline of the ER program established in the background study (Mercier et al., 2016).

Table 84: **Data and hypothesis for the calculation of emissions and removals from degradation due to selective logging in the program area**

Factors and pools		Data	Units	Sources
Exploitation data				
Licensed volume exploited in Zambézia	Concessions	18,046	m^3	DNFT - German and Wertz-Kanounnikoff, 2012
	Simple license	22,345	m^3	
Part in the program area	50%	8,939	m^3	Data on concessions
	48%	10,796	m^3	

Total with illegal exploitation	78,938	m^3	
Total tree biomass			
BCEF	0.89	tdm/m^3	IPCC, 2006
Root-to-shoot ratio	0.28		
Bark fraction	0.1		
Carbon fraction	0.47	tC/tdm	
Equivalent total AGB and BGB biomass	45,567	tC	
Carbon in merchantable volume			
Wood density	0.79	tdm/m^3	IPCC, 2006
Carbon fraction	0.47	tC/tdm	
Total merchantable biomass	29,310	tC	
Emissions dead wood pool			
Carbon in residual stand damage and branches and trimmings	-	tC	
Difference between merchantable biomass and total biomass	16,258	tC	
Annual decay	0.1		
Long term harvested wood product			
Stocks in residues from processing	-		
Oxidation rate	0.023		VM0011, VCS
Regrowth after selective logging			
Annual rate	0.05		

Table 85: **Results of the estimation of emissions from selective logging (legal and illegal) over 10 years in the program area**

	Emissions in tCO_2eq				
Year	**Emission from non merchantable volume**	**Emission from processing**	**Emission from merchantable volume - ltHWP**	**Removals from regrowth**	**Total emissions**
1	5,961	0	2,444	- 8,354	51
2	11,922	0	7,275	- 16,708	2,489
3	17,883	0	14,441	- 25,062	7,262
4	23,845	0	23,887	- 33,416	14,315
5	29,806	0	35,561	- 41,770	23,597
6	35,767	0	49,414	- 50,124	35,057
7	41,728	0	65,396	- 58,478	48,646
8	47,689	0	83,457	- 66,832	64,314
9	53,650	0	103,552	- 75,186	82,016
10	59,611	0	125,633	- 83,540	101,705
Average	**32,786**	**-**	**51,106**	**- 45,947**	**37,945**

Annex 4: MoU between the Installer Commission of the Zambezia MSLF and the Forum of ONGs, private sector and academies

MEMORANDO DE ENTENDIMENTO
ENTRE
A COMISSÃO INSTALADORA DA PLATAFORMA PARA O DESENVOLVIMENTO SUSTENTAVEL DA ZAMBÉZIA
E
,FÓRUM DAS ONGs DA ZAMBÉZIA, SECTOR PRIVADO E AS ACADEMIAS

Doravante denominados as "Partes"

Desejosos, de promover a coordenação , diálogo, partilha e disseminação de informação no contexto de desenvolvimento sustentável integrado da Província da Zambézia, particularmente sobre politicas sectoriais, uso de terra e outros recursos naturais, protecção ambiental, governação participativa e pesquisas relacionadas com o desenvolvimento;

Ressaltando a necessidade da colaboração intersectorial para o desenvolvimento sustentável e gestão de recursos naturais, com vista ao alcance a uma melhor qualidade de vida e um desenvolvimento económico, social e ambiental sustentável e na necessidade de aumentar e promover o intercâmbio de experiências, conhecimentos, metodologias e tecnologias no campo do desenvolvimento sustentável;

Chegaram ao seguinte entendimento:

Artigo 1°

As Partes concordaram no estabelecimento de uma Plataforma Provincial, denominada por "**PLATAFORMA DE DESENVOLVIMENTO SUSTENTAVEL DA PROVÍNCIA DA ZAMBÉZIA**", constituída por Organizações da Sociedade Civil , Instituições Publicas e Privadas , Academias e Comunidades locais.

Artigo 2°

Com esse espírito, as Partes acordaram em promover no contexto da Plataforma acções permanentes de consultas, coordenação , intercâmbio de experiências , partilha de informações, estudos e pesquisas técnico-científicos e tecnológicos, nas seguintes áreas temáticas:

a) Agricultura Sustentável;
b) Gestão Florestal;
c) Administração e Gestão de Terras;
d) Energia e Biomassa;
e) Género e Diversidade;
f) Recursos Minerais e Hídricos ;
g) Governança e Mudanças Climáticas;

Artigo 3°

As Partes concordam no âmbito da Plataforma em estabelecerem consultas que servirá para: (*i*) manter diálogo estratégico sobre temas de interesse mútuo; (*ii*) ter discussões técnicas sobre os temas escolhidos; (*iii*) compartilhar informações sobre a execução dos projectos e programas em curso; e (*iv*) explorar novas iniciativas conjuntas.

Artigo 4°

As Partes reconheceram a importância da visibilidade de criação de uma Plataforma multi-sectorial , uma iniciativa inovadora, e comprometem-se a promovê-la conjuntamente nos níveis provincial, nacional, regional e internacional, por meio de ferramentas mais relevantes e com os recursos disponíveis.

Artigo 5°

As partes entendem como uma oportunidade para o fortalecimento dos Fóruns e Redes Temáticas existentes na Província no espreito representativo ao nível da Plataforma, colaborando nos processos de dialogo com o Governo (Observatório de Desenvolvimento e Reuniões Anuais da Sociedade Civil e Sector Privado com o Governo)

Artigo 6°

As partes acordaram que no espírito do presente Memorando de Entendimento, esta reconhecida a necessidade de criação da Plataforma de Desenvolvimento Sustentável da Província da Zambézia sob liderança da Comissão Preparatória pela RADEZA (Rede de Organizações para Ambiente Comunitários Sustentável da Zambézia).

Artigo 7°

Qualquer das Partes poderá, a qualquer momento sugerir revisões deste Memorando de Entendimento, as quais entrarão em vigor mediante acordo das Partes. Qualquer das Partes poderá denunciar o presente Memorando de Entendimento mediante notificação por escrito com antecedência de 30 dias .

Os conflitos derivados durante a execução e interpretação deste memorando devem ser resolvidos de forma amigável pelas partes.

Artigo 8°

Este Memorando de Entendimento entrará em vigor na data de sua assinatura pelas Partes.

Feito em Quelimane, aos 12 de Agosto de 2016

Assinado por:
A Comissão

Sociedade Civil/FONGZA

Conselho Empresarial da Zambézia

Academias/UNIZAMBEZE

12.08.16

12/08/2016

Lista de Presenças

Ord	Nome	Instituição	Contacto	E-mail
1	Bob Gumbe	RADEZA	845588091	bobgumbe@yahoo.com
2				
3	Amade Nalia	CONSILMO/GZ	825803926	
4	Lourenço	ORAM	840459138	
5		AMAZA		
6				
7		AMOMA		
8				
9				
10				
11				
12			825200770	
13		IIED		
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				

Quelimane 12 de Agosto de 2016

Acta da Reunião da Comissão Instaladora com os Fóruns da Provincia da Zambézia

Participantes:

FÓRUNS: FONGZA, CECOHAS, MMMR, G-20, OTM- CS, GD, NAFEZA

Comissão: Cândida Magalhães, Estêvão Neves, Rui Rodolfo, Tomás Bastique, Hilário Patrício, João Machel, Daniel Maula, Farai Muchiguel, José Gonçalo,

Aos Catorze dias do mês de Julho do ano de dois mil e dezasseis, teve lugar uma reunião da comissão instaladora alargado aos Fóruns da Zambézia, nos escritórios da RADEZA, em Quelimane e estiveram presentes 7 membros dos Fóruns e 8 membros da comissão.

A reunião teve como ponto da agenda, dar seguimento as recomendações do Fórum extraordinário que teve lugar no dia 30 de Junho do ano em curso, na cidade de Quelimane.

O Presidente da Comissão, fez a contextualização sobre a criação do Fórum, e passou em revista as questões colocadas no Fórum Extraordinário com enfoque para: *i*) Inquietação sobre a criação do novo Fórum; *ii*) Sustentabilidade do Fórum, *iii*) Processo de integração de vários actores no mesmo Fórum. Frisou ainda que o Fórum que se pretende criar é de âmbito provincial e não jurisdicional, tendo em vista várias iniciativas que estão em curso em toda a Província.

Os membros da Comissão acrescentaram no seguinte: Deve-se ter em conta o Foco do que se pretende criar, Grupo alvo, necessidade de abrangência e visitas de trocas de experiências.

Por sua vez, os membros do Fórum reiteraram da opção de criação de uma Plataforma e não Fórum. Dada a impossibilidade jurídica para a constituição de um Fórum com diversos actores (governo sociedade civil e sector privado) uma prática não aplicável no pais pelo motivo mencionado. Esclareceram também a diferenciação entre Fórum e Plataforma.

Por conseguinte algumas questões foram apresentadas com a criação da plataforma: *i)* Quem será o implementador das actividades? *ii*) Quem irá prestar contas FONGZA ou a Plataforma? *iii*) Qual é o papel real da Fongza, seu nível de organização e prestação de contas?

Por consenso foi acordado o seguinte:

1. Elaboração do Memorando de Entendimento;
2. Actualização dos TOR's da Plataforma;

3. A plataforma deve trazer soluções para os Fóruns existentes;
4. A plataforma deve incluir as seguintes redes temáticas:
   a. Agricultura Sustentável;
   b. Gestão Florestal;
   c. Administração e Gestão de Terras;
   d. Energia de Biomassa;
   e. Género e Diversidade;
   f. Recursos Hídricos e Minerais;
   g. Mudanças Climáticas e Governação.

Com base nas discussões acima, a comissão considera que a criação de uma Plataforma acomoda todos os intervenientes, porque esta funcionará numa base de coordenação, partilha de informação e troca de experiências, advocacia e poderá estar hospedada numa instituição que assegurará o seu funcionamento a médio e longo prazo.

A Comissão considera que a Plataforma poderá funcionar com base em Termos de Referencia onde estarão acomodados todas as funções, objectivos, estrutura de funcionamento, constituído assim o documento da sua oficialização. Pretende-se num futuro breve a elaboração de um plano estratégico ou de actividades.

A Comissão conclui que nesta fase a Plataforma deverá estar hospedada numa Rede já existente - RADEZA dada a natureza do seu trabalho na Província (*ambiente, recursos naturais e desenvolvimento comunitário*) para que a sua máquina administrativa possa dar o devido suporte a gestão financeira dos fundos concedidos pelos parceiros de desenvolvimento para o funcionamento da Plataforma.

Sem mais assuntos a tratar, foi dada por encerrada a reunião.

Quelimane, aos 14 dias de Julho de 2016

Elaboração:

Tomás Bastique e **Hilário Patrício**

Tomás Bastique   Hilário Patrício

APROVADA POR

#	Nome	Instituição	Assinatura
1	Daniel R. Maúla	RADEZA	[signature]
2	CHARLES P. CHICHONE	CTA/CEPZ	[signature]
3	Faria Rifate Rodrigues	ADRA	[signature]
4	ESTEVÃO JOSÉ NEVES	PROAEA-MOCUBA	[signature]

5	Hilário Patrício	ITC	[signature]
6	Simone Brito	LDC	[signature]
7	Geraldo Salomone	AMOMA	[signature]
8	João Mpelula	S.P.A.B.Z	[signature]
9	José Manuel Gonçalves	P.G.I.A.R.N	[signature]
10	Marcos do Amaral	FONGZA	[signature]
11	Amade Nalgia	GMD/G20	[signature]
12	Delfina Mussa	MMMR	[signature]
13	Sérgio Mamudo	RM	[signature]
14			
15			
16			

Quelimane, aos 02 de Agosto de 2016

Legenda

FONGZA Fórum das ONGºs da Zambézia

CECOHAS Centro de Coordenação Para Higiene, Agua e Saneamento

MMMR Movimento Moçambicano Mulher Rural

G-20 Plataforma para Governação da Zambézia

OTM- CS, Organização dos Trabalhadores Moçambicanos, Central Sindical

GD Grupo Moçambicano da Divida

NAFEZA Núcleo da Associações Femininas da Zambézia

Annex 5: Terms of Reference of the Zambézia MSLF

Termos de Referência da Plataforma de Desenvolvimento Integrado da Zambézia

Contextualização

1 - A recente abordagem sobre o desenvolvimento mostra tendências cada vez maior de se avançar para uma intervenção integrada com envolvimento de todos sectores para dar resposta aos desafios permanentes de uso dos recursos naturais e governação sustentável.

2 - As abordagens sectoriais, na maioria dos casos não tomam a devida atenção às perspectivas de desenvolvimento das partes interessadas, da ligação e interação dos factores biofísicos e a promoção das interações institucionais e dos sistemas produtivos críticos para geração e sustentabilidade de benefícios dos vários actores da sociedade.

3 - Na Província da Zambézia, existem varias iniciativas de gestão de recursos naturais que inclui o sector especifico de agricultura e florestas que beneficiarão ao governo as comunidades, sector privado, academias e a sociedade civil, cuja abordagem se encerrem em modelos de interação comum dos sectores abrangidos. Exemplos disto destacam-se os projectos, Redução de Emissões Por Desmatamento e degradação Florestal (REDD+), Projecto de Biodiversidade e Desenvolvimento das Áreas de Conservação (MozBio), Projecto de Gestão Integrada da Agricultura e Recursos Naturais (PGIARN), Programa de Investimento Florestal (FIP) e Mecanismo Dedicado as Comunidades Locais (DGM), sob tutela do Ministério de Terra, Ambiente e Desenvolvimento Rural (MITADER) financiados pelo Banco Mundial entre outros projectos em curso e em carteira.

4 - Os presentes Termos de Referência definem as linhas gerais e as condições que orientam as actividades da Plataforma no âmbito do seu funcionamento e articulação entre os seus membros, parceiros de cooperação e os demais interessados no processo de desenvolvimento da província da Zambézia.

Abordagem

5 - A Plataforma tem uma abordagem mais ampla da gestão de recursos naturais e desenvolvimento sustentável seguindo um modelo multissectorial.

6 - A Plataforma não vem substituir as várias redes temáticas e Fóruns da sociedade civil e outros existentes na Província, mas sim fortalece-las e criar sinergias de diálogo e partilha de informações e conhecimento no contexto multissectorial com forte ligação com

a) Os decisores governamentais;
b) O sector privado;
c) A sociedade civil;
d) As comunidades;
e) As academias e os institutos de ensino técnico;
f) Os parceiros nacionais e internacionais.

7 - Reconhecendo essa abordagem transversal, a Plataforma dedica-se, de uma maneira geral, a promoção e difusão dos conhecimentos locais, os quais são representados pelas comunidades como actores de referência, como base para o desenvolvimento integrado sustentável da Província.

Objectivos

8 - A Plataforma de Desenvolvimento Integrado da Zambézia (designada Plataforma) tem como objectivos:

a) A promoção de diálogo;
b) A partilha e disseminação de informação entre as partes interessadas e intervenientes no desenvolvimento, particularmente sobre políticas sectoriais, uso de terra e outros recursos naturais;
c) A conservação e protecção ambiental;
d) A governação participativa;
e) O desenvolvimento de pesquisas relacionadas com o desenvolvimento integrado e sustentável.

Estruturação da Plataforma

9 - Para operacionalizar o funcionamento interno da Plataforma, é instituída a seguinte composição:

a) Sessão Plenária
b) Grupo de coordenação
c) Grupos temáticos

Designação da Estrutura

10 - **Sessão Plenária** – é um momento de interatividade entre os diferentes participantes, desde o nível provincial até ao nível das estruturas locais, que se reúne 2 vezes por cada ano.

11 - **Grupo de Coordenação** – é um órgão de coordenação constituído por 17 (dezassete) membros, representando organizações da sociedade civil, o sector público e privado, comunidades, academias e coordenadores de projectos estratégicos e de organizações de referência.

12 - **Grupos Temáticos** – é o órgão de implementação composto por instituições especializadas em áreas temáticas que reúnam perfil para tal feito e aprovadas pelo Grupo de Coordenação.

13 - Organizações de refência, nomeadamente o FONGZA e o CEP, estão ligadas aos órgãos da Plataforma como membros observadores, referindo-se ao Memorando de entendimento assinado no dia 12 de Agosto de 2016 entre a Comissão Instaladora da Plataforma e os Fóruns das ONGs da Zambézia, o sector privado e as academias.

Mandato

14 - A Plataforma tem um período indeterminado.

15 - A Sessão Plenária reúne-se 2 vezes ao ano e discute temas de interesse público através de debates e troca de experiencias.

16 - O mandato da presidência e do Grupo de Coordenação é de 2 anos e meio, renovável uma única vez.

17 - O mandato dos Grupos Temáticos é ilimitado dependendo de empenho, responsabilidade e dinamismo.

18 - Ao longo do processo, lições e boas práticas serão adquiridas, partilhadas e incorporadas para o melhoramento do seu funcionamento e dos presentes termos de referência.

Funcionamento dos Órgãos

Sessão Plenária

19 - Sessão Plenária reúne ordinariamente duas vezes por ano. E extra-ordináriamente sempre que for necessário por convocação do presidente da plataforma ou por iniciativa de 2/3 dos seus membros.

20 - As Sessões Planárias são dirigidas pelo presidente coadjuvado pelo vice-presidente e secretário, referido no número 0, artigos 25 - e 26 -.

21 - Competências da Sessão Plenária:

a) Discutir e debater temas de interesse Nacional e da Província em particular
b) Promover troca de experiências e boas práticas
c) Eleger os membros do Grupo de Coordenação
d) Garantir a representação e participação das comunidades e suas lideranças nos processos de consulta e tomada de decisão no desenvolvimento da Província

Grupo de Coordenação

22 - O Grupo de Coordenação, reúne-se trimestralmente em sessões ordinárias e extraordinariamente sempre que for necessário por convocação do presidente da plataforma ou por iniciativa de 2/3 dos seus membros.

23 - O grupo de coordenação é composto por 17 (dezassete) membros, de entre eles, um presidente, um vice presidente, um secretariado e 14 (quatorze) vogais aprovados pela Sessão Plenária.

24 - Competências do Grupo de Coordenação:

a) Representar a Plataforma
b) Apreciar e aprovar o plano de actividades e orçamento anual
c) Coordenar as actividades da Plataforma nos espaços entre as sessões plenárias
d) Apreciar e aprovar o relatório de actividades e o de contas
e) Ratificar a composição e o funcionamento dos grupos temáticos
f) Eleger o presidente, o vice-presidente e o secretariado da Plataforma
g) Garantir a divulgação e partilha de informação e estudos realizados
h) Garantir a implementação do plano de actividades da Plataforma

i) Assegurar a prestação de contas
j) Mobilizar parcerias
k) Recomendar estudos e pesquisas em área atinentes
l) Propor a celebração de contratos de prestação de serviços a Plataforma
m) Convocar Sessões Plenárias ordinárias e extraordinárias sempre que necessário ou a pedido dos membros
n) Manter encontros regulares com os grupos temáticos

25 - Para a operacinalização das tarefas do Grupo de Coordenação é estabelecido um secretário dedicado a gestão da plataforma nos domínios administrativos, financeiros e patrimoniais. O secretariado é eleito entre os membros dos grupo de Coordenação

26 - O secretário funciona na instituição eleita para o efeito, recebendo todo o apoio logístico da máquina administrativa da instituição hospedeira. Para garantir a execução interna das actividades do secretariado, é contratado um(a) profissional a tempo inteiro.

Grupos Temáticos

27 - Os Grupos Temáticos são constituídos por instituições que trabalham nas áreas da Agricultura sustentável, Gestão Florestal, Admnistração e Gestão de Terras, Energia e Biomassa, Género e diversidade, Recursos Hídricos e Minerais, Governança e Mudanças Climáticas, Áreas de conservação. Havendo necessidade, serem alargadas.

28 - Os Grupos Temáticos são liderados por organizações, instituições, redes de referência que trabalham nas áreas afins. Partilham os resultados dos debates em Sessão Plenária, garantem assim uma abordagem integrada do desenvolvimento especifico da área junto dos seus actores principais.

29 - Competências dos Grupos Temáticos:

a) Disseminar no seio das suas instituições e membros as deliberações da Sessão Plenária e as recomendações do Grupo de Coordenação
b) Desenvolver actividades especificas no âmbito da sua área temática
c) Organizar debates, estudos, pesquisas sobre temas de interesse da plataforma
d) Promover a ligação entre a plataforma e as comunidades locais/beneficiários
e) Promover e facilitar a partilha de informação entre os membros da Plataforma
f) Apreciar e aprovar o relatório de actividades e o de contas
g) Ratificar os tratados de cooperação e de parceria estabelecidas pelo grupo de coordenação

Eleição dos Órgãos

30 - A eleição dos Órgãos refere-se a Presidência, Vice-présidência e Secretário da Plataforma.

31 - A eleição da Presidência, Vice-présidência e Secretário da Plataforma compreende:

a) Representatividade
b) Competência
c) Reconhecimento

d) Profissionalismo
e) Consenso

32 - O membro a ser eleito deve estar representando numa organização da sociedade civil, o sector público ou privado, academias e coordenadores de projectos estratégicos e de organizações de referência ligados aos Grupos Temáticos referidos no número 0 e a operarem na Província de Zambézia, sendo a sua organização a propor a sua candidatura.

33 - A organização, instituição, rede ou fórum a candidatar-se deve ter uma competência sobre a área que leve ao reconhecimento da sua participação e intervenção na agricultura sustentável e gestão de recursos naturais com profissionalismo em prol de desenvolvimento da Província.

Sessão Plenária

34 - Os membros participantes a Sessão Plenária são aprovados pelo Grupo de Coordenação segunda as propostas voluntárias das organizações, instituições, rede o fórum relevantes.

Grupo de Coordenação

35 - A composição do Grupo de Coordenação é proposta em Sessão Plenária e submitida a aprovação das organizações participantes. O seu mandato é de 2 anos e meio, renovável uma única vez.

Presidência, Vice-presidência e secretário da Plataforma

36 - O presidente, vice-presidente e secretário da Plataforma são eleitos entre os 17 (dezassete) membros do Grupo de Coordenação, seguindo as candidaturas respectivas. A eleição do presidente, vice-presidente e secretariado é feita durante uma reunião eleitoral ordinária do Grupo de Coordenação num espaço de tempo de 2 anos e meio com agenda específica para o efeito, podendo ser convocada com antecipação se as condições assim o exigirem.

Grupos Temáticos

37 - A composição dos Grupos Temáticos é aprovada pelo Grupo de Coordenação segunda as propostas voluntárias emitidas pelas organizações membros da Plataforma.

Actividades Gerais da Plataforma

a) Organizar debates sobre temas relevantes ao desenvolvimento da Província
b) Identificar áreas/temas de pesquisas que contribuem para o desenvolvimento da Província
c) Partilhar e disseminar de informação e resultados de estudos
d) Facilitar a ligação fluente entre os membros da Plataforma com os Fóruns da sociedade civil , as instituições do governo, sector privado e parceiros
e) Promover a valorização e integração das comunidades locais e suas lideranças no processo de desenvolvimento
f) Fortalecer o papel interventivo da Plataforma, do Fóruns da sociedade civil, Redes Temáticas e Plataformas Distritais da sociedade civil

g) Promover praticas sustentáveis de gestão integrada dos recursos naturais
h) Promover e participar em trabalhos de estudos e pesquisas
i) Desenvolver campanhas de sensibilização, consciencialização e educação ambiental das comunidades locais no uso sustentável dos recursos naturais
j) Incentivar práticas sustentáveis de agricultura, uso de terra e mineração
k) Incentivar o maneio de florestas (plantações, produtos nao madeireiros e energia de biomassa)
l) Promover intercâmbios e trocas de experiências ao nível local, nacional, regional e internacional

Representação e Tomada de Decisões

38 - A presidência da Plataforma lidera o Grupo de Coordenação e representa a Plataforma ao nível interno e externo.

39 - O Grupo de Coordenação supervisa as actividades dos Grupos Temáticos e trabalha para manter e melhorar a democracia participativa, transparência partilhada e clareza na tomada de decisões ao nível da Plataforma.

40 - A tomada de decisões para o funcionamento da Plataforma será feita pela Sessão Plenária, órgão máximo da Plataforma, e nas sessões do Grupo de Coordenação e dos Grupos Temáticos.

41 - Quaisquer conflitos ou fortes divergências de opinião do Grupo de Coordenação e dos Grupos Temáticos serão submetidos à votação por um quórum mínimo de 2/3 dos membros. As opiniões que não constem do acordo podem ser levadas a Sessão Extraordinária num período de espaço mínimo de 30 dias considerável.

42 - As decisões são tomadas pelos representantes das organizações ou seus mandatários devidamente autorizados, membros do Fórum, do Grupo de Coordenação e Grupos Temáticos.

Dissolução da Plataforma

43 - A sua dissolução será aprovada pela Sessõ Plenária convocada para o efeito

Outros Aspectos Relevantes

44 - Quaisquer aspectos relevantes não cobertos nestes TdR serão descritos na base do regulamentos interno da Plataforma. Em caso de conflitos, uma terceira entidade será chamada a arbitrar.

45 - Em casos de força maior, serão aplicados os mecanismos de arbitragem de acordo com a legislação Moçambicana.

Aprovado pela Sessão Constituinte

Quelimane, no dia 5 de Abril de 2017

Annex 6: Thematic groups of the Zambezia MSLF

REPÚBLICA DE MOÇAMBIQUE

Governo da Província da Zambézia

Direcção Provincial da Terra, Ambiente e Desenvolvimento Rural

PLATAFORMA DE DESENVOLVIMENTO INTEGRADO DA ZAMBÉZIA

Proposta de lista dos membros do Grupo de Coordenação

Data: 06/04/2017 Local: sala de conferências da Direcção Provincial de Econômia e Finanças, Cidade de Quelimane

#	Instituição	Seguimento	Observações
1	RADEZA	Sociedade civil	Presidência
2	Industria e Construções Sotomane, Lda	Sector privado	Vice-presidência
3	REDD+	Governo	Secretario
4	UniZambeze	Academia	

5	DGM	Comunidade	
6	Líder Comunitário	Comunidade	
7	Unidade de Maneio Comunitário	Governo	
8	Sustenta	Governo	
9	SPER (Serviço Provincial de Extensão Rural)	Governo	
10	AMAZA	Sector privado	
11	APAMAZ	Sector privado	
12	ITC	Sociedade civil	
13	ORAM	Sociedade civil	
14	ADRA	Sociedade civil	
15	PRODEA	Sociedade civil	
16	CECOHAS	Sociedade civil	
17	MMMR (Movimento Moçambicano de Mulheres Rurais)	Sociedade civil	

Annex 7 - Terms of Reference for the creation of the National Steering Committee (NSC) for MozFIP

Contexto

O Programa de Investimento Florestal (**FIP**) foi criado no âmbito dos Fundos de Investimento Climático (CIF), para apoiar os esforços de REDD+ dos países em desenvolvimento. O FIP visa ***catalisar políticas, acções e mobilizar fundos para facilitar a implementação das actividades para a redução do desmatamento e da degradação florestal, e promover a melhoria da gestão sustentável das florestas, contribuindo para a redução de emissões e a protecção das reservas de carbono florestal.*** Em Março de 2015, Moçambique confirmou seu interesse em participar do Programa de Investimento Florestal (FIP), através da apresentação de uma manifestação de interesse, que foi aprovado em Maio de 2016.

O Governo de Moçambique coordenou a preparação do Programa de Investimento Florestal (**FIP**) no país através do Ministério da Terra, Ambiente e Desenvolvimento Rural (MITADER), para o qual o processo foi liderado pela Unidade Técnica de Redução de Emissões de Desmatamento e Degradação Florestal (UT-REDD+).

Como parte do MozFIP, o Governo de Moçambique vai receber **US$ 47 milhões**, bem como um adicional US$ 4.5 Milhões no âmbito do Mecanismo de Doação Dedicado a comunidades locais (DGM).

Em Novembro de 2016 Moçambique aprovou a sua **Estratégia Nacional de REDD+,** e o Governo assumiu que o processo do FIP esteja integrado com os processos e planos existentes sob o REDD+. A maior parte dos esforços realizados para estratégia nacional REDD+, como estudos sobre causas do desmatamento, arranjos institucionais, Definição de florestas, consultas, enquadramentos e regimes de salvaguardas e partilha de benefícios, sistemas de monitoramento, foram portanto utilizados para a criação do Plano de Investimento Florestal.

Desta forma **o Governo pretende usar o FIP para**:

- Apoiar os esforços de REDD+, fornecendo financiamento imediato para reformas e investimentos públicos e privados identificados através do processo nacional do REDD+;
- Se esforçar para maximizar os benefícios do desenvolvimento sustentável, incluindo a conservação da biodiversidade, a protecção dos direitos das comunidades locais, redução da pobreza e melhorias de meios de subsistência rurais;

- O FIP financiará os esforços para resolver as causas do desmatamento e da degradação florestal e para superar os obstáculos que têm dificultado os esforços anteriores.

A orientação do Plano de Investimento utilizou os seguintes critérios do FIP para examinar as estratégias, programas e projectos de investimento, bem como para priorizar programas e projectos pilotos na perpectiva do REDD+, com vista a maximizar o impacto transformacional dos recursos do FIP: 1) *Potencial de mitigação de mudança de clima 2) Potencial de demonstração à escala 3) Relação custo-eficácia 4) Potencial de implementação 5) Integração do desenvolvimento sustentável (co-benefícios) e 6) Salvaguardas ambientais e sociais.*

O objectivo do FIP é melhorar as práticas e gestão de terras e florestas em paisagens específicas em Moçambique. Para alcançar este objectivo, o FIP actuará em duas componentes:

i. Promoção da Gestão Integrada de Paisagens;
ii. Fortalecimento das Condições para a Gestão Florestal Sustentável.,

Deste modo, este projecto inicialmente trabalhará em em 9 distritos na província da Zambézia ((Mocuba, Ile, Gilé, Mocubela, Mulevala, Gurúe, Alto Molócue, Maganja da Costa e Pebane) e em 7 distritos da Província de Cabo Delgado (Ibo, Macomia, Meluco, Quissanga, Ancuabe, Metuge, Montepuez).

Neste contexto a FNDS está a conduzir um processo para o estabelecimento do Comité Nacional de Gestão (**CNG-FIP**) que é a entidade que irá assessorar o MITADER na fase de elaboração assim como na fase de implementação do MozFIP no país.

Objectivo do Comité Nacional de Gestão

O CNG é uma comissão de coordenação transectorial a nível nacional, constituída pelas diferentes entidades interessadas, governamentais e não governamentais.

Tem como objectivo principal apoiar/assessorar o MITADER na planificação, gestão implementação, e monitoramento da implementação do FIP.

Os presentes Termos de Referência tem como objectivo definir as linhas de orientação do funcionamento do CNG-FIP em Moçambique.

Tarefas

As tarefas específicas para o CNG-FIP incluem:

Na fase de elaboração do Plano de Investimento Florestal:

- Assessorar o FNDS (MITADER) na priorização das actividades nas áreas geográficas de implementação do FIP em Moçambique;

- Assessorar o FNDS (MITADER) na definição das modalidades de implementação do FIP;
- Apoiar o FNDS (MITADER) na articulação e coordenação com os vários intervenientes do FIP.
- Assegurar que as actividades propostas do FIP estejam de acordo com as estratégias e programas do país;
- Harmonizar as actividades propostas com os diferentes sectores económicos e sociais bem como dos seus diferentes sectores, nomeadamente, governo, sociedade civil, sector privado e comunidades locais. (para retirar ou juntar com a priorização)

Na fase de implementação do Projecto de Investimento Florestal (FIP):

- Acompanhamento e aconselhamento na implementação das actividades do MozFIP e eventuais serviços contratados para a execução;
- Apoiar na identificação das necessidades de serviços
- Apreciar os Planos e os relatórios periódicos e anuais do FIP;
- Acompanhar a o processo de resolução de conflitos que envolvem os diversos intervenientes na implementação do MozFIP,
- Recomendar mecanismos de funcionamento do MozFIP com diferentes intervenientes.

Duração

O CNG-FIP terá a duração de vigência do FIP .

Periocidade de Encontros

O CNG-FIP encontrar-se-á trimestralmente na fase de preparação de FIP, e semestralmente durante a fase de implementação para acompanhamento e monitoria, no entanto poderá haver encontros extraordinários quando se justificar

Pontualmente poderão ser convidados apresentações técnicas de assuntos relevantes a MozFIP.

Orçamento

O Comité deverá ter um orçamento para o seu funcionamento e actividades de monitoria acordadas em reuniões do Comité

Composição

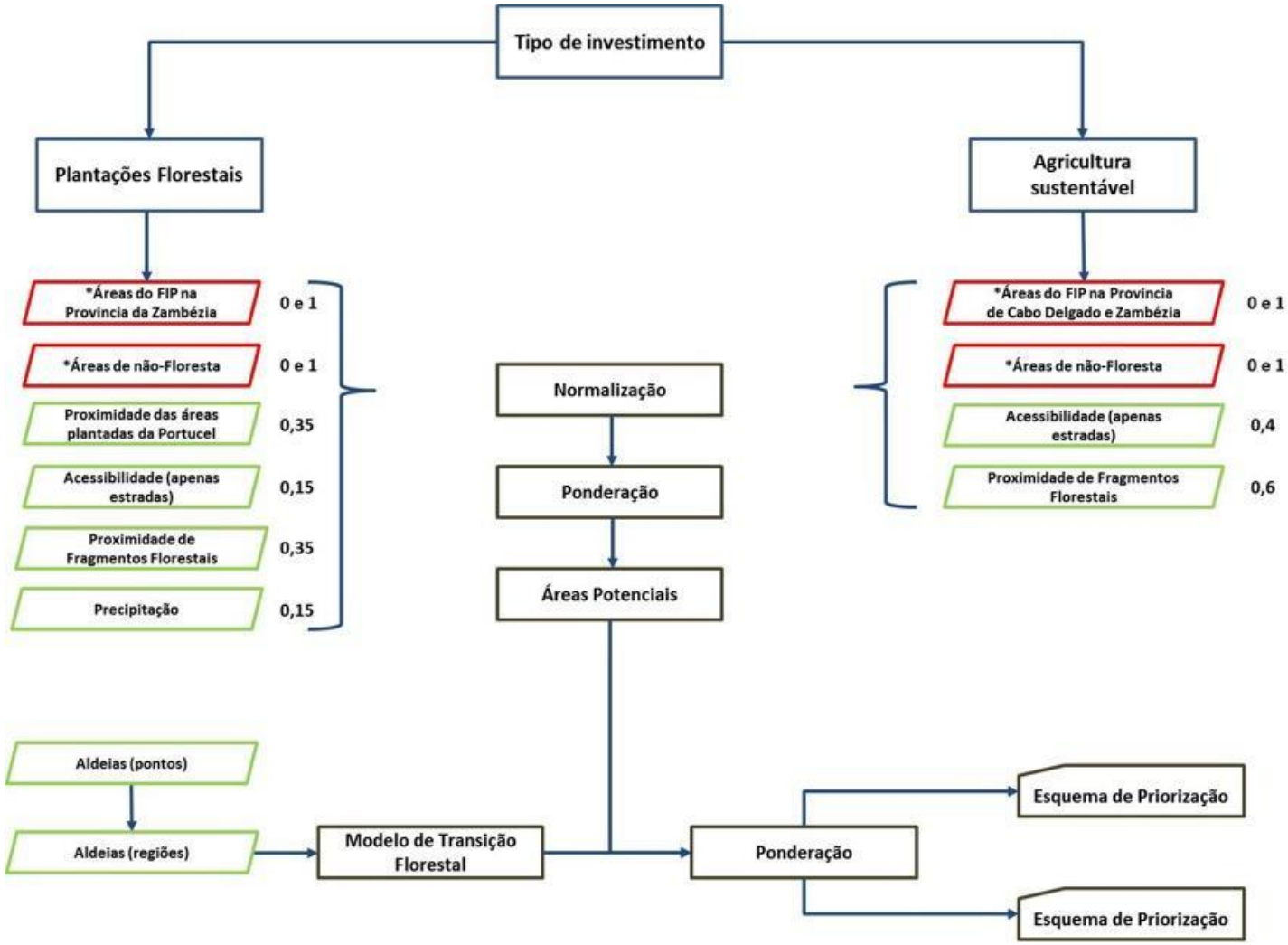
A composição proposta do CNG é o seguinte:

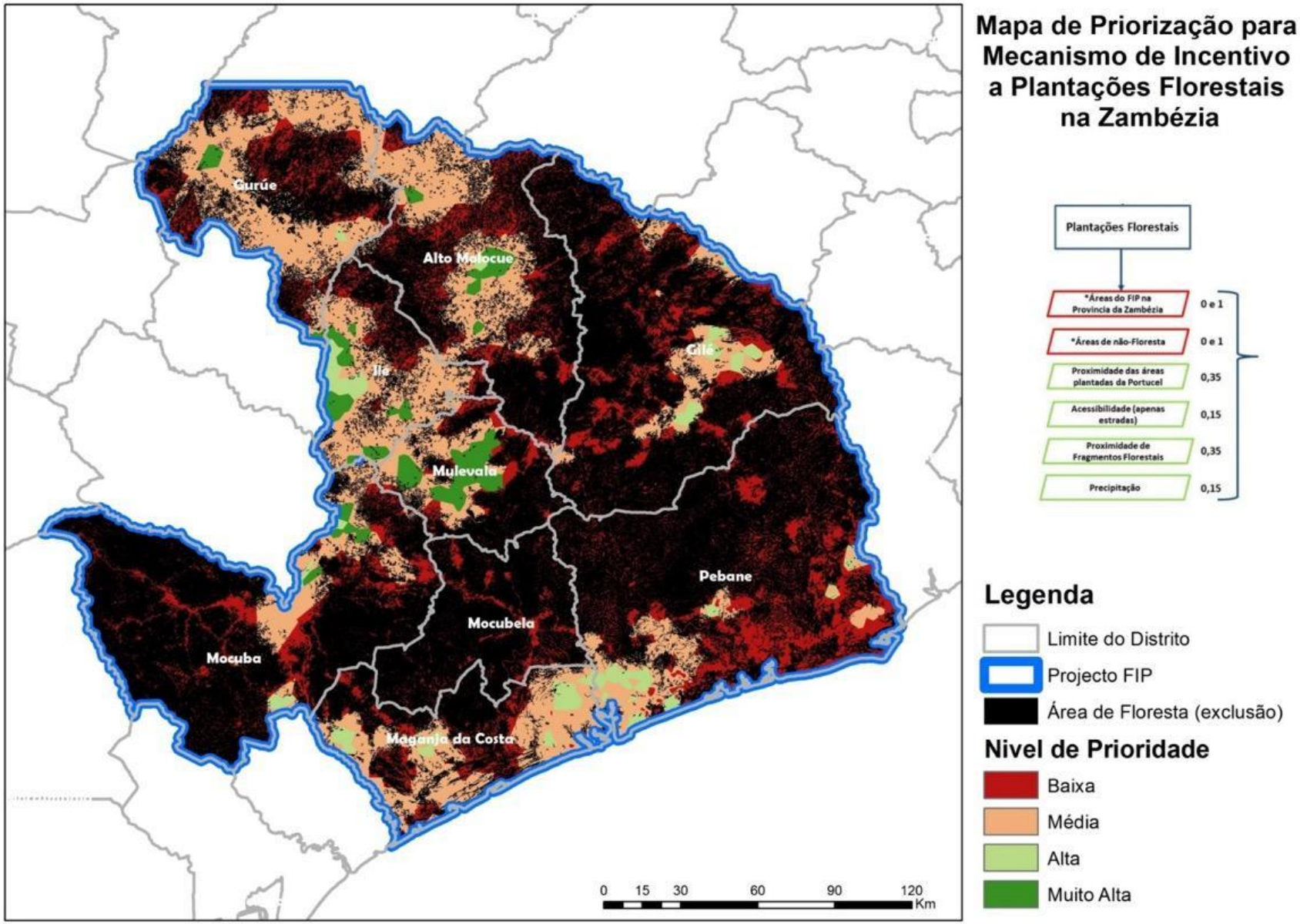
1 Representante da DINAF
1 Representante da AQUA
2 Representantes do Sector Privado – AMOMA, Portucel?
2 Representantes das ONG (CTV, IUCN, WWF?)
1 Representante da UEM

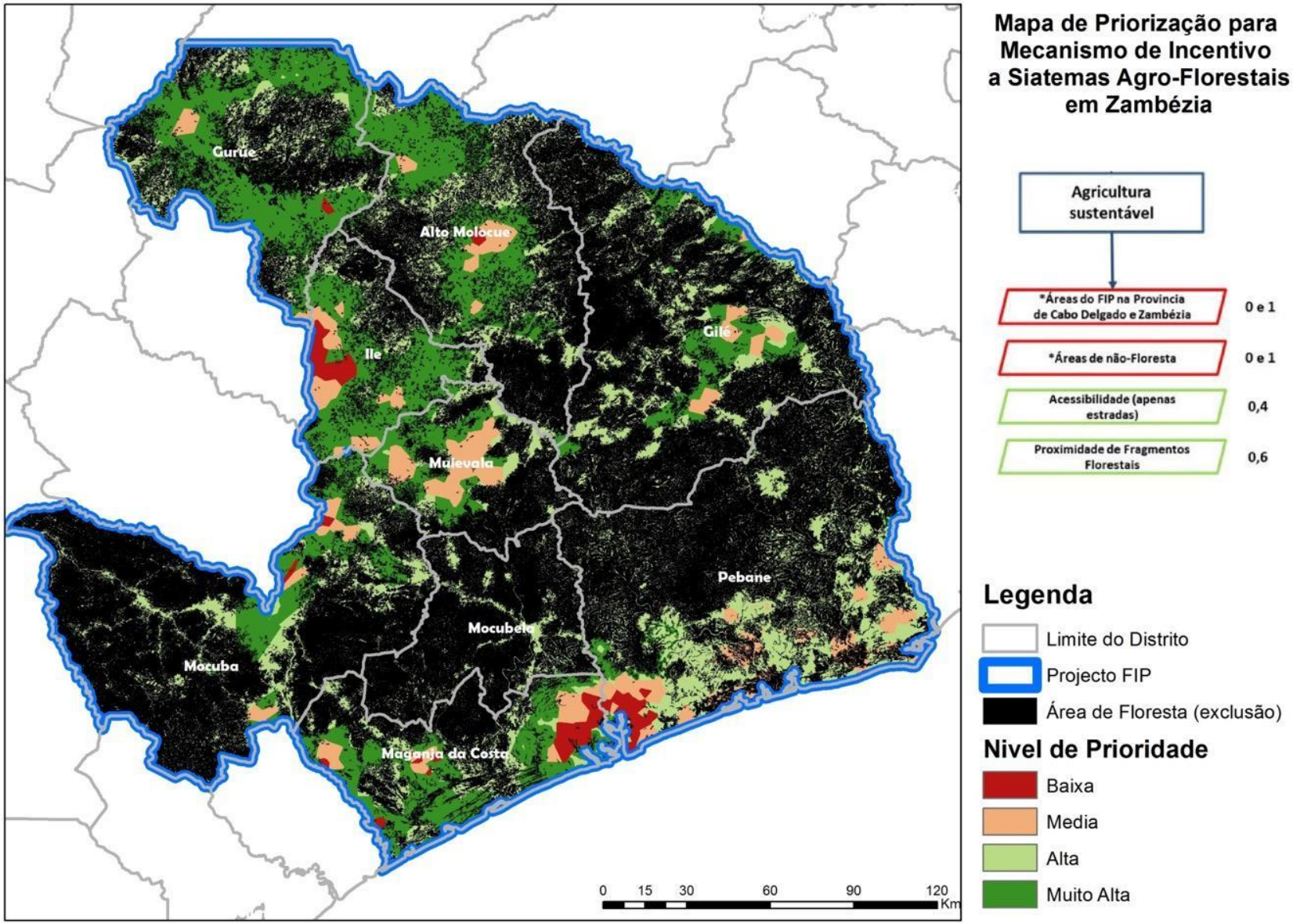
2 Representantes do MASA (DNEA - Extensão, DINAS)
1 Representante do IIAM
1 Representante do Ministério dos Recursos Minerais e Energia
1 Representante da PRM (PPPNMA)
1 Representante do Banco Mundial
1 Representante do IFC
1 Representante dos Doadores
1 Representante do Steering Committee do DGM
1 Representante da FNDS - que deverá Secretariar o Comité

O Comité seria presidido pelo FNDS.

Annex 8: Geographic prioritization of forest plantation and agro-forestry areas for MozFIP


Tipo de investimento
Plantações Florestais
Agricultura sustentável
*Áreas do FIP na Provincia da Zambézia
0 e 1
*Áreas de não-Floresta
0 e 1
Proximidade das áreas plantadas da Portucel
0,35
Acessibilidade (apenas estradas)
0,15
Proximidade de Fragmentos Florestais
0,35
Precipitação
0,15
*Áreas do FIP na Provincia de Cabo Delgado e Zambézia
0 e 1
*Áreas de não-Floresta
0 e 1
Acessibilidade (apenas estradas)
0,4
Proximidade de Fragmentos Florestais
0,6
Normalização
Ponderação
Áreas Potenciais
Aldeias (pontos)
Aldeias (regiões)
Modelo de Transição Florestal
Ponderação
Esquema de Priorização
Esquema de Priorização


Mapa de Priorização para Mecanismo de Incentivo a Plantações Florestais na Zambézia
Plantações Florestais
*Áreas do FIP na Provincia da Zambézia
0 e 1
*Áreas de não-Floresta
0 e 1
Proximidade das áreas plantadas da Portucel
0,35
Acessibilidade (apenas estradas)
0,15
Proximidade de Fragmentos Florestais
0,35
Precipitação
0,15
Legenda
Limite do Distrito
Projecto FIP
Área de Floresta (exclusão)
Nivel de Prioridade
Baixa
Média
Alta
Muito Alta
Gurúe
Alto Molocue
Ile
Gilé
Mulevala
Pebane
Mocubela
Mocuba
Maganja da Costa
0 15 30 60 90 120
Km


Mapa de Priorização para Mecanismo de Incentivo a Siatemas Agro-Florestais em Zambézia
Agricultura sustentável
*Áreas do FIP na Provincia de Cabo Delgado e Zambézia
0 e 1
*Áreas de não-Floresta
0 e 1
Acessibilidade (apenas estradas)
0,4
Proximidade de Fragmentos Florestais
0,6
Legenda
Limite do Distrito
Projecto FIP
Área de Floresta (exclusão)
Nivel de Prioridade
Baixa
Media
Alta
Muito Alta
Gurue
Alto Molocue
Ile
Gilé
Mulevala
Pebane
Mocubela
Mocuba
Maganja da Costa
0 15 30 60 90 120
Km

Annex 9 - Characteristics of the Web portal for MRV REDD+ in Mozambique

- The application is based on a multi-tier architecture, based largely on modular software components running on the application server:

- Presentation layer (top tier, client tier) that provides services to end-user, in particular everything related to user interface, which may be web based or stand-alone. It can be seen as the client-side in client-server architectures modules. Multiple clients (they are supported by browsers) may be running concurrently at a given time.
- Logic Business layer (middle tier, process management tier), which handles the received requests from clients (browsers) for processes execution. It's the heart of the system. It supports the server-side software applications run on, that are the core of the system. Server applications include the web server, which acts as a proxy redirecting requests to application server.
- Data layer (computation tier) is composed by the data structures as databases (POSTGRESQL+POSTGIS), file store systems, dissemination data repositories, etc. This layer collects and deals with the business data such as services data, order requests information and monitoring of the information. The COTS used are PostGreSQL + PostGIS, Googlemaps API, Spring, Tomcat, Liferay.
  - It is based on the use of JSR168 specification, commonly named as portlets. The use of this specification provides several advantages: maintenance, upgrade and reuse. Logical modules and components can be separated physically as different and independent software applications although the behavior for users is totally transparent and appears as a whole system interconnected. This physical separation implies several advantages for the tool:
    - Modular design of subcomponents, providing supervision information in structured way;
    - Easiness to package, maintain and upgrade each of the modules without needing to stop or to abort the other modules implementing functionalities for the system;
    - Updating Portlets in a separate file on a live system does not impact the rest of the system.
    - Facilitates scalability and extensibility.
  - User web interface is adapted and customized according to the specific SIS indicators and users (Multiple user configurations). Pure HTML and JavaScript is used (to avoid compatibility issues with different browsers). No additional plugins are envisaged. For applications that must run in multiple OS, the current standard is Java. Interfaces for tablet/mobile devices are simplified agreed according to the results of the pilot testing of the PMRV system in Mozambique in 15 districts of the Cabo Delgado and Zambezia provinces during the 2018.

Annex 10 - Grievance form example for the FGRM

PROJECTO ________________

REGISTO DE DIÁLOGO E RECLAMAÇÕES

<table>
<tr><th colspan="2">FORMULARIO</th></tr>
<tr><td colspan="2">Nome:</td></tr>
<tr><td>Nº de Telefone:

Outro meio de contacto:</td><td>Sexo: ☐ M ☐ F

Idade:</td></tr>
<tr><td>Comunidade:</td><td>Posto Administrativo:</td></tr>
<tr><td>Distrito:</td><td>Província:</td></tr>
<tr><td colspan="2">Data de recebimento: ________/________/_____

Projecto: ☐ MozBio ☐ MozFIP ☐ DGM ☐ SUSTENTA

Resumo do Conteúdo:
____
____
____
_______________</td></tr>
</table>

- -

Mecanismos de Diálogo e Reclamações (FNDS)

Nome _

Data_ _ /_ _ /_ _

Assinatura Reclamante Assinatura Receptor

Assinatura do Reclamante Assinatura do Receptor

- -

Annex 11 – Summmary of main actors involved in the ER Program FGMR and responsibilities

Table 86: Players' responsibility in FGRM according to steps and levels in the process

Step	Level	Players	Action/responsibility
Step 1 *Gathering complaints*	Local, provincial, national	Any person or group of people who have a relationship with the ER Program or is affected by its activities (communities, service providers, NGOs, local governments, etc.)	- Send complaints through chosen channel: green line, email, specific forms, community meetings, in person, etc. - (*Possible use of the advisory fund for highly vulnerable claimants*).
	Provincial	PIU Safeguard team	- Gather suggestions and complaints addressed through specific forms, during community meetings or in person by complainant; - ***Continue to step 2***.
	National	FNDS Safeguard team	- Gather suggestions and complaints sent by emails or received through the green line; - Answer to claimants with a text message or an email for them to be able to follow up the complaint at local level; - ***Continue to step 2.***
Step 2 *Registering and categorizing complaints*	Provincial	PIU Safeguard team	- Categorize the suggestions and complaints addressed through specific form, during community meetings or in person: ○ Un-relevant suggestions and complaints; ○ Suggestions and complaints concerning Zambézia projects; ○ Suggestions and complaints concerning the MozDGM project;

		○ Suggestions and complaints linked to conservation areas (expect those involved in the MozBio project); ○ Other suggestions and complaints. - Register in the FGRM platform the suggestions and complaints addressed through by specific form, during community meetings or in person, in the right category; - ***Continue to step 3.***
National	FNDS Safeguard team	- Categorize the suggestions and complaints sent by emails and received through the green line: ○ Un-relevant suggestions and complaints; ○ Suggestions and complaints concerning Zambézia projects; ○ Suggestions and complaints concerning the MozDGM project; ○ Suggestions and complaints linked to conservation areas (expect those involved in the MozBio project); ○ Other suggestions and complaints. - Register in the FGRM platform the suggestions complaints sent by emails and received through the green line in the FGRM platform in the right category; - ***Continue to step 3.***

			- For **un-relevant complaints** addressed through specific form, during community meetings or in person: (i) answer to claimant within 5 working days through text messages, letter or in person; (ii) explain the reasons for the invalidity and, if relevant, (iii) suggest other channels of resolution; - For **suggestions and requests for clarification** addressed through specific form, during community meetings or in person: (i) answer to claimant within 10 working days through text messages, letter or in person; (ii) indicate the follow-up actions that should be agreed with applicants and relevant actors of the project, along with respective deadlines; - For **relevant grievances and complaints** addressed through by specific form, during community meetings or in person: o *For grievances and complaints concerning Zambézia projects*: (i) inform the claimant within 5 working through text messages, letter or in person that the case is registered; (ii) ***continue to step 4***; o *For grievances and complaints concerning the MozDGM project*: (i) inform the claimant within 5 working through text messages, letter or in person that the case is registered; (ii) forward to WWF safeguard specialists for them to organize meeting with the parties involved to investigate complaint; and propose a friendly resolution; o *For grievances and complaints linked to conservation areas* (expect those involved in the MozBio project): (i) inform the claimant within 5 working through text messages, letter or in person that the case is registered; (ii) forward to Conservation Areas administration for them to organize meeting with the parties involved to investigate complaint and propose a friendly resolution; o *For other grievances and complaints*: (i) inform the claimant within 5 working through text messages, letter or in person that the case is registered; (ii) forward to relevant institutions for them to organize meeting with the parties involved to investigate complaint and propose a friendly resolution.
Step 3 *Confirming relevance of complaints*	Provincial	PIU Safeguard team	

National	FNDS Safeguard team	- For **un-relevant complaints** sent by emails and received through the green line: (i) answer to claimant within 5 working days through text messages, letter or in person; (ii) explain the reasons for the invalidity and, if relevant, (iii) suggest other channels of resolution; - For **suggestions and requests for clarification** sent by emails and received through the green line: (i) answer to claimant within 10 working days through text messages, letter or in person; (ii) indicate the follow-up actions that should be agreed with applicants and relevant actors of the project, along with respective deadlines; - For **relevant grievances and complaints** sent by emails and received through the green line: o *For grievances and complaints concerning Zambézia projects*: (i) inform the claimant within 5 working through text messages, letter or in person that the case is registered; (ii) ***continue to step 4***; o *For grievances and complaints concerning the MozDGM project*: (i) inform the claimant within 5 working through text messages, letter or in person that the case is registered; (ii) forward to WWF safeguard specialists for them to organize meeting with the parties involved to investigate complaint; and propose a friendly resolution; o *For grievances and complaints linked to conservation areas* (expect those involved in the MozBio project): (i) inform the claimant within 5 working through text messages, letter or in person that the case is registered; (ii) forward to Conservation Areas administration for them to organize meeting with the parties involved to investigate complaint and propose a friendly resolution; o *For other grievances and complaints*: (i) inform the claimant within 5 working through text messages, letter or in person that the case is registered; (ii) forward to relevant institutions for them to organize meeting with the parties involved to investigate complaint and propose a friendly resolution;

Step 4 *Verification, investigation, action of complaints*	Provincial	PIU Safeguard team	For **relevant grievances and complaints** addressed through by specific form, during community meetings or in person and concerning the Zambézia project: - Organize meeting with the claimant and the parties involved to investigate complaint; - Propose a friendly resolution; **(i) If the solution is accepted by claimant**: - Issue report to summarize the case and submit it for signature to claimants and involved parties; - Download report on FGRM web platform; - ***Continue to step 5***. **(ii) If the solution is not accepted by claimant**: - Inform the complainant about the different levels of resolution of the complaints; - ***Forward the case to local level mediator (level 1 of resolution)*** and inform the mediator of the nature of the complaint, the results of the investigations and the proposed solutions and results.
	National	FNDS Safeguard team	For **relevant grievances and complaints** sent by emails and received through the green line and concerning the Zambézia project: - Organize meeting with the claimant and the parties involved to investigate complaint; - Propose a friendly resolution; **(i) If the solution is accepted by claimant**: - Issue report to summarize the case and submit it for signature to claimants and involved parties; - Download report on FGRM web platform; - ***Continue to step 5.*** **(ii) If the solution is not accepted by claimant**: - Inform the complainant about the different levels of resolution of the complaints;

	- ***Forward the case to local level mediator (level 1 of resolution)*** and inform the mediator of the nature of the complaint, the results of the investigations and the proposed solutions and results.

Step 4.1 *Level 1 of conflict resolution*	Local	Community Court	For **disputes arising between individuals or groups of individuals**: - Organize meeting(s) with the claimant and the parties involved to investigate complaint; - Propose another friendly resolution within 15 working days.
		District Service for Economic Activities (SDAE) or District Service for Planning and Infrastructures (SDPI)	For **disputes arising between individuals or groups of individuals or community and service provider, private sector or ER Program staff**: - Organize meeting(s) with the claimant and the parties involved to investigate complaint - Propose another friendly resolution within 15 working days.
		NGO not attached to the ER Program	For **disputes arising between individuals or groups of individuals or the community and governmental institutions**: - Organize meeting(s) with the claimant and the parties involved to investigate complaint - Propose another friendly resolution within 15 working days.
	Provincial	PIU Safeguard team	For **relevant grievances and complaints** addressed through specific form, during community meetings or in person and concerning the Zambézia project **(i) If the solution is accepted by claimant**: - Issue report to summarize the case and submit it for signature to claimants and involved parties; - Download report on FGRM web platform; - ***Continue to step 5.*** **(ii) If the solution is not accepted by claimant**: - Prepare short report explaining the reasons of the refusal and download it onto the FGRM web platform; - ***Forward the case to the FNDS safeguard department (level 2 of resolution)***
	National	FNDS Safeguard team	For **relevant grievances and complaints** sent by emails and received through the green line and concerning the Zambézia project:

	(i) **If the solution is accepted by claimant**: - Issue report to summarize the case and submit it for signature to claimants and involved parties; - Download report on FGRM web platform; - ***Continue to step 5.*** **(ii)** **If the solution is not accepted by claimant**: - Prepare short report explaining the reasons of the refusal and download it onto the FGRM web platform; - Keep the case within the FNDS safeguard department ***(and move to level 2 of resolution).***

Step 4.2 *Level 2 of conflict resolution*	National	FNDS Safeguard team	- Assign the processing of each complaint to a safeguards officer; - Analyze the complaints with possible on site visit to hear the parties involved; - Propose another solution within 20 working days. **(i) If the solution is accepted by claimant**: - Issue report to summarize the case and submit it for signature to claimants and involved parties; - Download report on FGRM web platform. - For relevant grievances and complaints addressed through by specific form, during community meetings or in person, inform the PIU safeguard officer of the result of the process; - ***Continue to step 5.*** **(ii) If the solution is not accepted by claimant**: - Prepare short report explaining the reasons of the refusal and download it onto the FGRM web platform; - Download report on FGRM web platform. - ***Forward the case to the independent mediator (and move to level 3 of resolution)***
Step 4.3 *Level 3 of conflict resolution*	National	Independent mediator	- Analyze the case with possible call to the parties involved for a meeting or request of additional documentation or investigations; - Propose another solution within 20 working days.
		FNDS Safeguard team	**(i) If the solution is accepted by claimant**: - Issue report to summarize the case and submit it for signature to claimants and involved parties; - Download report on FGRM web platform; - For relevant grievances and complaints addressed through by specific form, during community meetings or in person, inform the PIU safeguard officer of the result of the process;

			- ***Continue to step 5.*** **(ii) If the solution is not accepted by claimant**: - Prepare short report explaining the reasons of the refusal; - Download it onto the FGRM web platform ; - For relevant grievances and complaints addressed through by specific form, during community meetings or in person, inform the PIU safeguard officer of the result of the process; - Inform the complainant of his rights and the means of appeal against the mediator's decision in court.
Step 5 *Implementation of agreed actions*	Provincial	PIU Safeguard team	For **relevant grievances and complaints** addressed through specific form, during community meetings or in person and solved: - Take the necessary actions to implement the agreements reached within 15 working days after the signature of the agreement; - Communicate the solution through various channels, including local radios, internet, and the use of the Zambézia MSLF.
	National	FNDS Safeguard team	For **relevant grievances and complaints** sent by emails and received through the green line and and solved: - Take the necessary actions to implement the agreements reached within 15 working days after the signature of the agreement; - Communicate the solution through various channels, including local radios, internet, and the use of the Zambézia MSLF.
Step 6 *Monitoring and Evaluation*	National	FNDS Safeguard team	- Monitoring of: (i) number of complaints registered; (ii) percentage of complaints answered within the deadlines; (iii) percentage of complaints resolved at each level / step; (iv) level of community and users satisfaction regarding the FGRM (perception survey); - Dissemination of monitoring results through the use of brochures, community radio messages and meetings with communities, etc.

Annex 12 – Most updated list of allometric equations to calculate AGB for the NFI

It should be reminded that, at this stage, discussions are still on-going for the final selection of the allometric equations to be used (November 30th, 2017). Here is a summary of current discussions:

- For semi-deciduous forest including miombo, for above-ground biomass and below-ground biomass, the equation of Mugasha et al. (2013) developed for miombo forests of Tanzania may be used – *see tables below*;
- For mopane forests, for above and below ground biomass, the equations developed by JICA may be used - *see tables below;*
- For the mecrusse forests, for below and above ground biomass, the equations developed by Magalhães et al. (2015) and Magellan (2015) may be used - *see tables below;*
- For species occurring in the mopane stratum and distinct from *Colophospermum mopane species*, the IPCC equation (2003) may be used to estimate the above-ground biomass, and for below-ground biomass the root-to-shoot ratio developed by Singh et al. 1999 may be used - *see tables below;*
- For species that occur in the mecrusse and distinct from the *Androstachys johnsonii* species, the IPCC equation (2003) may be used for estimating above-ground biomass; for below-ground biomass the root-to-shoot ratio developed by Singh et al. 1999 may be used - *see tables below;*
- For the *umbila*, *chanfuta* and *jambirre* species, the equations developed by Mate et al. (2014) for estimating above-ground biomass may be used; for below-ground biomass, the equation developed by Mugasha et al. (2013) may be used - *see tables below.*

Biomass allometric equations by stratum

#	Stratum	Equation for AGB	Equation for BGB	R/S ratio
1	Semi-deciduous forest (includ. Miombo)	Y=0.0763*d^2.2046*h^0.4918 Mugasha et al. (2013)	Y=0.1766*d^1.7844*h^0.3434 Mugasha et al. (2013)	
2	Mopane	For Mopane species: Y = 0.03325 * d ^ 1.848 * h ^ 1.241 JICA (2017) For non-Mopane species: Y = exp(-2.289+2.649*ln(d)-0.021*(ln(d))^2) (IPCC 2003)	For Mopane species: Y = 0.09572 * d ^ 1.7969 * h ^ 0.3797 JICA (2017)	For non-Mopane species: 0.28 Singh et al. 1999
3	Mecrusse	For Mecrusse species Y=1.1544 + 0.0398*d^2*h Magalhães (2015) For non- Mecrusse species Y = exp(-2.289+2.649*ln(d)-0.021*(ln(d))^2) IPCC(2003)	For Mecrusse species Y=0.0185*d^2.1990*h^0.4699 Magalhães (2015)	For non-Mecrusse species: 0.28 Singh et al. 1999
4	Semi-evergreen forest (incl. gallery forest)	Y = exp(-2.289+2.649*ln(d)-0.021*(ln(d))^2) IPCC(2003)		0.28 Singh et al. 1999

Biomass allometric equations by species

#		Equation for AGB	Author	Equation for BGB	Author
1	Chanfuta	Y = 3.1256*d^1.5833	Mate et al. (2014)	Y=0.1766*d^1.7844*h^0.3434	Mugasha et al. (2013)
2	Jambirre	Y = 5.7332*d^1.4567	Mate et al. (2014)	Y=0.1766*d^1.7844*h^0.3434	Mugasha et al. (2013)
3	Umbila	Y = 0.2201*d^2.1574	Mate et al. (2014)	Y=0.1766*d^1.7844*h^0.3434	Mugasha et al. (2013)

Where d is the DAP in cm and h and the total height in m. In the case that we do not have allometric equation for the belowground biomass, the root-to-shoot ratio will be used, enough to multiply the root-to-shoot ratio by the biomass above the ground.

Annex 13 - Detailed executive summary

Mozambique is one the few sub-Saharan countries to possess a significant portion of natural forest: 51% of its territory is composed of natural forest - that is 40.6 million hectares (ha). Miombo forest is the most extensive forest type, covering approximately two third of the country. Yet, historical deforestation rate in Mozambique is estimated to reach 0.23% between 2000 and 2012, representing an annual loss of 138,000 ha of forest per year and an amount of emissions close to 12 $MtCO_2e$ per year. Deforestation is especially concentrated in in the Central and Northern provinces of the country, where the Emission Reductions (ER) Program that is being presented here is located.

The *Zambézia Integrated Landscape Management Program* (ZILMP), which currently is one of the two national REDD+ pilot programs in Mozambique[92], was designed in this very framework: standing as its first program of results-based payments for ER in Mozambique, it is expected to contribute to long-term sustainable management of forest in the province of Zambézia by addressing the main drivers of deforestation and forest degradation, while implementing innovative measures aiming to increase rural communities' income and to generate long-term non-carbon benefits.

The Emission Reductions Project Idea Note (ER-PIN) of the ZILMP was accepted in October 2015 into the Carbon Fund's pipeline and a Letter of Intent (LOI) between the World Bank and the Government of Mozambique (GoM), on the potential purchase of ER from the ER Program in Mozambique, was signed during the Paris COP in December 2015. In January 2017, the GoM submitted its Readiness Package[93], which was approved by the Participants Committees Meeting (PC23) in March 2017 (Resolution PC/23/2017/5). Mozambique issued its first and advanced drafts ER-PD in, respectively, January and July 2017, and submittedits final ERPD in December 2017.

On January 30th, 2018 Mozambique presented its final ERPD at the FCPF Carbon Fund meeting, which was provisionally included into the portfolio of the Carbon Fund in February 2018, through Resolution CFM/17/2018/1. **The provisional inclusion of Mozambique's ER-PD into the portfolio of the Carbon Fund was deemed approved upon fulfillment of several conditions, including the submission of a revised ER-PD, the approval of the new REDD+ Decree and the availability of an Advanced Draft of Benefit Sharing Plan (BSP).** The country is now presenting this revised ER-PD, along with the other requirements, hoping that the quality and ambition of its ER Program will justify a positive decision from the FCPF to proceed to negotiating an Emission Reductions Payment Agreement (ERPA), in order to be able to sell carbon credits.

The Zambézia Integrated Landscapes Management Program (ZILMP)

Designed at jurisdictional scale, the ZILMP is located in Zambézia province of Mozambique. Zambézia province is characterized by relevant qualities for the ER Program: it concentrates 14% of Mozambique's forest; it is the most densely populated province of Mozambique;

---

[92] The other large-scale landscape/REDD+ Program that has been identified is the Cabo Delgado/Quirimbas Emissions Reductions Program (PROGIP-CD). The Program covers 7 districts in Cabo Delgado: Ancuabe, Macomia, Metuge, Quissanga, Meluco, Montepuez and Ibo, in which deforestation rate between 2011 and 2013 reached 0,31% (5,522 ha) per year.

[93] See FCPF website for Readiness Package and TAP assessment.: https://www.forestcarbonpartnership.org/mozambique

70.5% of its population lives under the poverty line; its economy is based on agriculture and the use of forest resources; it already comprises a strong private sector and civil society involvement.

The ER Program was designed as an up-scale of a previous REDD+ pilot project, launched in the Gilé National Reserve (GNR) and its periphery. Considering the success of the project and facing growing deforestation in other part of Zambézia province, the GoM decided in 2015 to extend this initiative and to intensify it in order to make it an innovative REDD+ jurisdictional program, covering several districts of the Zambézia province.

The GoM decided not to develop the ER Program on the whole Zambézia province but, rather, to focus on a portion of it. As such, when the ER-PIN was presented to the FCPF, the ZILMP was actually only covering 5 districts of the Zambézia province, which are characterized by globally important biodiversity with mangrove forests, a significant range of endemic and vulnerable/endangered species and a protected area: the GNR[94].

Following comments and observation from the CFPs in 2015, the total ER Program area was extended to cover 7 and then 9 districts of Zambézia province, for two main reasons. First, within Zambézia province itself, the 9 selected districts especially represent a strong area of expansion for deforestation. Second, but linked to the first point, because they are particularly subject to deforestation, those 9 districts are those, within Zambézia province, which concentrate the investment activities that will help reduce deforestation in the province. Indeed, the selected districts are geographically coherent with the areas covered by other initiatives already funded by the World Bank (WB), including the Conservation Area for Biodiversity and Development project (MozBio project), the Mozambique Forest Investment Project (MozFIP) and the Dedicated Grant Mechanism (MozDGM), as well as the Agriculture and Natural Resources Landscape Project (the "*Sustenta*" project) - *see section 4.1*. Yet, those existing funds enable to secure long-term financing for the ER Program interventions and ensure the efficiency of the activities - *see section 6.2.* Admittedly, no financial gap is forecasted for the ER Program until, at least, 2022. Such investment are for now limited to those 9 districts, and more funding would be necessary to cover other districts of the province. This is however a medium to long-term objective for scaling-up the Program.

[94] It should be noted that Zambézia province is home of another protected area: the archipelago of "Ilhas Primeiras e Segundas", located in front of Nampula and Zambézia Province. Although they are not part of the ER Program accounting area for now (no ER Program activities are planned in those islands) they could be the subjects of further attention in the event of a potential up-sale of the ER Program in the future.

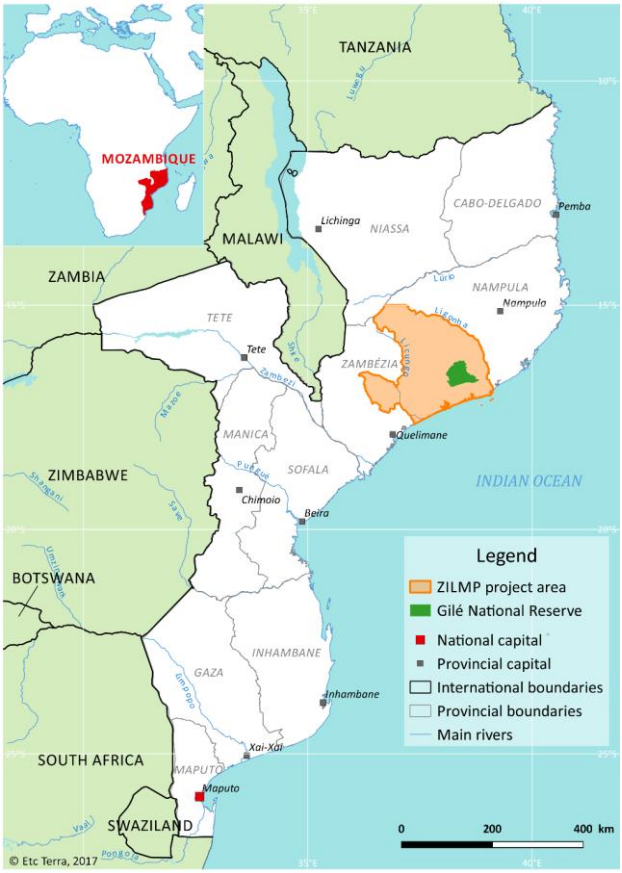


Figure 43: Localization of the ER Program in Mozambique

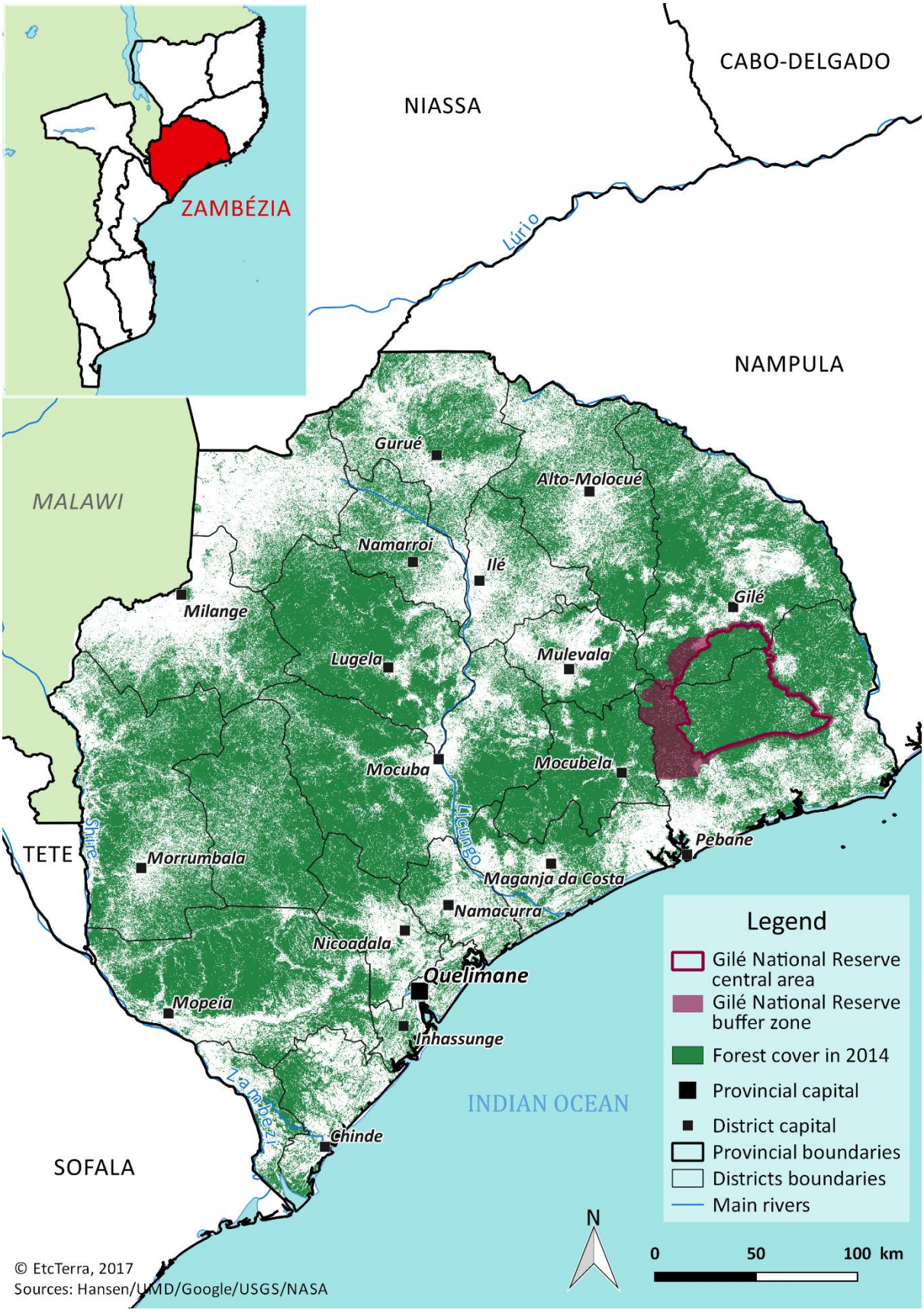


Figure 44: Forest cover in Zambézia from Global Forest Watch data

Main drivers of deforestation in the ER Program area

During Readiness phase, the main drivers and causes of deforestation in Mozambique were analyzed in Winrock International and CEAGRE (2015). It has been refined for the ER Program area in Mercier et al. (2016). Those studies show that the drivers of deforestation and forest degradation are highly linked to the socio-economic context.

Most of the population of Zambézia province is living in rural area (79% in 2015) and is highly dependent on natural and forest resources. Accordingly, agriculture is the main economic sector in Zambézia province: 91.1% of the economically active population is working in the agricultural sector. The level of production is nevertheless low, agricultural activities being essentially subsistence means. The main form of land use is small-scale sedentary and shifting cultivation, mainly for maize and cassava: "slash-and-burn" agriculture is widely practiced in Miombo areas. Just like at national scale and in Northern Mozambique where it accounts for, respectively, 65% and 72% of deforestation, small-scale (itinerant) agriculture is the first driver of deforestation in the ER Program area. Smallholders' move towards extensification rather than intensification actually is the very basis of the deforestation mechanism we observe in the ER Program area, and is almost exclusively driven for maize and cassava production, constrained by labor availability during peak season (rather than by land availability).

Charcoal production, in the ER Program area, only accounts for forest degradation and not for deforestation. On field studies in the ER Program area have shown that charcoal is actually produced through practices that are already accounted for in the deforestation process linked to small-scale agriculture: it is therefore, for now, not expected to have any additional impact, relatively to agriculture, on forest cover. However, given the high population growth and the increasing need in charcoal and energy, especially around urban centers, charcoal production might increase in the future. It is, therefore, still an important driver of forest degradation to address. In the ER Program area, the main supply basins in size and production are located around Alto-Molocué, Gilé, Maganja and Ilé. They are characterized by low production yields due to non-efficient kilns.

At national scale, forestry is another driver of forest degradation. It is estimated that forestry could account for 9% of deforestation and forest degradation in Mozambique and in Northern Mozambique. In the ER Program area, this can be explained by: (i) illegal logging, focused on specific and precious timber; (ii) non-sustainable exploitation practices in concessions and simple licenses areas. Forest degradation due to forestry is a different issue for the ER Program: because it is essentially driven by illegal logging, which is enhanced by the international demand and failure of local law enforcement, the efficiency of the measures implemented will also depend from national policies and should be backed at national scale. In 2013, 93% of all commercial logging in Mozambique was illegal and at least 50% of the quantities of timber shipped out of Zambézia are also believed to be illegal.

Finally, although it is a bit more significant at national scale (4%), in Northern Mozambique, large-scale agriculture only represents 2% of deforestation. In the ER Program area, it is almost non-existent. This is coherent with the fact that, in 2013, large-scale agriculture represented only 5.7% of total cultivated lands in Mozambique. Accordingly, large-scale agriculture is not directly involved in the ER Program interventions.

The analysis of the direct drivers of deforestation and forest degradation shows that these processes have complex roots that extend across different sectors of development. The

direct drivers of deforestation are all interlinked with indirect and underlying causes that are both economic and social. They are related to population growth, poverty and the demand for timber products on the international market. Poverty is the most important underlying cause of deforestation, with small income and poor access to alternative source of income for rural population being primary drivers for their unsustainable exploitation of forest. In the same way, demography and high population growth can also account for a significant part of deforestation and forest degradation and may be responsible for future deforestation and possible displacement of ERs.

Interventions of the proposed ER Program and complementary initiatives

The ER Program is composed of four main projects (Sustenta, MozBio, MozFIP and MozDGM): their activities represent the totality of the planned interventions and enabling activities of the ER Program.

Along land-based investments aiming to generate ERs, enabling activities are needed to create the necessary conditions for the ER interventions to be successful. Although those activities may not directly generate ERs, they aim at producing behavior change and livelihoods strategy changes that are essential to achieve ERs. Although these changes themselves do not produce ERs, they are an essential element of the strategic framework within which ERs will be achieved. The ER Program enabling activities (EA) are summarized in three categories: (i) enabling activities for development, coordination and monitoring of the ER Program (EA-A); (ii) enabling activities related to land planning (EA-B); (iii) enabling activities related to law enforcement and forest governance and management (EA-C).

Besides enabling activities, concrete land-based investments aiming to actually reduce deforestation an forest degradation are scaled throughout the 9, with the help of various extension agents, especially for conservation agriculture activities. They were gathered into one category: ER interventions for sustainable production, livelihood and income generation (ERI-D). Those land-based investments encompass: conservation and climate smart agricultural production, including with the establishment of agroforestry systems; sustainable production of key cash-crops; plantations and restoration of degraded lands through assisted natural regeneration (ANR) and enrichment planting; sustainable production of charcoal; valorization of key NTPF products around the GNR. For now, the total land area brought under sustainable landscape management by the ER Program is expected to reach 472,433 ha (including the GNR and its buffer zone)[95].

The table below summarizes the main strategic objectives and associated planned interventions of the ER Program. They are all linked to the six Strategic Objectives (SO) of the National REDD+ Strategy, which were translated into various enabling activities (EAs) and ER Interventions (ERI). It should be noted that all those action will be supported by various initiatives already in place in the ER Program area, namely: the *"Sustenta"* project, the MozBio project, MozDGM and MozFIP that will significantly contribute to financing the ER Program. As such, all the investments planned within the ER Program are already financed by those projects. They should be responsible for the totality of the forecasted ERs of the ER Program.

[95] *Including the Buffer Zone (152,799 ha) of the GNR (core area 283,584 ha)*

Table 87: Summary of ER Program planned interventions (ERIs)

Summary of ER Program enabling activities (EAs) and planned Interventions (ERI)	
EA-A. Enabling activities for development, coordination and monitoring	
EA - A1: Coordination and management of activities	*Coordination and management of the ER Program (implementation of a grievance redress mechanism, oversight of field activities, fiduciary and safeguards management and communications, monitoring, evaluation and reporting, etc.)*
EA – A2: Institutional development and strengthening and intersectoral communication	*Financing of the additional costs of FNDS related to project management and of the Program Implementation Unit (PIU) at the provincial level*
	Strengthening of ANAC, Biofund and CITES secretariat
EA – A3: Community awareness and capacity building – ensuring stakeholders' involvement and participation in the ER Program	*Capacity building for local communities and CGRNs (decision-making, accountability, transparency, local governance, business planning and management, use and management of funds, partnerships with the private sector, use of information technology, etc.)*
	Workshops, trainings, meetings, communication and consultation about ER Program and REDD+, including through the consolidating of Zambézia Multi-Stakeholders Landscape Forum (MSLF)
EA-B. Enabling activities related to land planning	
EA– B1: Regularizing land tenure	*Community land delimitation with community delimitation certificates, community land use plans and strengthening of community-based organizations (CBOs)*
	Issuance of individual DUATs (right of land use)
	Provision of technical advisory services and equipment to conduct land demarcations, natural resource mappings and legal registration
	Availability of grants for implementing subprojects, including micro-zoning for territorial management plans
EA - B2: Improvement of districts land use planning & promotion of community level land use planning	*Strengthening of land administration services and upgrading of the land administration system*
	Implementation of geospatial tools at the provincial and district levels to improve land-use planning, including with the operationalization of a GIS platform
	Development of the National Land Use Plan
EA-C. Enabling activities related to law enforcement and forest governance and management	
EA – C1: Enhanced protection of conservation areas	*Improvement of the management regime of the Gilé National Reserve*
	Law enforcement and protection of biodiversity around the GNR
EA – C2: Strengthening of forest governance, transparency and forest management	*Support to the government's forest law enforcement institutions (particularly AQUA and ANAC)*
	Improvement of national monitoring, detection and land information systems, including with support to a forest information system
	Support to the National Forest Forum
	Training to forest operators and to forest administration
	Support to small-scale forest businesses
D. Land-based investment for sustainable production, livelihood and income generation	

ERI-D1: Promotion of conservation agriculture and agroforestry system	*Trainings to conservation agriculture with extension services, support and monitoring of smallholders' activities*
	Support to agroforestry systems through technical assistance, provision of inputs, distribution of fruit trees and assistance to targeted nurseries
ERI-D2: Structuring of key sustainable value chains (forestry-based value chains) for cash crops and support to the establishment of commercial agriculture in areas with no forest cover	*Study and analysis of the commercial potential of various cash-crops*
	Technical assistance for cash crops production, training on quality standards and on the maintenance of orchards, provision of inputs for smallholders around the GNR
	Technical assistance to small emerging commercial farmers and other key rural micro, small and medium enterprise agribusiness, including on business plans
	Improvement of key selected rural infrastructures for commercialization of cash crops
	Implementation of a market information platform to support cash-crops producers, with the diffusion of information on markets dynamics and prices through SMS
	Agribusiness finance to value chains actors, including support to access credit and financing schemes for agribusinesses (matching grant and partial credit guarantee)
ERI-D3: Promotion of multipurpose plantations and restoration of degraded lands	*Implementation of a planted Forests Grant Scheme and support to community out grower schemes*
	Restoration of natural habitats through Assisted Natural Regeneration (ANR) and enrichment planting
ERI-D4: Promotion of sustainable charcoal production	*Plantation of fast growing trees for energy purpose*
	Support to local producers for the creation of improved kilns for charcoal production
	Training of producers for the elaboration and implementation of forest management plans and for the creation of partnerships with private operators
	Training to Assisted Natural Regeneration (ANR) techniques to limit the negative impact of charcoal production
ERI – D5: Valorization of the income generating potential of the GNR and sustainable livelihood around the GNR	*Improvement of sustainable tourism in the GNR with support to a community sport hunting area*
	Sustainable use of NTPF around the GNR

Involvement of stakeholders and local population

Since it is fully aligned with Mozambique REDD+ National Strategy, the information sharing and consultation and participation mechanisms that have been used in the design of the ER Program are interlinked with the consultation structures and mechanisms that were used for the evaluation and validation of the REDD+ National Strategy and related projects (MozFIP and MozDGM, MozBio and *Sustenta*) and safeguards instruments. They include two components: (i) a consultative and participatory process, relying on extensive public consultations and on the MSLF; (ii) an information-sharing process, relying on the automatizing of REDD+ information dissemination on social media, website and mails, on the diffusion of didactic documents (pamphlets, policy briefings, posters, cartoons) and on other innovative communication events in local languages. From March 2013 to November 2016, 61 public consultation meetings on REDD+ and associated projects were organized in the country. 10 of them were community consultations. Along those consultations, 3,370 participants were recorded, 29% of which were women.

Admittedly, the design and implementation of the ER Program are based on the on-going participation of all stakeholders, accordingly with the Mozambican legal framework and with

the FCPF Methodological Framework (FCPF MF). Smallholders' engagement in the ER Program will be facilitated by the existence of efficient platforms and tools for them to express any potential concerns and grievances, so that the ER Program interventions can quickly be adapted to answer their queries. This will especially be ensured though the functioning of the Zambézia MSLF and with the operationalization of a transparent, clear and well-known Feedback and Grievance Redress Mechanism (FGRM), open and available to all the people living in the ER Program area. It will also rely on a clear land tenure framework, which is an important component of the ER Program, promoted in both the Sustenta and MozFIP projects, in order to create the tenure security needed for local people to take part in new economic activities and value chains development.

Ambition and potential of the ER Program

Reference Emissions Level - In order to respect the FCPF MF, data for the ER Program RL have been extracted from national FREL/FRL for the Program accounting area and for the period 2005-2015 (reference period used in the construction of the Reference Level for the ER Program). Between 2005 and 2015, total deforestation in the ER Program accounting area reached 213,202 ha – corresponding to 21,320 ha/yr. The Reference Emission Level for the ER Program area is 6,487,447 tCO_2e/yr.

Ambition and expected Emissions Reductions - The ER objectives of the ER Program are based on the articulation of two successive periods, with the ambition to reduce deforestation in the ER Program area by 30% below the reference level in the first period (2018-2019)[96] and by 40% in the second period (2020-2024). This represents a total of 10,680,932 tCO_2eq of ER, of which 10,000,000 tCO_2e could be sold to the FCPF, depending on the final terms of the ERPA[97].

This ambition is highly consistent with national policies and development priorities in Mozambique and the ER Program actually holds a significant place in the national strategy of reducing carbon emissions. In its Intended Nationally Determined Contribution (INDC), the GoM has pledged for the reduction of 76.5 $MtCO_2e$ between 2020 and 2030. In the same way, the National REDD+ Strategy has an overall objective of avoiding 170 $MtCO_2e$ during the reference period going from 2016 to 2030. The ER Program should therefore contribute to 6% of the National REDD+ Strategy's objectives in terms of ERs.

Accordingly, the ER Program is not an isolated initiative in Mozambique, but has been designed as a pilot program with the aim of providing both lessons-learnt on ER activities and a strong case for the overall development and implementation of REDD+ policy in Mozambique. As such, its activities and results are expected to help fine-tune the REDD+ National Strategy, contributing to identify possible unforeseen gaps and needs with the aim of preparing a relevant scaling-up of ER activities at larger-scale. It is therefore logical that the institutional arrangements that have been defined for the ER Program reflect the structures that should, on the long run, help implement REDD+ initiatives in the country.

---

[96] *Since the ER-Pa is expected to be signed mid-2018, only the second semester of 2018 will be accounted for.*

[97] *According to the terms of the LOI that was signed in December 2015 between the GoM and the World Bank, it was initially decided that 8,724,732 tCO_2e would be provided to the FCPF. However, following a re-evaluation of the total of ERs that could be achieved by the ER Program, the GoM is willing to offer more to the FCPF. The Maximum Contract Volume could therefore be updated in the future ER-PA.*

Non-carbon benefits - The expected ER associated to the ER Program will eventually generate monetary benefits, through the sale of carbon credits to the FCPF. However, the ER Program is also expected to be associated with high non-carbon value, which should be generated during its implementation and which is expected to continue long after the terms of the ERPA. The non-carbon benefits are numerous and can be classified in three main categories: (i) improvement of rural population's livelihood; (ii) strengthening of forest management and governance and (iii) environmental benefits.

Risks associated to the ER Program and safeguards

Displacements and reversals - Most of the ER Program measures are primarily based on incentives and on the valorization of non-carbon benefits rather than coercive. They are therefore expected to lower the overall appeal of the activities that cause deforestation and forest degradation *per se* for the agents of deforestation and, at this stage, the ER Program is not expected to generate any displacement of emissions (with the exception of potential market leakage at international scale, on which the ER Program has no grip).

Most of the implementation risks of the ER Program interventions can also be assessed through Reversal risks. Arguably, the main risks associated with the ER Program comprise political and financial risks, the risk of the lack of long term effectiveness in addressing the underlying drivers of deforestation and forest degradation, the risk of not securing broad and sustained stakeholders support, the lack of institutional capacities and the exposure and vulnerability to natural disturbances. Although the implementation of specific risks mitigation measures result in those risks being all considered as medium, a specific reversal management mechanism is based on the creation of an ER – Program specific buffer managed by the Carbon Fund, in which 30% of the ERs generated by the ER Program will be deposited as an "insurance" mechanism.

Safeguards - In addition, in order to enhance the positive impacts and reduce any risk of negative impacts of REDD+ projects' implementation activities, various safeguard documents were prepared. They include a Strategic Environmental and Social Assessment (SESA), an Environmental and Social Management Framework (ESMF) and a Process Framework (PF). The ER Program will be fully aligned with the recommendations formulated in those documents. Safeguards implementation will be monitored throughout the project lifetime. In particular, a Safeguards Information System (SIS), a Participatory Monitoring, Reporting and Verification (PMRV) system and an efficient Feedback and Grievance Redress Mechanism (FGRM) are designed and implemented.

Specific arrangements for the ER Program success

Political commitment - Actually, the recent creations of the MITADER[98] and of the FNDS[99] are subsequent signs of the commitment of the GoM to REDD+. The main functions of the MITADER are to manage and implement policies in the fields of land management and administration, forests and wildlife, environment, conservation areas and rural development. Its creation shows the efforts that the GoM has been carrying out to integrate complex issues and promote synergy between those core challenges for REDD+ in Mozambique. This

[98] *Which brings together responsibilities that were previously spread across several ministries, namely the Ministry of Agriculture (MINAG) and the Ministry responsible for the Coordination of Environmental Affairs (MICOA).*

[99] *The decree of creation of the FNDS is available here.*

restructuring is a clear indication of the Government's vision and commitment to promote a landscape-based approach to forest and natural resources management.

Financial capacity for the implementation of the ER Program was reinforced with the creation of the Directorate for the Mobilization of Funds (*Pelouro para Mobilização dos Recursos* - PMR), based in FNDS, responsible for managing REDD+ funding - it coordinates and supervises major donor support programs, including REDD+.

Institutional arrangements - From a general point of view, REDD+ policies and implantation in Mozambique are dependent on properly articulated institutions, enabling the proposed activities to be carried out in harmony. They are especially defined by the National REDD+ Strategy and Decree No. 70/13 on the "Regulation of the procedures for approval of projects for reducing emissions from deforestation and degradation" and were updated in the new REDD+ Decree, which is currently being prepared and which should be approved early 2018.

The ERPA will be signed by the the Ministry of Economy and Finance (MEF) and the overall management and implementation of the ER Program will be coordinated at national level by the National Funds for Sustainable Development (FNDS), which is part of MITADER. The FNDS will also guarantee inter-institutional coordination with the relevant directorates of the key ministries of Agriculture and Food Security (MASA) and of Energy (MIREME). At provincial scale, the implementation of the ER Program will mostly be supervised by the Program Implementation Unit (PIU) based in Mocuba, in full cooperation with the Zambézia government and the provincial representation of the MITADER (DPTADER).

Monitoring, Reporting and Verification - The Measurement, Monitoring and Reporting (MRV) system of the ER Program builds on the national MRV system, which is a Participatory MRV (PMRV). The national coordination and supervisions of the PMRV is the responsibility of the FNDS. The FNDS will be supported at provincial scale by the PIU, in which a small MRV team was incorporated. For each monitoring session, data for the ER Program will be extracted from results of the national monitoring. Since natural regeneration and plantations are not accounted for the ER Program, only data for deforestation will be extracted from national MRV.

Benefit sharing mechanisms - Specific arrangements will be created for the distribution of the monetary and non-monetary benefits generated by the ER Program. A Benefit Sharing Working group was created and a first preliminary draft on key finding for the Benefit Sharing Plan (BSP) was elaborated, with options and proposals to be analyzed. Those arrangements are still being discussed. As required by criterion 30.1 of the FCPF MF (2016a), an advanced draft of the BSP will be made publicly available prior to ERPA signature, and as soon as it is approved by the GoM.

Annex 14 – Clarification on how degradation data were analyzed and on how degradation will be monitored and reported for during the Program

I - ANALYSIS OF DEGRADATION

The main driver of emissions due to degradation is logging

- Charcoal production is not responsible for additional emissions

In Mozambique, forest degradation is mainly caused by forest exploitation and, to a lesser extent, by charcoal production. Emissions related to those two sources in the ER Program area were primarily estimated in the ZILMP Background Study (Mercier et al., 2016). However, the Background Study (Mercier et al., 2016) accounted for emissions due to charcoal production in the ER Program area in addition to emissions due to agricultural activities and, by doing so, has overestimated emissions related to charcoal production: in the ER Program, those are not specifically accounted for.

Granted, at first glance, charcoal production in the ER Program area is expected to be responsible for forest degradation and subsequent emissions. However, in reality, in the ER Program area, when trees are cut to produce charcoal, the cleared area is most of the time used afterwards for agricultural purposes. Hence, the final objective of such clearing is not so much charcoal production than slash-and-burn agriculture. Yet, slash-and-burn practices are responsible for emissions due to deforestation that are accounted for in the Program. In other words, since charcoal production can actually be considered as a by-product of slash-and-burn agriculture, emissions due to charcoal production are already accounted for in the estimation of emissions due to deforestation. Consequently, it was decided not to include it as a source of emissions related to degradation (which is conservative).

To sum up, in the ER Program area, emissions due to degradation are only related to forest exploitation for legal and illegal logging.

- Context of logging in the ZILMP area

The main legal instruments that define forest exploitation in Mozambique are the following (Falcão et al. 2015):

- The Forestry and Wildlife Regulations (2002), which recognizes forest concessions as a new regime of land use to promote sustainability;
- The Conservation law (2014);
- The Environment law (1997);
- The Policy and strategy for the development of the Forestry and Wildlife sector (1997).
- The moratorium on *pau-ferro* (*Schwartzia madagariensis*) exploitation and on the deliverance of new forest concession and simple licenses (1st of January 2016).

Logging in Mozambique can occur in two types of land uses that obey to different regulations:

- Simple licenses: They consist of a 5 years permit that limit the maximal harvesting amount to 500 m^3 per year, on an area that should not exceed 10 000 ha. They are available for Mozambican citizens only and require simplified management plan.
- Concessions: Lands are allocated to companies for 50 years. To obtain the administrative authorization to exploit those concessions, a management plan is required. Companies also need to be in possession of timber processing facilities. They are prohibited from exporting unprocessed log of first class species[100]. `

Forest concessions were introduced in 1999 to guarantee the sustainability of exploitations. Although forest concessions were initially supposed to replace simple licenses, those still exist: as they imply fewer responsibilities and represent a higher part of production - about two third of the authorized volume, according to Sitoe et al. (2012) - they still are more appealing. All in all, data show an important increase of all areas under forest exploitation in the past few years: operational concessions and simple licenses increased, respectively, from representing 15% of the ER Program area in 2011 to 31% in 2015, and from representing 4% of the ER Program area in 2011 to 21% in 2015. However, since the percentage of forest areas under simple licenses is inferior to the percentage of the ER Program area under simple licenses, we can conclude that licenses are surprisingly attributed in area where there is low forest cover.

Today, 31% of delimitated concessions are currently operational. The final approval for the attribution of the remaining 69%, which is still being analyzed by the administration, will depend inter alia on the approval of the management plans. As for simple licenses, 58% of them are currently operational and the status of the other share is pending.

[100] *22 species of which Jambire (Millettia stuhlmannii), Chanfutta (Afzelia quazensis), Umbila (Pterocarpus angolensis) and Pau-Ferro (Swartzia madagascariensis)*

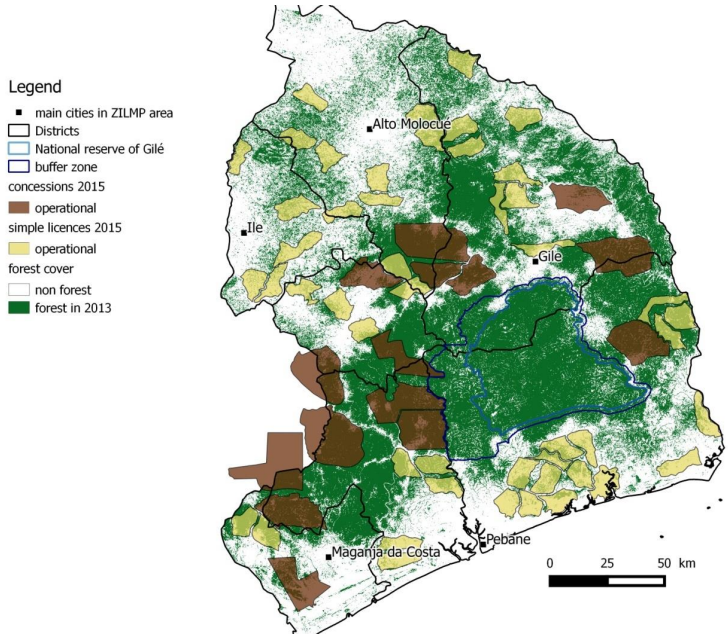


Figure 45: Map of operational forest concessions and simple licenses in the ZILMP area in 2015 (Source: SPFFB Zambézia, retreatment by Etc Terra)

- Estimates of deforestation and degradation in concessions and simple licenses areas

In order to assess the share of deforestation that occurs inside of concessions and simple licenses areas, data were extracted from deforestation maps produced for the Background study (Table 83). They were analyzed in light of the past deforestation data from the 2010 – 2013 period and of the 2011 delimitations of concession and simple licenses areas:

- In logging concessions, deforestation rates are similar to those of the overall program area (Table 83). However, it is not possible to separate the deforestation exclusively due to logging from the deforestation due to "slash and burn" agriculture inside of the concessions. This is due to the fact that, although the right of sale of trees is the property of their owner, there is no land use restriction for households in concessions. Yet, to the contrary of agricultural practices, it is very likely that logging leads to degradation rather than deforestation because exploitation pressure is concentrated on few species only.
- In simple licenses areas, deforestation rates are higher and highly above the program area rate: 0.86 %/yr. This may be explained by a fast attribution of lands, leading to a rapid exploitation of the available timber, with lower selection of tree species (Table 83).

Given this, we can infer that logging in concessions or licenses do not mitigate deforestation dynamics.

Table 88: Proportion of forests in the program area that was under concession or simple license status in 2011 and in 2015 and corresponding deforestation rate during the period 2010-2013

Land cover classes	ZILMP	2011		2015	
		Concessions	Simple licenses	Concessions	Simple licenses
Total area	3,865,062	594,925	157,794	1,208,748	799,292
Proportion of the ZILMP area	100%	15%	4%	31%	21%
Forest cover in 2013	1,983,784	461,045	82,829	766,025	348,119
Proportion of the forest	100%	23%	4%	39%	18%
Historical deforestation rate between 2010-2013	-0.86%	-0.39%	-1.12%	-1.09%	-1.75%

- Unsustainable practices in forest exploitation and illegal logging

In addition, in Mozambique and in Zambezia province especially, current practices are based on short cutting cycles that jeopardize logging sustainability: although it is acknowledged that a 30 years rotation would be necessary in the Miombo forest to ensure regeneration (Mackenzie and Ribiero, 2009), management plans are usually based on a 20 years rotation, or less (often, 5 to 10 years rotation). EIA (2014) estimates that, with a linear evolution of the 8% exploitation growth rate, the exploited species stocks would be exhausted within 15 years.

In the same way, official data on timber exploitation show a strong level of activity in Zambézia (German and Wertz-Kanounnikoff, 2012; Mackenzie and Ribiero, 2009):

- In 2009, Zambezia represented the second highest production of Mozambique, just after Sofala province: licensed volumes reached 18 046 m^3 in concession areas and 22 345 m^3 in areas under simple license (source: DNFT as reported by German and Wertz-Kanounnikoff 2012).
- In 2007, 14 simple licenses and 99 concessions licenses were issued in Zambezia province for a total volume of 36 693 m^3, close to the 2009 amount (Mackenzie and Ribiero, 2009).

Yet, exported quantities are higher than licensed quantities. In the same way, although most of the wood (about 80%) is exported towards China ((Ekamn et al., 2013; Mackenzie and Ribiero, 2009), Mozambican reports of exportations towards China do not correspond to the Chinese importation level from Mozambique. That is to say that, arguably, most exports are illegal and, therefore, excluded from official reports (Mackenzie, 2006; Mackenzie and Ribiero, 2009): estimates given by official data should be far below timber exploitation real rates. Actually, today, 50% of timber shipped out of Zambézia is believed to be illegal (Ekamn et al., 2013; Mackenzie 2006; Mackenzie and Ribiero 2009). In Mozambique, this share could reach 76% to 93% of timber production (EIA, 2014). (Figure 42).

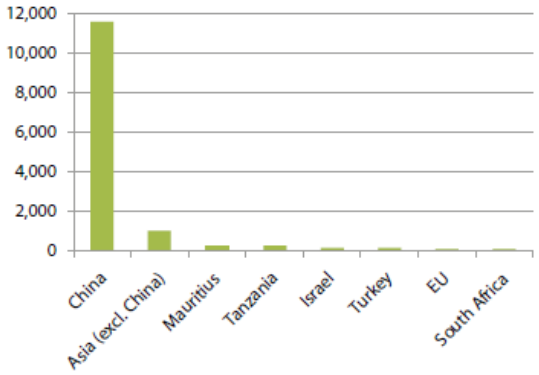


Figure 46: Exports of wood from Cabo Delgado province of Mozambique by destination during the year 2010 in m^3 (From (Ekamn et al., 2013)

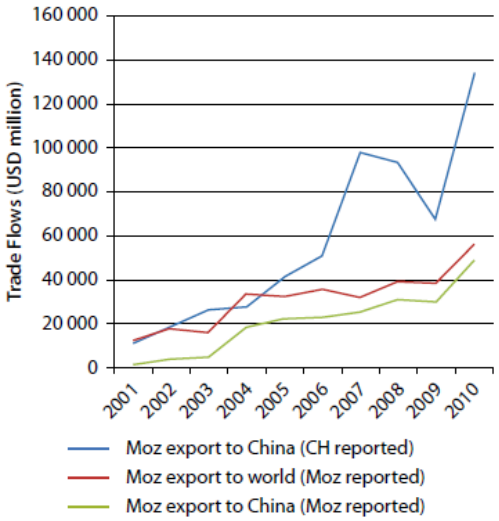


Figure 47: Value of timber exports from Mozambique (Moz) to China (CH) and to the world as reported by the respective countries (Source: UN COMTRADE as presented in (German and Wertz-Kanounnikoff, 2012))

Illegality lies in different practices, from illegal harvest that do not respect management plans to violation of labor laws, violation of transport laws and illegal exports of unprocessed timber for first class species (Ekamn et al., 2013; Mackenzie, 2006; Wertz-Kanounnikoff S. et al., 2013). Again, whereas Mozambican authorities declare that 20% of exportations are composed of unprocessed logs, in accordance with the law, China declares 75% of unprocessed log imports in 2010, underlying illegal practices in timber processing (German and Wertz-Kanounnikoff 2012; Ekamn et al. 2013). A study of Falcão et al. (2015) shows that companies that export unprocessed logs can reach a 2,430 USD benefit per container, against 530 USD per container for legal wood, because (i) cost is not related to processing and (ii) logs are sold at a higher price in China. According to (EIA, 2014), uncollected taxes related to illegal logging accounted for approximately 146 millions USD between 2007 and 2012 between 3 and 6 USD per log are usually paid to the loggers hired in villages.

Widespread illegality in logging sector is enhanced by weak law enforcement, as illustrated by the limited number of fines - 177 in Zambezia province in 2007 - compared to the extent of the illegality phenomenon, and a high degree of corruption along the value chain (Mackenzie,

2006; Mackenzie and Ribiero, 2009). In Zambezia province, the main agents of logging are Mozambican and Chinese companies (German and Wertz-Kanounnikoff, 2012; Mackenzie and Ribiero, 2009).

Estimation of historical emissions due to degradation (legal and illegal logging)

- Methodological approaches

Two options to estimate emissions related to forest exploitation were considered and are summarized hereafter:

- A classic method requires to delimitate intact and degraded forest and to compare carbon stocks. It was tried to delimitate degraded forest by considering distance to anthropic activities (i.e. distance to deforestation patches of deforestation) or to forest edge, as explained in the GOFC GOLD. However, this analysis shows that proximity to anthropic activities or to forest edge does not have an impact on carbon stocks (Figure 48). Moreover, carbon stocks have an unexpected negative correlation to distance of deforestation patches (Figure 48). On this basis, it is not possible to delimitate degraded forest with the indirect approach of the GOFC-GOLD.
- As a consequence, the method presented in the ZILMP Background Study (Mercier et al., 2016) using exploited volumes seems to be the most suitable. Based on the estimation of exploited volumes in Zambezia (legal and illegal logging) with secondary data from the literature, emissions due to forest exploitation in the accounting area can be estimated to reach 37,945 tCO_2e (Mercier et al., 2016), which corresponds to less than 10% of emissions due to deforestation. The method to estimate those emissions is described hereafter.

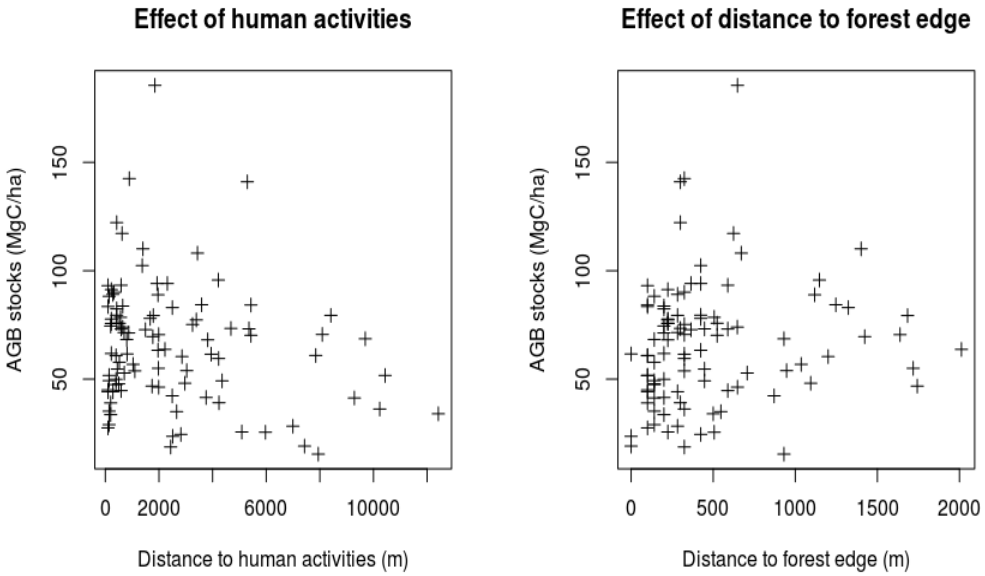


Figure 48: Relation of carbon stocks in forest inventory plots and distance to deforestation patches (left) and forest edge (right)

- Estimation of emissions based on exploited volume

The analysis of emissions related to forest degradation due to legal and illegal logging in the ER Program area was realized for the Background study in preparation of the ERPD development (Mercier et al., 2016). At that time, it covered 7 districts that initially constituted the ER Program area. **Emissions related to logging were compared to total emissions of the area, of which they represent less than 10%.** The calculations and results of the analysis are described hereafter.

Emissions due to forest exploitation were estimated based on data about the official volume of exploitation in the ER Program area and on the approximate share of illegal logging. This resulted in an estimation of emissions representing 37,945 tCO_2eq/yr. However, great uncertainties exist about those volumes: a field survey would be necessary to improve the analysis. It will however remain difficult to access data on illegal logging. In addition it was not possible to gather data on the roads created for wood extraction out of the logging area and, therefore, possible additional emissions are not part of this estimation, which is therefore conservative. Furthermore, since there are no available estimates on the areas impacted by roads or wood parks for the Zambezia province, activity data could not be established.

Estimates of emissions due to forest exploitation (legal and illegal) can also be based on exported quantities from Zambezia and on several hypotheses about exploitation methods and impacts. To do so, we followed the VM0011 VCS methodology for improved forest management "Logged to protected forest: calculating GHG Benefits from preventing planned degradation", developed by *Carbon Planet Limited* and approved by VCS in 2011. For emissions sources and removals, the methodology is as follows:

- Emissions from the dead wood pool, which is composed of residual from stand damage, branches and trimmings left in soil after logging. Carbon from this pool is gradually emitted while the biomass is degrading. In this pool, carbon can be estimated with factors detailed in literature and correlated to carbon stocks in merchantable quantities. However, the lack of data on forest exploitation in Mozambique prevented us from following this methodology. Instead, dead wood pool carbon stocks were considered as a difference between carbon stocks in the estimated total biomass and merchantable biomass (i.e. biomass in logs). The decay rate was considered similar to the one recommended by IPCC for belowground biomass (i.e. 10%/yr):
    - **Total biomass** is estimated with expansion factors for conversion of wood removals (BCEF) as recommended by the (IPCC, 2006);
    - **Merchantable biomass** is estimated with a relation between wood density and exploited volume as recommended by IPPC. For wood density, an average for the main exploited species was used.
- Emissions from long term harvested wood products (ltHWP), composed of emissions from the decomposition or burning of processing residues and from the oxidation of long-lived wood products: The first component was conservatively set to zero wood, since it is mostly not processed in Mozambique and few relevant data are available about processing techniques. The second component was estimated as precious wood from forest exploitation in Mozambique, as it is mostly used to form planks and pieces of furniture. According to the VM0011 methodology, the fraction of carbon remaining in ltHWP can be estimated with the

following equation (k being the rate of oxidation of ltHWP and t the elapsed time since wood processing):

Equation 2: $$F_{ltHWP_{remain},t} = e^{-k_{ltHWP}t}$$

- Removals from regrowth after selective logging have to be assessed with annual growth rates. However, since it is not possible to assess the areas that have actually been impacted by selective logging, the total biomass would be retrieved with a delay considered in a 5% regrowth rate - which means that 20 years would be necessary to ensure post-logging regeneration (Mackenzie and Ribiero, 2009).

Those data and hypothesis are summarized in Table 84. The result is an estimation of 0.04 $MtCO_2eq$ over a period of 10 years (Table 85). **This represents a proportion of 1.2% of emissions due to deforestation in the 7 districts of the ER Program implementation area**, 3.3 $MtCO_2eq/yr$, as assessed by the baseline of the ER program established in the background study (Mercier et al., 2016).

Table 89: Data and hypothesis for the calculation of emissions and removals from degradation due to selective logging in the program area

Factors and pools		Data	Units	Sources
Exploitation data				
Licensed volume exploited in Zambezia	Concessions	18,046	m^3	DNFT - German and Wertz-Kanounnikoff, 2012
	Simple license	22,345	m^3	
Part in the program area	50%	8,939	m^3	Data on concessions
	48%	10,796	m^3	
Total with illegal exploitation		78,938	m^3	
Total tree biomass				
BCEF		0.89	tdm/m^3	IPCC, 2006
Root-to-shoot ratio		0.28		
Bark fraction		0.1		
Carbon fraction		0.47	tC/tdm	
Equivalent total AGB and BGB biomass		45,567	tC	
Carbon in merchantable volume				
Wood density		0.79	tdm/m^3	IPCC, 2006
Carbon fraction		0.47	tC/tdm	
Total merchantable biomass		29,310	tC	
Emissions dead wood pool				
Carbon in residual stand damage and branches and trimmings		-	tC	
Difference between merchantable biomass and total biomass		16,258	tC	
Annual decay		0.1		
Long term harvested wood product				
Stocks in residues from processing		-		
Oxidation rate		0.023		VM0011, VCS
Regrowth after selective logging				
Annual rate		0.05		

Table 90: Results of the estimation of emissions from selective logging (legal and illegal) over 10 years in the program area

	Emissions in tCO_2eq				
Year	**Emission from non-merchantable volume**	**Emission from processing**	**Emission from merchantable volume - ltHWP**	**Removals from regrowth**	**Total emissions**
1	5,961	0	2,444	- 8,354	**51**
2	11,922	0	7,275	- 16,708	**2,489**
3	17,883	0	14,441	- 25,062	**7,262**
4	23,845	0	23,887	- 33,416	**14,315**
5	29,806	0	35,561	- 41,770	**23,597**
6	35,767	0	49,414	- 50,124	**35,057**
7	41,728	0	65,396	- 58,478	**48,646**
8	47,689	0	83,457	- 66,832	**64,314**
9	53,650	0	103,552	- 75,186	**82,016**
10	59,611	0	125,633	- 83,540	**101,705**
Average	**32,786**	**-**	**51,106**	**- 45,947**	**37,945**

Conclusion for the inclusion of degradation in the baseline

Since emissions from degradation represent less than 10% of the global ER Program emissions, it was decided not to include forest degradation in the sources of emissions for the ER Program. Moreover, small-scale agriculture being the main cause of deforestation, there is no indication that measures intended to reduce deforestation would result in leakage towards degradation. Rather, with the ER Program enabling activities such as land tenure clarification or national policies to reduce illegal logging, both deforestation and degradation would probably be reduced if the program succeeds. Hence, it is conservative not to account for degradation.

II - MONITORING OF DEGRADATION AT NATIONAL LEVEL

Forest degradation is a process leading to a temporary statistically representative data on land-cover change or permanent deterioration in the density or structure of vegetation cover or its species composition. Assessing and monitoring forest degradation under national Monitoring, Verification and Reporting (MRV) systems in developing countries has been difficult due to the lack of adequate technical and operational capacities. Reducing emissions from deforestation and forest degradation (REDD+) implies the implementation of efficient monitoring methods to provide high-quality data on forest degradation and its changes, according to reporting standards.

As the avoidance of forest degradation (under the REDD+ strategy) seeks to maintain carbon in the living biomass on the ground, the most practical monitoring approach focuses on the assessment of Above-ground Biomass (AGB) as the main indicator of forest degradation. **Mozambique´s National Forest Inventory Sampling Plots databases from periods 2007 and 2017 will be used to estimate aboveground biomass across the countries forest.** To estimate AGB per tree or ecosystem, allometric equations reported for the area were applied (see Table 91).

Stratum/species	AGB	BGB
Mopane	Y = 0.03325 * d ^ 1.848 * h ^ 1.241 (JICA 2017)	Y = 0.09572 * d ^ 1.7969 * h ^ 0.3797 (JICA 2017)
Mecrusse	Y=1.1544 + 0.0398*d^2*h (Magalhães 2015)	Y=0.0185*d^2.1990*h^0.4699 (Magalhães, 2015)
Semi-deciduous forest (+ Miombo)	Y=0.0763*d^2.2046*h^0.4918 (Mugaha et al 2013)	Y=0.1766*d^1.7844*h^0.3434 (Mugasha et al 2013)
Semie-evergreen forest (+Gallery)	Y = exp(-2.289+2.649*ln(d)-0.021*(ln(d))^2) (IPCC, 2003)	R/S = 0.28
Milletia stuhlmannii	Y = 5.7332*d^1.4567 (Mate et al 2014)	Y=0.1766*d^1.7844*h^0.3434 (Mugasha et al 2013)
Pterocarpus angolensis	Y = 0.2201*d^2.1574 (Mate et al 2014)	Y=0.1766*d^1.7844*h^0.3434 (Mugasha et al 2013)
Afzelia quanzensis	Y = 3.1256*d^1.5833 (Mate el al 2014)	Y=0.1766*d^1.7844*h^0.3434 (Mugasha et al 2013)

Table 91: Models used to estimate biomass of each stratum and species

Definition of forest degradation

The first step in the methodological design required the identification of an **operational definition of forest degradation and its component indicators**. Mozambique defines forest degradation as the reduction, in the long-term, of canopy cover and/or forest stocks, which result in the decrease in the capacity of the forest to provide goods and services, which include timber and biodiversity. This reduction may result from logging, fires, cyclones and other, but the canopy cover is maintained above the 30 % threshold. However, the definition is still to be refined as the tool is being developed.

National Forest Reference Emission Level and ER Program FREL

At the National Level, Mozambique has already submitted the **National Forest Reference Emission Level** and adopted a stepwise FREL construction approach: although, at this

point, the FREL only takes into account emissions from deforestation, it might eventually include forest degradation and other pools in the future.

As previously explained, since emissions from forest degradation were less than 10% of the total emissions in the ER Program area, and accordingly with the FCPF methodological framework, emissions from forest degradation is not included in the FREL of the ER Program, which only account for deforestation. However, it is still strongly advised to monitor degradation in future, in order to be able to see the trends on emissions related to this pool (even though these will not be at any point included into the FREL).

Monitoring of degradation

Mozambique is developing a **hybrid semi-automated tool** that intends to produce, at a minimum cost and available datasets, maps with information on forest cover and estimations of total carbon stocks and productivity. Those could ultimately be used as tools for decision-making concerning the volumes of carbon involved, not only under the REDD+ strategy but also for national forest policies. They are being developed using free, easy to access data with granted flow of data in the long term. These tools and methods will have to be approved so as to have wider applicability, beyond Mozambique.

Monitoring changes in biomass with optical satellite data is very challenging, and not recommended: dissociating the phenology of grasses and trees is very challenging, and the changes in spectral properties caused by fire or drought can be unrelated to woody biomass. In this way, although the green area of a specific plot, screened every year at the same time by a satellite, can sharply change, this change could be entirely unrelated to the proportion of trees removed in that plot.

However, a proven technology for mapping woody biomass and monitoring forest biomass changes through time does exist. **L-band radar data** is sensitive to biomass up to a saturation point at or above the highest biomass values found in dry forest. Errors are low and well understood, and the need only to apply a simple function to a single annual scene means that the data processing overheads are comparatively small, even at the scale of a whole country. L-band radar data exist as free analysis-ready (i.e. pre-processed) mosaics produced for the 1990's (Japanese Earth Resources Satellite 1- JERS-1, 1992-98), from the late 2000's (ALOS PALSAR 2007-2010) and for the modern day (ALOS-2 PALSAR-2 2015-2016), all produced and distributed by JAXA as part of its Kyoto & Carbon programme. Data are still being collected by ALOS-2 PALSAR-2, and were actually collected many times per year over the above-mentioned periods. Although these data are available for purchase, this should not be necessary unless near real time monitoring is required.

Clearly the JERS, PALSAR and PALSAR-2 mosaics are the best data to map past biomass and biomass change in dry tropics, providing baseline deforestation, degradation and possibly regrowth rates. PALSAR-2 is still functioning well and is funded until 2022, and JAXA intends to continue providing free annual mosaics suitable for such a system. However, ALOS-2 could stop before 2021, and there is no guarantee of a successor. In the longer term, free L-band Synthetic Aperture Radar (SAR) data will be delivered by the NASA NISAR satellite (2021), and data continuity will be provided by the (commercial) SAOCOM missions (2017).

Given that the future of free L-band satellite data is not entirely certain, it is important to consider alternatives. It might be possible to monitor dry forests using **C-band radar (sentinel 1)**. In the past this would not have been attractive: a higher saturation point and lower sensitivity to grass and ground moisture makes L-band the obvious system to use. However, the Sentinel-1 satellites are

providing C-band radar data free of charge across wide areas with 12-day repeats. As the saturation point at C-band is much lower than for L-band (~30-50 Mg ha-1), and sensitivity to moisture in the ground layer much higher, the same methods as used for L-band do not work. It is not possible to produce a biomass map by simply applying a function to a single C-band scene. Instead it would be necessary to use dense time series of C-band data and use the behavior of each pixel throughout the year to characterize its vegetation, and changes in this behavior to trigger an identification of change. It is unknown whether such a method would be effective: research is ongoing in various groups, but Sentinel-1 data is still new and methods for using dense time series of C-band data are still in early stages of development. Equally, such methods would involve very intense data processing. Not only is Sentinel-1 data not provided as 'analysis-ready', with computationally intense processing required to convert the raw radar data into usable products, but stacks of tens to hundreds of scenes would also be needed across a country to create products. The data volume required to map a country would go from the tens of GBs for single PALSAR mosaics, manageable on a desktop computer, to TBs requiring a dedicated powerful server.

Mozambique is developing an automated method to produce yearly forest biomass, biomass change and degradation maps for the periods 2007-2010 and 2015-2016, using the freely available ALOS PALSAR (1 and 2) mosaics. This tool will run both on local installations of Linux and will also be developed for cloud-based platforms. This module will be used to produce a benchmark for forest biomass and degradation estimates baseline (see Figure 49 for more details).

Methods relying on L-band are easy to implement, as the relationship between L-band backscatter and woody biomass is much simpler than either that of the C-band Sentinel-1, or the optical imagery from Sentinel-2. This leads to simpler data processing with L-band data (in particular pre-processed mosaics) and the need for lower data volumes. Thus, for Mozambique´s (and possibly other countries) use there are strong advantages to use Lband for mapping biomass and biomass change. Online platforms will be used, then the large data volumes and complex processing will be also performed in the cloud, and thus the Sentinel data can be explored. The latter approach involves the exploitation of dense time-series of observational data, which is only operationally feasible on a cloud platform.

The L-band module, which will be able to provide historical data on biomass stocks, degradation and deforestation for 2007-10 and 2015-16, will make use of freely available data from ALOS and ALOS-2 from the mosaic products. This module will be used to produce a benchmark for forest biomass and baseline degradation estimates and is expected to be available in time (before June 2018) to support the Mozambican activity of developing a degradation baseline for the year 2016. Data continuity may be provided with reduced cost or free data in future (e.g. SAOCOM and NISAR). The tools are being documented so they can easily be adapted for this use in the future. **A Sentinel-2 (S2) time series module for continuous detection of forest change, focusing on forest degradation, from 2016 onwards will be developed.** The output from this module will be forest change maps, from which proxies of forest degradation will be investigated. **A method that classifies forest change events (observed from either S2 or ALOS) by their geographical attributes (e.g. area, shape, and distance from road, town, and type of forest) will also be developed.** This tool aims to identify a cause of forest change events based on these attributes. The L-band module will be important as part of this to provide the benchmark information against which the S2 module products will be compared. The S2 module will include processes that will allow the pre-processing of S2 data to be used in land

cover mapping activities currently under way. The scripts will be modular, allowing in-country partners to use part or all of each processing chain. **The tools will be developed using Python, with support from GDAL and ESA's SNAP tool libraries where required and will be designed to work on both a desktop Python installation or in the online platforms discussed above.** An online platform will be created for the large data volumes of the Sentinels and this approach will give the in-country partners the flexibility to choose how to implement the tools. The tool and methods developed will make use of open source and freely available software for satellite EO processing. The use of high quality open-source tools aims to minimize costs for Mozambique and make it sustainable in a long-term, enabling also full access to the international community and to, as far as possible, encourage the replication and modification of methods developed in other tropical forest countries.

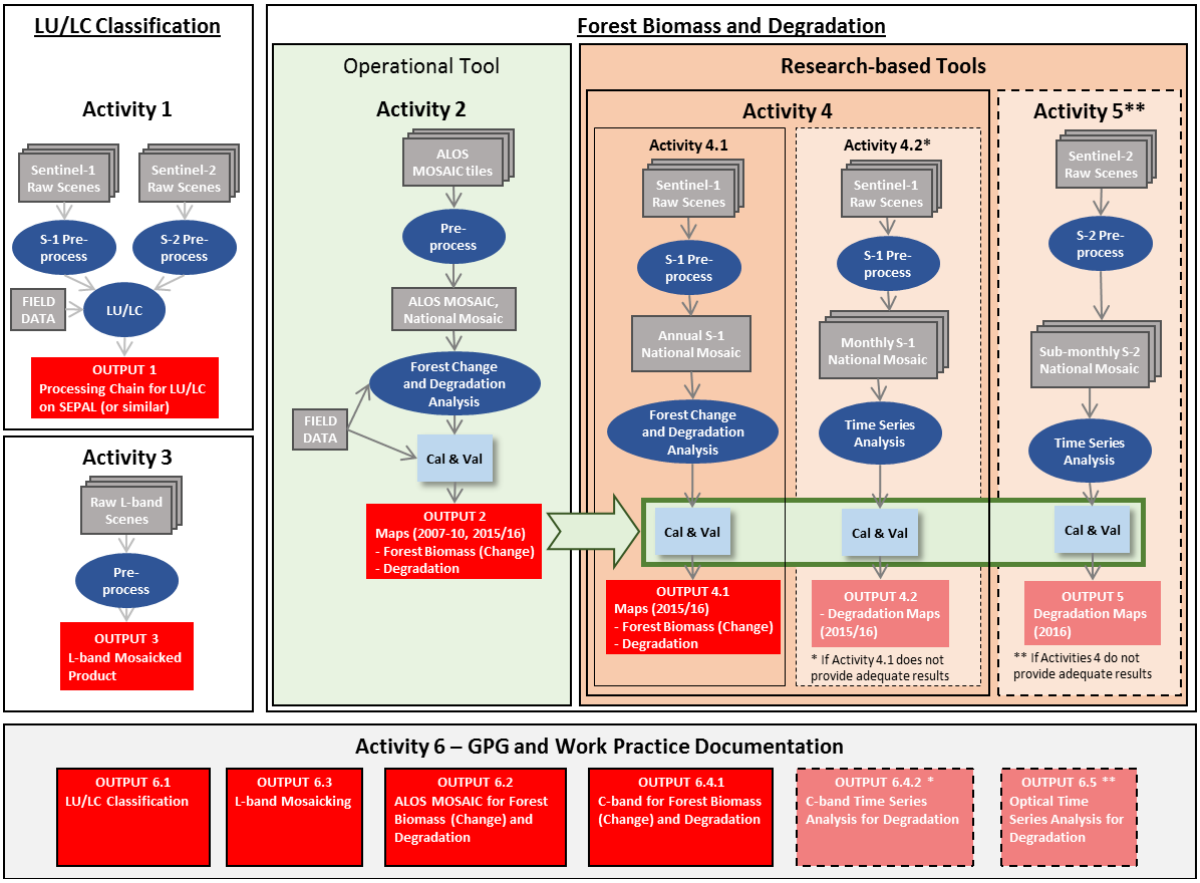


Figure 49: Methodological path to monitor and assess forest degradation in Mozambique

References

EIA, 2014. First class crisis. China's criminal and unsustainable intervention in Mozambique's Miombo forests. Environmental Investigation Agency.

Ekamn, S.-M., Wenbin, H., Langa E., 2013. Chinese trade and investment in the Mozambican timber industry: A case study from Cabo Delgado Province. Working Paper 122. CIFOR, Bogor, Indonesia.

Falcão, M.P., Bila, A., Remane, I., 2015. Avaliação das perdas de receitas devido a exploração e comércio ilegal de madeira em Moçambique no periodo 2003 – 2013. (Presentation, WWF).

German, L.A., Wertz-Kanounnikoff, S., 2012. Sino-Mozambican relations and their implications for forests: A preliminary assessment for the case of Mozambique. Work. Pap. 93 CIFOR Bogor Indones.

IPCC, 2006. 2006 IPCC Guidelines for National Greenhouse Gas Inventories.

Mackenzie, C., 2006. Forest governance in Zambézia, Mozambique: Chinese takeaway! (Final report for Fongza).

Mackenzie, C., Ribiero, D., 2009. Tristezas tropicais: More sad stories from forests of Zambézia.

Sitoe, A., Salomão, A., Wertz-Kanounnikoff, S., 2012. The context of REDD+ in Mozambique: Drivers, agents and institutions. Occas. Pap. 79 CIFOR Bogor Indones.

Wertz-Kanounnikoff S., Falcão M.P., Putzl L., 2013. Facing China's demand for timber: an analysis of Mozambique's forest concession system with insights from Cabo Delgado province. Int. For. Rev. 15.

Annex 15 – Deforestation and reference level of the Province of Zambezia

This Annex serves to address the Resolution CFM/17/2018/1 that requires Mozambique to provide data on: a) deforestation in the group of Zambezian districts outside the ER Program Accounting Area ("Outside Area"); and b) baseline emissions for the Outside Area.

Deforestation in the group of Zambezian districts outside the ER Program Accounting Area ("Outside Area")

Total forest cover in the Outside Area is 1,869,365 ha, with 1,866,136 ha of natural forest (semi-deciduous, evergreen and Mangrove forest). It is distributed as shown in the following table.

Table 92. Forest cover according to the point sampling analysis extracted from national activity data on the ER Program accounting area for 2015

Forest cover class 2015	Points number	Area (ha)	pi	Standard Error (proportion)	Standard Error (ha)	Confidence Interval at 90% (ha)	Error %
Semi-deciduous	*727*	*1,173,600*	*0.115*	*0.004022*	*40,944*	*± 80,249.9*	*± 6.84%*
Miombo open	*469*	*757,109*	*0.074*	*0.003304*	*33,638*	*± 65,929.6*	*± 8.71%*
Miombo dense	*258*	*416,491*	*0.041*	*0.002495*	*25,396*	*± 49,775.4*	*± 11.95%*
Mopane open							
Mopane dense							
Evergreen forests	*323*	*521,420*	*0.051*	*0.002776*	*28,262*	*± 55,393.6*	*± 10.62%*
Montane open	*105*	*169,502*	*0.017*	*0.001611*	*16,405*	*± 32,153.2*	*± 18.97%*
Montane closed	*111*	*179,188*	*0.018*	*0.001656*	*16,859*	*± 33,043.1*	*± 18.44%*
Coastal forest open	*26*	*41,972*	*0.004*	*0.000807*	*8,215*	*± 16,101.5*	*± 38.36%*
Coastal forest dense	*2*	*3,229*	*0.000*	*0.000224*	*2,283*	*± 4,474.3*	*± 138.58%*

Gallery forest	*51*	*82,330*	*0.008*	*0.001128*	*11,483*	*± 22,506.0*	*± 27.34%*
Mangrove	*28*	*45,201*	*0.004*	*0.000837*	*8,524*	*± 16,706.6*	*± 36.96%*
Mangrove open	*8*	*12,914*	*0.001*	*0.000448*	*4,563*	*± 8,944.3*	*± 69.26%*
Mangrove closed	*20*	*32,286*	*0.003*	*0.000708*	*7,209*	*± 14,128.7*	*± 43.76%*
Forest with shifting cultivation	*106*	*171,116*	*0.017*	*0.001619*	*16,481*	*± 32,303.4*	*± 18.88%*
Plantations	*2*	*3,229*	*0.000*	*0.000224*	*2,283*	*± 4,474.3*	*± 138.58 %*
Total	*1,158*	*1,869,365*					

Total deforestation between 2005 and 2015 in the Outside Area is 266,360 ha – corresponding to 26,636 ha/yr. It is distributed as follows: 205,017 ha in semi-deciduous forests, 56,501 ha in evergreen forests and 4,843 ha in Mangrove forests corresponding to a rate of 20,501 ha/yr, 5,650 ha/yr and 484 ha/yr respectively. The remaining area deforested (4,843 ha or 484 ha/year) correspond to forests with agriculture. Results are provided below:

Table 93: Results of the point sampling analysis extracted from national activity data on the ER Program accounting area for the period 2001-2015

IPCC category	Points number	Area (ha)	pi	Standard Error (proportion)	Standard Error (ha)	Confidence Interval at 90% (ha)	Error %
Forest -> Non-forest	*165*	*266,360*	*0.026*	*0.002010*	*20,465*	*± 33,562.0*	*± 12.60%*
Semi-deciduous	*127*	*205,017*	*0.020*	*0.001769*	*18,010*	*± 29,535.7*	*± 14.41%*
Miombo open	*101*	*163,045*	*0.016*	*0.001581*	*16,094*	*± 31,545.0*	*± 19.35%*
Miombo dense	*26*	*41,972*	*0.004*	*0.000807*	*8,215*	*± 16,101.5*	*± 38.36%*
Mopane open	*0*	*-*	*0.000*	*0.0000*	*0*	*± 0*	*-*

Mopane dense	*0*	*-*	*0.000*	*0.0000*	*0*	*± 0*	*-*
Evergreen forests	*35*	*56,501*	*0.006*	*0.000936*	*9,525*	*± 15,620.3*	*± 27.65%*
Montane open	*9*	*14,529*	*0.001*	*0.000475*	*4,840*	*± 9,486.1*	*± 65.29%*
Montane closed	*6*	*9,686*	*0.001*	*0.000388*	*3,953*	*± 7,747.2*	*± 79.98%*
Coastal forest open	*0*	*-*	*0.000*	*0.0000*	*0*	*± 0*	*-*
Coastal forest dense	*0*	*-*	*0.000*	*0.0000*	*0*	*± 0*	*-*
Gallery forest	*16*	*25,829*	*0.003*	*0.000634*	*6,450*	*± 12,641.1*	*± 48.94%*
Mecrusse open	*1*	*1,614*	*0.000*	*0.000159*	*1,614*	*± 3,164.0*	*± 196.00%*
Mangrove	*3*	*4,843*	*0.000*	*0.000275*	*2,796*	*± 4,584.8*	*± 94.67%*
Mangrove open	*1*	*1,614*	*0.000*	*0.000159*	*1,614*	*± 3,164.0*	*± 196.00%*
Mangrove closed	*2*	*3,229*	*0.000*	*0.000224*	*2,283*	*± 4,474.3*	*± 138.58%*
Forest with shifting cultivation	*3*	*4,843*	*0.000*	*0.000275*	*2,796*	*± 4,584.8*	*± 94.67%*
Plantations	*0*	*-*	*0.000*	*0.0000*	*0*	*± 0*	*-*

Calculation of the average annual historical emissions over the Reference Period baseline emissions for the Outside Area

The RL for the Outside Area were calculated using the same methods as those used for the ER program area. According to the FCPF MF (FCPF, 2016a), the REL equals to the average over the reference period of activity data multiplied by emission factors. Emission factors for AGB and BGB are added to account for all tree biomass. In the following tables, activity data (annual deforestation rate) and emissions due to deforestation in each forest strata are presented.

The addition of all these emissions gives mean annual emissions for the entire Outside Area of: 8,226,085 tCO_2e/yr.

Table 94: Annual emissions due to deforestation in the Outside Area

Reference periods	Historical deforestation rate - in ha/yr	Emissions related to AGB - in tCO_2e	Emissions related to BGB - in tCO_2e	Total reference emissions - in tCO_2e/yr
Semi-deciduous forests	20,501.7	4,510,368	1,140,678	5,651,046
Evergreen forests	5,650.1	1,880,751	472,442	2,353,193
Mangroves	484.3	168,369	53,478	221,847
Average over the reference period - baseline	**26,636**	**6,559,487**	**1,666,598**	**8,226,085**

The REL is the result of (i) the multiplication of activity data and emission factors for the estimation of emissions related to each forest strata and (ii) the addition of all emissions from different strata and sources. Uncertainties were calculated using the method of propagation of errors. **The overall level of uncertainties is 14% at the 90% confidence interval, corresponding to mean annual emissions of 8,226,085 tCO_2e/yr +/- 1,102,899.**

Table 95: summary of uncertainty estimated for REL for the Outside Area

	Deforestation in semi-deciduous forests	Deforestation in evergreen forests	Deforestation in mangroves	Total
Activity data in ha	20,501.7	5,650.1	484.3	**26,636**
Emission factor in tCO_2e/ha	262	392	431	
Annual emissions in tCO_2e	5,651,046	2,353,193	221,847	**8,226,085**
90% CI	16%	28%	114%	**14%**