Forest Carbon Partnership Facility (FCPF)
Carbon Fund

Emission Reductions Program Document (ER-PD)

ER Program Name and Country: Atiala Atsinanana Emission Reduction Program, Madagascar

Date of Submission or Revision: May 30, 2018

FINAL ER-PD

Ministry of Environment, Ecology and Forest (MEEF)

National REDD+ Coordination Office – BNC REDD+

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ACRONYMS AND DEFINITIONS

AFD	French Development Agency
AFOLU	Agriculture, Forestry, and Other Land Use
AGB	Above Ground Biomass
AP	Protected Area
BGB	Below-Ground Biomass
BIF	Local Tenure Office
BNC CC	National Coordination Office for Climate Change
BNC REDD+	National Coordination Office for REDD+
BRC REDD+	Regional REDD+ Coordination Office
CASEF	Agricultural Growth and Property Security
CAZ	Ankeniheny-Zahamena Corridor
CDM	Clean Development Mechanism
CF	Carbon Fund
CI	Conservation International
CIME	Interministerial Environmental Committee
CIREEF	Constituency of Environment, Ecology and Forests
CITES	Convention on International Trade in Endangered Species of Wild Flora and Fauna
COAP	Protected Area Code
COBA	Basic community
COP	Convention of Parties
COPIL	Steering committee
COPIL REDD+	REDD+ Steering Committee
CSO REDD+	REDD+ Civil Society Organization
CSR	Corporate Social Responsibility
CTD	Decentralized local authority
DMNF	Deforested Modified Natural Forest
DNA	Designated National Authority
DPF	Deforested Primary Forest
ECM	Executive Committee
EIA	Environmental Impact Assessment
ERPA	Emission Reductions Payment Agreement
ER-PD	Emission Reductions Program Document
ERs	Emissions Reductions
ESMF	Environmental and Social Management Framework

ESMP	Environmental and Social Management Plan
ESO	Environmental and Social Officer
FAPBM	Foundation for Protected Areas and Biodiversity of Madagascar
FCPF	Forest Carbon Partnership Facility
FDA	Agricultural Development Fund
FDL	Local Development Fund
FF	Functional Framework
FGRM	Feedback and Grievance Redress Mechanism
FMT	Facility Management Team
FRA	Forest resource Assessment
FRDA	Regional Agricultural Development Fund
FREL	Forest Reference Emission Level
FTM	Malagasy center of maps
GCF	Community Forest Management
GDP	Gross Domestic Product
GEF	Global Environment Facility
GELOSE	Secure local resource management-grassroot governance
GFOI - MGD	Global Forest Observations Initiative Methods and Guidelines
GFW	Global Forest Watch
GIZ	German Development Cooperation
GM	Grievance Mechanism
GMC	Carbon Methodology Group
GRM	Grievance-Redress-Mechanism
GTS	Technical Group on Safeguards
IEFN / IFN 96	National Forest Ecologic Inventory
INDC	Planned Contribution Determined at National Level
INSTAT	National Institute of Statistics
IPCC	Intergovernmental Panel on Climate Change
ITTC	International Tropical Timber Convention
KASTI	Committee on Forestry and the Environment
LRA	Applied research laboratory
LULUCF	Land use, land-use change and forestry
MAEP	Ministry of Agriculture, Livestock and Fisheries
MBG	Missouri Botanical Garden
MECIE	Consistency of Investments with the Environment
MEEF	Ministry of Environment, Ecology and Forest
MERPA	Madagascar ER-P Area
MF	Methodological Framework (FCPF)
MFB	Ministry of Finance and Budget

MNF	Modified Natural Forest
MOPO	Market operator and production operator relation
MTR	Mid-Term Report
NAP	New Protected Area
NDC	Nationally Determined Contribution
NGO	Non-governmental organization
NF	Non-Forest
NFMS	National Forest Monitoring System
ONE	National Environmental Office
ORSTOM	Office for Scientific and Technical Research Overseas
PADAP	Sustainable Agriculture through a Landscape Approach
PAPC	Priority Areas for Plant Conservation
PCD	Plan Communal de Développement
PCI-REDD+	REDD+ Specific Principles, Criteria and Indicators
PEDD	Environmental Plan for Sustainable Development
PERR-FH	Eco-Regional REDD + - Madagascar Wetlands Project
PF	Primary Forest
PFN REDD+	National REDD+ Platform
PFR REDD+	Regional REDD+ Platforms
PGE	Overall State Policy
PLI	Inter-commune Platform
PND	National Development Plan
PNLCC	National Policy for the Fight against Climate Change
POLFOR	Forest Policy
PREE	Environmental Commitment Program
PRPF	Population Resettlement Policy Framework
RPF	National Strategy for Forest Landscapes Restoration
SAC	Municipal planning scheme
SAPM	Madagascar Protected Areas System
SAVA	SAmbava-Vohemar-Antalaha
SC REDD+	Civil Society Organization for REDD+
SESA	Strategic Environmental and Social Assessment
SIS	Safeguards Information Systems
SLCs	Local Consultative Structures
SNABE	National Fuel Wood Supply Strategy
SNRPF	National Strategy for the Restoration of Forest Landscapes
SOC	Soil Organic Carbon
SRAT	Regional spatial planning scheme
STD	Deconcentrated technical service

TGRN	Transfer of Natural Resource Management
TSS	Technical Support Staff
UN REDD+	The United Nations Program on Reducing Emissions from Deforestation and Forest Degradation
UNDP	United Nations Development Program
UNFCCC	United Nations Framework Convention on Climate Change
USAID	United States Agency for International Development
USFS	United States Forest Service
VCUs	Voluntary Carbon Units
VNA	Committee on Forestry
VOI	Grassroot communities
WCS	Wildlife Conservation Society
WWF	World Wildlife Fund
ZOC	Zone of controlled occupation
ZUC	Area of controlled use
ZUD	Area of sustainable use

DEFINITION OF MALAGASY WORDS USED IN THE DOCUMENT

Dina: Local social convention used to establish common rules for social cohesion, mutual support and security, and that includes sanctions when non-respect. It is elaborated during the establishment of management agreement under the GELOSE law, at village scale.

Dinabe: Social convention equal to DINA but at communal or regional scale

Fokonolona: indicate all citizens living on a specific territory

Fokontany: administrative subdivision of a commune including several villages and created with decree n°97-1257 of October 30th 1997.

KASTI: Kaomitin'ny Ala sy ny Tontolo Iainana: volunteers elected by the village to help the forest cantonment in its general functions

Koloala: Sustainable forest management or exploitation site with a quite extensive area (from 5000 to 10 000ha). They are managed by legal persons, whether private or public, with a formal delegation from the State for a rational and sustainable exploitation.

Olobe: Traditional authorities or old elder of the village

Tangalamena: traditional authorities taking care of cultural or cultual aspects

Tranobe: Dominant and important family within a community

VNA: Vaomieran'ny Ala, volunteering local structure that work with the Forest Cantonment Chief in order to ensure control over forest

VOI: Vondron'olona itotony (or COBA in French): group of volunteers to which natural resources management has been transferred through the law N°96-025 (GELOSE)

EXECUTIVE SUMMARY

Context and Ambition

"Madagascar is one of eight "hottest" biodiversity hotspots in the world based on richness and endemism of plants and vertebrates. According to the International Union for Conservation of Nature (IUCN) Global Red List data, **Madagascar is currently considered as a priority conservation area**, with a disconcerting number of species threatened with extinction, including 88.5 percent of lemur species, a signature species of Madagascar forests. Despite major biodiversity conservation efforts, some ecosystems of the eastern forest are so fragmented and degraded that many native large animal species have been lost, and the remainder are facing critical threats, of which deforestation and forest degradation are paramount, decreasing forest capacity to maintain viable populations in the future.

Madagascar remains among the poorest countries in the world, and has shown little improvement in indicators of the well-being of its population over recent years[1]. The development agenda of the country faces an array of challenges in reducing poverty, including (for the eastern region) severe climatic events like cyclones, agriculture infrastructure and education[2] deficits, tenuous access to markets and global rise in food prices, and other environmental and social challenges exacerbated by the process of forest and biodiversity loss (less effectiveness of environmental services for agriculture activities). As a result, 70 percent of the people of Madagascar were living in poverty in 2012 and had not seen any significant improvement in their welfare during the last decades. Exacerbated by population growth, this widespread poverty is increasing pressure on forests. In Madagascar, the stakes are high: REDD+ has both the challenge and opportunity to intervene for the survival of the country's unparalleled biodiversity and forest resources, and to offer to communities an alternative to the doomed cycle of environmental degradation and diminishing agricultural returns.

Madagascar's ER-P seeks to intervene at this nexus of poverty and environmental degradation. The central objective of this ER-P is thus not only to reduce deforestation but also to contribute to the economic development of populations and provide a solid model of sustainable and reproducible development in other regions of Madagascar. To do so, activities of the program will mainly concern the agricultural sector, but also energy supply as well as the forestry sector, with the clear support and engagement of local populations (including women and civil society) and local government entities, NGOs, private businesses, research organizations, etc.

Madagascar's ER-P is a translation of Madagascar's political commitment for the implementation of REDD+. Madagascar has invested heavily in the creation of a national REDD+ framework, and has integrated existing structures for cross-sectorial coordination and local coordination into the REDD+ process. This political commitment is evidenced by the **approval of the National REDD+ Strategy in May 2018 and the upcoming approval of a REDD+ decree in June 2018** that will formalize and institutionalize works undertaken as part of the readiness process such as the title to emission reductions, safeguards instruments, and institutional arrangements.

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[1] 2016, *Shifting Fortunes and Enduring Poverty in Madagascar: Recent Findings*, World Bank

[2] Razafindravononona, J., Stifel, D., Paternostro, S*., Evolution de la Pauvreté à Madagascar : 1993-1999*, INSTAT, 2001

Madagascar has also aligned financial instruments and prioritized investment projects within the ER-P area so as to ensure successful delivery of Emission Reductions and proof of concept. Through its intensive financial planning and fundraising, which includes its own financial resources, **Madagascar has secured financing to cover 80 percent of the activities envisioned in the first stage of its program implementation**, including grants, concessional finance, loans and in-kind contributions. In terms of area, all these financing sources including the non-secured ones **cover 47 percent of the total area of the ER-P and they cover 70 percent of all forests in the ER program area**.

Madagascar has set the stage to prove that sufficient results-based finance can provide the necessary support for developing countries to address poverty, reduce greenhouse gas emissions, and build a sustainable rural economy based on responsible natural resource management.

The ER-P makes a clear link between reducing poverty and forest conservation. The mountainous topography of the eastern part of the country results in a dynamic where forests are mostly found upstream, and agriculture lands downstream as part of a watershed. Agriculture is the primary occupation of households and the main opportunity for development, while simultaneously being the main driver of deforestation. The watershed approach provides coherence and sustainability between agriculture and forestry activities within a landscape. The ER-P seeks to combine the protection of forest cover and its biodiversity with development through improved and sustainable agriculture, as well as energy supply (mainly wood charcoal).

The ER-P area covers a total of 6,904,417 ha representing more than 50 percent of the remaining rainforest of Madagascar and 10% of the national territory. The ER-P Area includes 0.9 million ha of primary forests (PF) (14 percent of the total ER-P area),

Figure 1 ER-P Area and forest cover
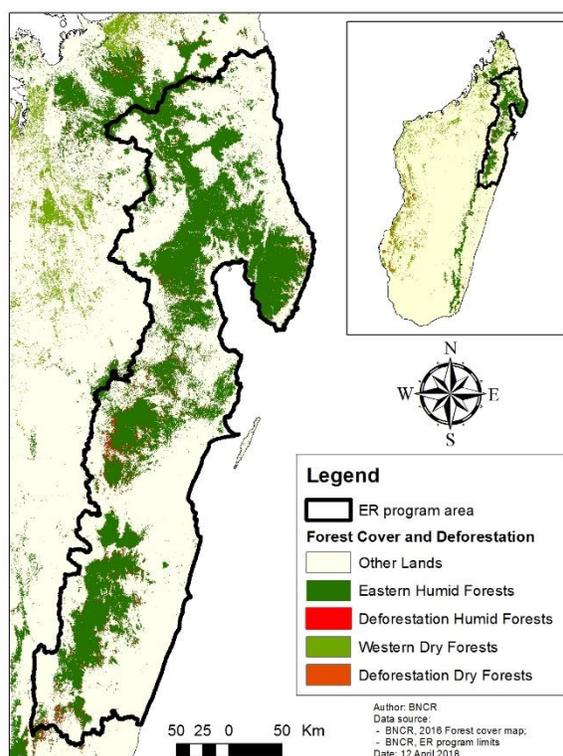
1.1 million ha of disturbed forests, (16 percent of the total ER-P area) and approximately 40,000 ha of young secondary forests.

The ER-P area has been designed to address a significant part of future forest-related emissions and removals, according to the following principles:

- High potential for REDD+: High forest cover and carbon stock, deforestation hotspots, higher capacity for carbon stock enhancement.
- Coherent geographical dimension for the goals of scaled up forest conservation, implementing the government's jurisdictional approach focused on communes (the governmental level at which land-use planning and resource management is administered), and rural poverty reduction: A continuum of 40 watersheds captured by the jurisdictional boundaries of communes, with potential for cost-effective interventions (linking forest conservation and development activities

- Presence of critical criteria for the 5-year ERPA efficiency: Presence of land-tenure management offices within communes, and existing protected areas.

Drivers and underlying causes of deforestation and forest degradation

The main direct drivers of deforestation and forest degradation in the program area are small-scale agriculture (*tavy*), energy production, mining (artisanal and illegal mining), forest harvesting, and livestock practices. The underlying drivers are population growth and demographic pressures, poverty and a reliance on economic activities that foster deforestation and forest degradation, a reliance on traditional agriculture systems and lack of adoption of new technologies, weak natural resource management and governance, incoherent policies and institutions and uncertain land tenure.

Intervention Strategy and Program Activities

Considering the wide range of drivers and agents of deforestation occurring in the area, **the ER Program aims to be flexible and ensure that selected activities address the pressures that forests are subject to, as well as the pressures faced by the people dependent on those forests**. In line with national development plans, this approach for the ER-P includes a portfolio of development opportunities for stakeholders (government, donors, private sector, NGO, local authorities, etc.) throughout the ER-P implementation zone. The National REDD+ Strategy and the activities in the ER-P are organized as interventions with direct and indirect impacts in terms of reduction of deforestation and forest degradation that will be tailored to particular target areas. The ER-P area has been selected based on several criteria, with the main goals of capturing the upstream and downstream drivers and impacts of forest loss through inclusion of a number of watersheds (of significant size: >100,000Ha to meet the definition of a "landscape), but using the government-designated boundaries of communes, which form the administrative boundaries most important for program administration and land-use planning in the landscape. Also taken into account was the interest to include the existing Protected Areas which had already been implementing REDD+ activities (Makira and CAZ PA's), and the avoidance of leakage by inclusion of Masoala, as recommended by the CFP's during the initial review of the Program. The rationale behind the commune-based approach has several elements, but the primary one is that the communes are national government designated, they are the level at which land-use decisions happen in the context of decentralization, and they are the political level around which the GoM has built its implementation strategy at the national level.

Madagascar initially selected the area of the ER-P using a watershed approach – these are also government designated areas. However, as watersheds are not administrative units, the communes covering the watersheds of priority were selected to create the administrative boundary of the program – communes also being a government-designated administrative unit. No communes in the watersheds were excluded from the area. The program boundary reaches into 5 different regions of the country. To include all of the regions which covered communes in the area would have been too large an area for the capacity and finance available for this substantial pilot program. Additionally, taking any one region would have left out important forest and increased the likelihood of leakage. This leakage potential is the reason CFP's requested the change to the boundary to include Masoala – a concern the GoM has responded to and addressed by including Masoala. The eco-region approach in Madagascar would also have been unmanageable, as the eco-region of concern is approximately 125m ha in size.

The ER-P is designed with institutional arrangements that reflect the scale of deforestation and degradation, and give flexibility to communities, communes and regions to select the most appropriate actions for their particular area. It will enable:

- Improved governance and decision-making through the development of activity and investment plans that match regional and local specificities and whose political validation will be decided by stakeholders from all levels, through the provision of participatory processes;
- Improved land planning and use at commune level, through the development and implementation of land use plans at the commune and regional levels (SAC and SAR respectively);
- Provision of incentive for communities and the private sector to support sustainable development and improve management of agricultural and raw materials (coal, perennial and annual crops, etc.
- Improved management of land and land use-related conflicts through community and participatory mapping of activities during activity planning.

The ER-P is designed to evolve and expand over time. It will take the first few years to achieve deforestation reduction across the large area included in the ERP. The direct and rapid impact activities currently planned through initial investments cover only part of the considered zone and achieve tangible results in terms of emission reductions. However, the ER-P will balance activities to ensure short- and long-term results that allow not only the maintenance of activities, but also reinvestment in new activities and new zones. This sets forth a vision and growth path beyond the ERPA with the Carbon Fund.

Program activities within the ER Program

Priority program activities have been identified by regions with spatially explicit prioritization through Regional REDD+ strategies. Although the strategic options outlined in the National REDD+ Strategy are not sector-specific, the ER-P, with its focus on implementation at jurisdictional scale, groups activities per sector.

Category of activity	With direct impacts	With indirect impacts
Agricultural sector	AD 1 - Optimize production systems and agricultural and livestock-dedicated infrastructures	AI 1 - Support the development and setting up of small and medium-sized enterprises and/or rural cooperatives and promote the creation of REDD+ mechanism-related subsectors at the local level
	AD 2 - Improve the management of cash crop production under the agroforestry system and improve the food security of local communities' riparian to forests	
Forest sector	FD 1 - Improve the management of forest areas under the landscape approach	FI 1 - Reinforce the forest surveillance and monitoring system and regulatory text enforcement, including fire management
	FD 2 - Promote private and community reforestation, rehabilitate degraded forest areas, and reforest in consideration of local needs, without converting natural forests	FI 2 - Improve the contribution of the forest sector to economic development by promoting the use of non-wood products and other subsectors that do not affect the carbon stock

Energy sector	ED 1 - Promote improved fuel wood transformation and use techniques, as well as the dissemination of improved coal stoves in urban centers	EI 1 - Support the harmonization and development of the legal framework relating to the development of alternatives to fuel wood and sustainable fuel wood supply
	ED 2 - Develop the use of renewable energy (solar, biogas, etc.) for domestic use	
Crosscutting and other sectors	ID 1 - Enhance the benefits delivered by the conservation of biodiversity and ecosystem services	II 1 - Reinforce land security, including with reforestation actors
		II 2 - Improve the coordination and monitoring of mining and agricultural developments and ensure the setting up of compensatory reforestation
		II 3 - Reinforce decentralized management and coordination of REDD+ mechanism-related interventions at local level
		II 4 - Align the legal framework with the institutional one conducive to the good governance of the REDD+ mechanism

Implementation and Monitoring Arrangements

The institutional arrangements for the ER Program are designed based on the agreed structures developed through the REDD+ readiness process and alignment with the national and sub-national (regional) level institutions and agencies.

National level

The Government of Madagascar will be the signatory of the ERPA and will be represented by the Ministry of Finance and MEEF as the Legal Entities for the ER-P. In this capacity, the MEEF authorizes the BNC REDD+ to administer and manage the ER-P. The overall responsibility for the development of REDD+ in the country rests with the BNC REDD+, on behalf of the MEEF, as the entity implementing the ER-P from an operational point of view, but also as the entity liable to the Carbon Fund.

A **REDD+ Steering Committee,** the Interministerial Committee for the Environment (CIME) will be the political and strategic decision-maker for the REDD+ mechanism in Madagascar, as well as for legal, operational and financial implications of the ER-P. This steering committee exists and is already operational. The Committee met on May 16 for the approval of the national REDD+ strategy.

The **National REDD+ Platform (PFN REDD+)**, chaired by the General Secretary of the MEEF, for which the secretariat is provided by BNC REDD+, is the most important and central body of the REDD+ mechanism, as it is in charge of developing and formulating specific proposals.

An **independent observer** on safeguards will be delegated to carry out an independent audit related to safeguards processes.

Regional

The **Regional REDD+ Platforms** chaired by the Head of Region, perform similar functions to the National REDD+ Platform but at the level of each region. **Regional REDD+ Cells (BRRs)** will be hosted by the DREEF and will ensure secretariat and operational support to the implementation of the ER-P at each regional level.

Commune and inter-commune

Commune-level **Local Consultative Structures (SLCs)** that are close to each other and that belong to a same landscape or watershed may come together to form an **Inter-Commune Platform (PLI).** According to the scale of intervention, SLC s or PLI will collect and prioritize REDD+ activities proposed by relevant local actors. The **Municipal Council** will validate the proposals of the SLC and will incorporate these into the Commune Development Plan and the **Mayor** (and his/her Executive Committee- ECM) will oversee the activities to be carried out.

Members of Civil Society including women's groups are included in the regional and national REDD+ platforms and are also being specifically provided with means to collect feedback among different local stakeholders to be reflected in activities and decision-making process. There are no Indigenous Peoples in the ER Program area.
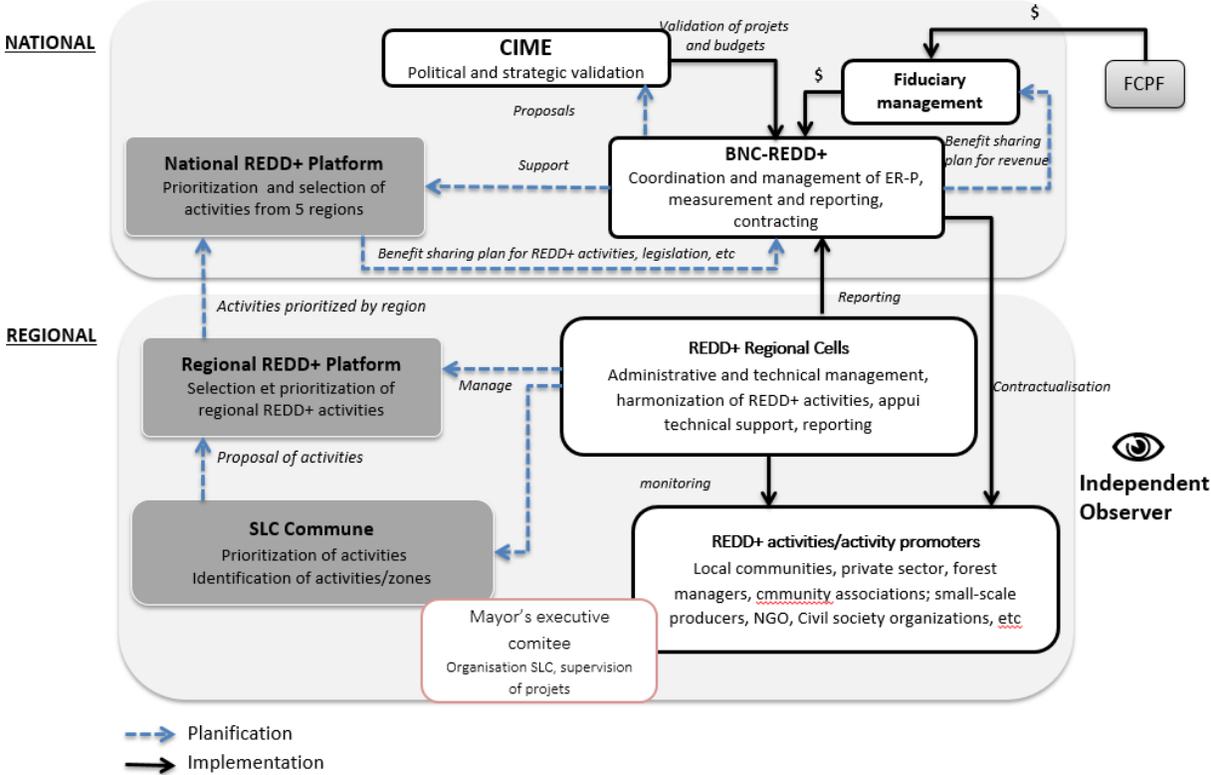
Monitoring and Evaluation will be conducted at the level of each region by the respective regional REDD+ Cells and aggregated at the national level by the BNC REDD+.

Reference Emission Level (REL)

The carbon accounting framework includes the three REDD+ generic activities defined by Madagascar (deforestation, forest degradation and enhancement of carbon stocks - afforestation/reforestation), it

includes all carbon pools and gases in deforestation, and it includes the most significant pools and gases in forest degradation and enhancement (i.e. aboveground and belowground biomass). This **represents 96 percent of total absolute forest-related GHG emissions/removals** according to the Key Category Analysis.

The reference level is calculated based on **average annual emissions for the reference period 2006-2015**, using the recommendations of the GFOI Methods and Guidance Document (MGD) guidance[2] and 2006 IPCC Guidelines. Activity data were estimated through stratified sampling following the best practices indicated by the GFOI MGD. The emission and removal factors were primarily based on terrestrial inventories conducted in 2014 and 2016.

ERPA term year t	emissions from deforestation (tCO2/yr)	emissions from degradation (tCO2/yr)	removals from enhancement of carbon stocks (tCO2/yr)	Total Reference Level (tCO2/yr)
2S 2019	9,481,642	2,011,023	-19,357	11,473,309
2020	9,481,642	2,011,023	-38,714	11,453,952
2021	9,481,642	2,011,023	-58,071	11,434,595
2022	9,481,642	2,011,023	-77,428	11,415,238
2023	9,481,642	2,011,023	-96,785	11,395,881
2024	9,481,642	2,011,023	-116,142	11,376,524

Potential Emission Reductions

The Emission Reduction Potential of the ER Program based on the intervention strategy and funding level presented in the financing plan and considered set-aside of ERs to address reversal (28%) and uncertainty (8%) is estimated at **13,718,472 tCO₂eq, from which 13 million tCO₂eq are available to the Carbon Fund**.

Benefit Sharing

Madagascar will use carbon revenues to invest in new REDD+ activities or expand existing REDD+ activities or ensure the continuity of existing REDD+ activities[3]. Available and up-front funding cannot cover the entire area of the ER-P, thus making, at each phase of carbon revenue generation, investment into new activities a priority for its continuity.

More than 80% of the revenues will be allocated to investments and incentives, while 10% of the carbon revenues will be allocated to program management costs and another 10% will be allocated to a reserve which will be used to manage the risk of non-performance and ensure the sustainability of the ER program, in case of lack of performance. In case of continuous performance this reserve will be used to cover additional investments.

Two main group of beneficiaries are identified: promoters of REDD+ activities and local communities. The former are those who present REDD+ activities to be funded with carbon finance. **The former can be VOIs, forest managers** (i.e. community forest manager or protected area manager), **civil society organizations, farmers' associations or groups of small producers (i.e. charcoal producers, hunters, animal and agriculture farmers, private sector actors, and NGOs**. The latter can also be promoters but will benefit in any case as

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[2] Chapter 5 of the GFOI MGD Version 2.0

[3] *REDD+ activity* in the context of this ERPD are detailed design composed of set of emission reduction activities. These could be funded already or they could be presented through the benefit sharing arrangements to seek funding from the ER-P.

REDD+ activities eligible to carbon finance will be required to build into the proposed REDD+ activities a number of community-based incentives (health, education, transportation, etc.) so that local communities will benefit beyond co-benefits generated by the REDD+ activities themselves.

Monetary Carbon benefits

Community incentives | Continuity of activities | Extension of activities | New activities | Management costs | Treasury

(Management of financial risks)

VOI   Forest Managers   Civil society   Associations

Small scale producers   Private operators   NGO

Promoters and beneficiaries
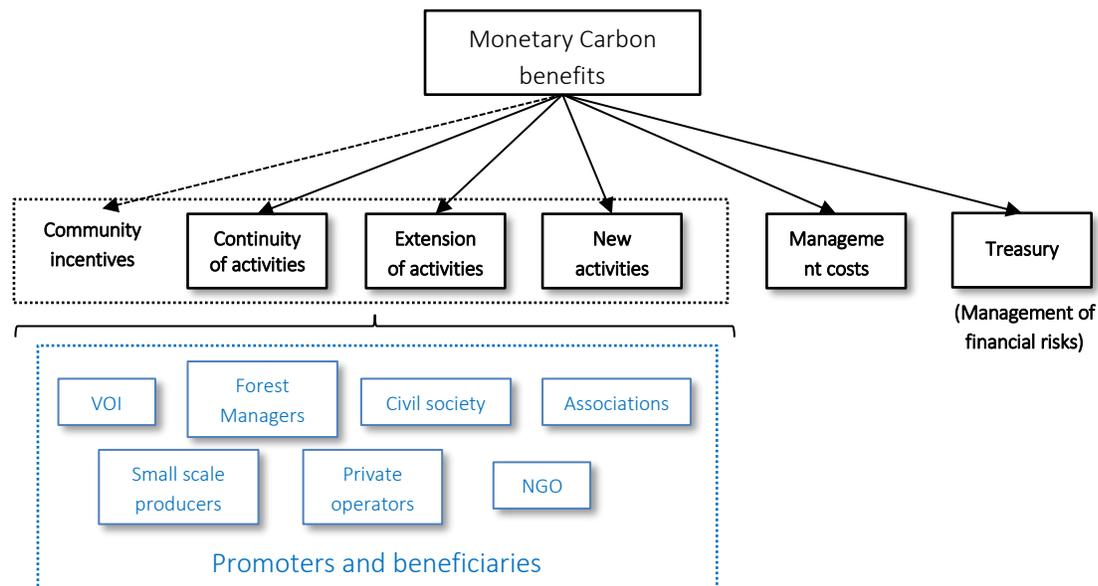
The allocation of the revenue available for investments and incentives (between 80% and 90% of ERPA proceeds) will be based not on actors but on REDD+ activities, their associated performance and non-carbon benefits generated, so there is no a-priori distribution defined in the benefit sharing plan.

The national platform will decide the allocation of the revenues to the different activities that are presented for consideration based on defined eligibility criteria that prioritize efficiency and non-carbon benefits generated such as community-based incentives. This ensures the transparency of the process. The selected activities will then be validated by the CIME. Once all REDD+ activities have been validated by CIME, the General REDD+ activity plan is put online (in the REDD+ Projects and Programs data information system) to allow all stakeholders to track the progress and achievements of the projects.

These activities can be presented by promoters as two different types of activities based on the scale: National/large-scale activities or regional/communal activities. The former consists of large transformational projects with multiple stakeholders, that cover a large area. The latter are activities proposed by SLCs or a region with the technical support of BRRs, and selected by the regional REDD+ platform to be presented to the national REDD+ platform for consideration. Priority is given to national/large-scale activities over regional/communal so as to prioritize efficiency in the generation of emission reductions and implementation of activities.

Carbon revenues will be used to finance three types of REDD+ activities by order of priority: continuity of existing activities; geographical or thematic extension of existing activities; or new activities. Finance of the continuity or extension of existing activities will occur if these have performed and it is demonstrated these lack funding that would ensure their continuation. Finance of new activities will consider the priority locations and activities defined by Regional REDD+ strategies that have been approved.

Monitoring of the benefit sharing plan will be done by the BRRs and BNC REDD+, and all data will be archived in the REDD projects and programs data management system.

The advanced benefit sharing plan is expected to be validated by the national REDD platform in December 2018, and to be be available by March 2019.

Social and Environmental Risks management

A Strategic Environmental and Social Assessment (SESA) for the national REDD+ Strategy in Madagascar was conducted in a participatory manner with a broad cross section of stakeholders, including civil society, taking an active part. The assessment was conducted in support of the development of the National REDD+ Strategy and the ER Program. Through the participatory work, it was possible to inform and refine the strategic options as well as the activities of the National REDD+ Strategy that was validated in March 2018. Associated environmental and social risks have been identified and recommendations have been made and have been taken into account in the design of the strategy. Through the development of the SESA recommendations, operational tools for the implementation of REDD+ activities were produced.

The safeguards instruments include: **An Environmental and Social Management Framework (ESMF), a Population Resettlement Policy Framework (PRPF) and a Process Framework (PF).** These three safeguards frameworks have been developed and are being validated at the national level. It should be noted that under PADAP, a pest and pesticide management framework was developed and will be implemented within the ER-P, and that the ER-P's ESMF also includes elements on the management of pests and pesticides, consistent with the framework developed for PADAP.

Additionally, the Working Group on Safeguards (GTS) and BNC REDD+ have defined a set of Principles, Criteria and Indicators (PCI-REDD+) applicable in the context of Madagascar that sets a high level of social and environmental performance for the REDD+ strategy in accordance with the Cancun Safeguards, UN-REDD Principles and the REDD+ SES principle-criteria. [4] The Safeguards Information System (SIS), which exists in beta form, will monitor the implementation of Madagascar's REDD+ strategy and the REDD+ activities of the ER-P will be based on these PCI-REDD+ (see Annex III for more details). Madagascar will work in the coming months to (i) strengthen the capacities of ER-P stakeholders, including civil society (CSOs) to monitor safeguards, and (ii) test these indicators in the field

The management of the program's social and environmental safeguards is fully integrated into the process of identification, design and monitoring and evaluation of the ER-P's REDD+ activities. Any activity financed by the program must therefore comply with the above-mentioned requirements applicable to them at each stage of their implementation.

To manage potential complaints and conflicts a Feedback, Grievance and Redress Mechanism (FGRM) has been designed and will be the responsibility of the Program Management Unit and the implementing agencies.

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[4] REDD+ SES (2012). *Social and Environmental Standards REDD+*, 10 September 2012, 30 pages.

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 Finance and Budget (MFB)
Type and description of organization	The MFB is in charge of ensuring the right application of financial, fiscal and and budget national policies in Madagascar. It ensures the management and monitoring of external support and contribute to the harmonization of cooperation with donors, ensure the supervision of financial and public institutions.
Main contact person	Mr RAJAOBELINA Falihery
Title	General Secretary of MFB
Address	Porte 314 -3ème étage, Immeuble du Ministère des Finances et du Budget -Antaninarenina -Antananarivo 101
Telephone	+261 20 22 336 30
Email	mfb-sg@moov.mg
Website	www.mefb.gov.mg

Name of the co-signatory entity	Ministry of Environment, Ecology and Forest (MEEF)
Type and description of organization	The MEEF is in charge of the management of environmental resources and services. The Ministry has been in charge of the REDD+ process since 2008. It ensures the coordination of REDD+ related activities through the REDD+ National Coordination Office (Bureau National de Coordination REDD+ - BNC REDD+).
Main contact person	Mr Liva Hariniaiana Ramiandrarivo
Title	General Secretary of MEEF
Address	B.P 3948, Rue Toto RADOLA – Antsahavola, Antananarivo 101
Telephone	
Email	liva.ramiandrarivo@meeft.gov.mg
Website	www.ecologie.gov.mg

1.2. ORGANIZATION(S) RESPONSIBLE FOR MANAGING THE PROPOSED ER PROGRAM

Same entity as ER Program Entity identified in 1.1 above?	Yes, but trough the BNC REDD+
Name of organization	National REDD+ Coordination Office – BNC REDD+
Type and description of organization	BNC REDD+ will be responsible for coordinating the implementation of the different activities on the ground and part of the management of the performance-based payment system. It is the secretary of the National REDD+ Platform, which is responsible for the elaboration of all strategic orientations at national level but also for the ER-P. These orientations have then to be officially approved by the National REDD+ committee.
Organizational or contractual relation between the organization and the ER Program Entity identified in 1.1 above	The BNC REDD+, through the decree N°8090/2014 is already officially in charge of the coordination of all REDD+ related activities.
Main contact person	Rakotosoa Andrianina Lydie
Title	Coordinator of BNC REDD+
Address	Lot II A 105 0, Iadiambola Nanisana, Antananarivo (101)
Telephone	Tel : +261 34 05 902 16
Email	arakotosoa@bnc-redd.mg / andrianinarakotosoa@gmail.com
Website	http://bnc-redd.mg/

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
NATIONAL GOVERNMENTAL ENTITIES		
National REDD+ COPIL	To be defined	National steering committee of the REDD+ process
National REDD+ Platform	Mr Liva Ramiandrarivo liva.ramiandrarivo@meeft.gov.mg	General Secretary of MEEF President of the National REDD+ Platform
Ministry of Environment, Ecology and Forest (MEEF)	Rafidison Manassé rafidi.manase@gmail.com 034 05 626 38 Zafitsara Elisette	Environmental managers, Represent the MEEF in the National REDD+ Platform

	Tel : +261 34 09 437 23 zafette63@yahoo.fr	
Ministry of Agriculture, Livestock and Fisheries (MAEP)	Rasolofoarivony Mamy Tel : +261 3439 416 66 rasolofoarivonymamy85@gmail.com Rafalimanana Oliva oliva_rafali@yahoo.fr	Environmental Manager, Represents the MAEP in the National REDD+ Platform Coordinates the PADAP Program
Ministry of Fisheries (MP)	Rafidison Roginah Tel : +261 34 05 579 61 rogirafidi@yahoo.fr	General Director of partnership and sustainable development Represents the MP in the National REDD+ Platform
Ministry of Water	Randrema Miora Harinavalona Tel : +261 3204 680 62 / 3302 722 13 miorarandrema@gmail.com celluleenvironnementale@mineau.gov.mg	Environmental Manager, Represents the Ministry of Water in the National REDD+ Platform
Ministry of Interior and Decentralization	Razafimandimby Paul Joseph pauljosepha@gmail.com Tel : +261 34 05 528 81	Chief of Projects and Studies department Represents the Ministry of Interior and Decentralization in the National REDD+ Platform
Ministry of Territory Management and Equipment	Rasoloharivony Farahanta Rivonarisoa Tel : +261 34 05 548 51 farahanta30@yahoo.fr	Chief of Environmental Department Represents the Ministry of Territory Management and Equipment in the National REDD+ Platform
Ministry of Mines and Oil	Razafindralambo Andriatsilavina Balita Tel : +261 32 03 110 10 balita@live.fr	Manager of Studies at Environmental and Security Regulation Direction Represents the Ministry of Mines in the National REDD+ Platform
Ministry of Justice	Rakotonindrina Onjamalala Tel : +261 33 28 444 22 minjus.de@gmail.com	Magistrate Collaborator at Studies Direction Represents the Ministry of Justice in the National REDD+ Platform
Ministry of Public Security	RandriamandersY André Tel : +261 34 14 005 18 Andrewsdelsarto75@yahoo.fr	Director of Organization and employment at National Gendarmerie Represents the Ministry of Public Security in the National REDD+ Platform
REGIONAL ENTITY		
Regional REDD+ Platform of Analanjirofo	Malo Benoit	Chief of region and president of the Regional REDD+ Platform
Regional REDD+ Platform of Atsinanana	Talata Michel	Chief of region and president of the Regional REDD+ Platform
Regional REDD+ Platform of Sava	Velomaro Faustin	Chief of region and president of the Regional REDD+ Platform

Regional REDD+ Platform of Alaotra Mangoro	Ranaivonirina Jean Yves	Chief of region and president of the Regional REDD+ Platform
Regional REDD+ Platform of Sofia	Zaranaina Tohanaina Ernest region_sofia@yahoo.fr Tel : +261 32 43 367 40	Chief of region and president of the Regional REDD+ Platform
ORGANISM IN CHARGE OF ENVIRONMENTAL POLICY APPLICATION		
Madagascar National Parks (MNP)	Ramangason Guy Suzon, dg@madagascar.national.parks.mg, tel: +261 32 05 047 17	Chief Executive Responsible for coordination of all activities in MNP Protected Areas and member of the National REDD+ Platform
National Environmental Office (ONE)	Rakotoary Jean Chrisostome, jcrakoto@pnae.mg,	Chief Executive of ONE, responsible for safeguards screening and evaluation of projects under the program
National Coordination Office for Climate Change (BNC CC)	Ramaroson Nivohary, nivoohary@yahoo.fr, Tel : +261 34 434 20 90	Director of BNC CC and responsible for the National Greenhouse Gas Inventory and National Carbon Registry
National Coordination Office for REDD+ (BNC REDD+)	Rakotosoa Andrianina Lydie Tel : +261 34 05 902 16 andrianinarakotosa@gmail.com	Principal coordinator of all REDD+ activities and of REDD+ process and implementation of the ER-P Representative of the secretariat of the National REDD+ Platform
ORGANISATIONS NON GOUVERNEMENTALES ET DE LA SOCIÉTÉ CIVILE		
Civil Society Organization for REDD+ (SC REDD+)	Daniel Rabeson Tel : +261 34 20 555 53 Raonintsoa Paul (Alliance Voahary Gasy) raonintsoa@yahoo.fr Tel : +261 34 01 113 41 Raparison Eric (Sehatra Iombonana ho an'ny Fananantany -SIF) reh212001@yahoo.fr Tel : +261 34 16 534 63	President of Civil Society Organization (CSO REDD+) Chief of Commission Protected Areas and Forest, Member of the National REDD+ Platform, National Coordinator of the SIF organization, Member of the National REDD+ Platform,
Wildlife Conservation Society (WCS)	Clausen Alison Tel : +261 32 85 983 16 aclausen@wcs.org	Makira REDD+ Project holder approved by VCS Member of the National REDD+ Platform
WWF - MDG	Rakotondrasoa Laza Tel : +261 34 22 100 01 lrakotondrasoa@wwf.mg	Responsible for the PHCF project in the CAPAM area

		Member of the National REDD+ Platform
Conservation International - MDG	Randrianarisoa Jeannicq jrandrianarisoa@conservation.org	CAZ REDD+ Project holder approved by VCS Member of the National REDD+ Platform
PRIVATE SECTOR		
Fanalamanga Society	Rakotonirina Augustin, aug.rakoto@gmail.com, Tel: +261 32 05 361 37 Rakotondrainibe Charles Tel : +261 32 07 244 88 charl_rainibe@yahoo.fr	Chief executive of Fanalamanga, main timber providers in Madagascar, Technical Director of Fanalamanga and representative of private sector in the National REDD+ Platform
National Federation of Loggers	Razafintsalama Claudie Tel : +261 34 13 715 2 gnefm@moov.mg irenerazafy@gmail.com	National Coordinator of the Federation and representative of loggers in the National REDD+ Platform
FUNDING PARTNERS		
Forest Carbon Partnership Facility	Tracy Lee Johns, tjohns@worldbank.org,	Technical and financial support for the finalization of REDD+ readiness and for the design of the ER Program including preparation of the ERPD.
World Bank	Erik Winter Reed ereed1@worldbank.org	Technical and Financial support for the REDD+ Readiness and for the design of the ER Program and for the PADAP as well
Délégation de l'Union Européenne à Madagascar	Andrianirina Nicole Tel : + 261 20 22 242 16 nicole.andrianirina@eeas.europa.eu	Environmental and Rural Development Program Manager Potential technical and financial support for the implementation of the ER-P.
Agence Française de Développement (AFD)	Claire-Isabelle Rousseau rousseauci@afd.fr Danielle RABENIRINA rabenirinad@afd.fr	Financial support for the PADAP program
GIZ	Rust Jenny jenny.rust@giz.de Tel: +261 32 05 425 36 Burren Christian christian.burren@giz.de Tel: +261 33 02 882 69	Technical Advisors at GIZ and responsible of the PAGE GIZ (Programme d'Appui à la Gestion de l'Environnement) supporting the REDD+ process and ER-P development on several aspects
UN REDD+	Boccucci Mario (UN-REDD / Geneva) Tel: +41 (0) 22 917 8944	Technical and financial support for REDD+ readiness including support for the national MRV system and the National REDD+ Fund

USAID	Razafimahatratra Tiana Tel : +261-34-07-428 26	Financial support for MRV and NFMS development

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

Madagascar finalized its Readiness-Package while concurrently developing the ER-P. It has capitalized on the readiness process to align with and inform the ER-P, especially with regards to the drivers analyses, specific activities, targeted areas, accounting frameworks, and implementation structures. During the readiness process, government entities and stakeholders have focused on the practical elements of REDD+ implementation as envisioned in the ER-P. Overall, national preparation for REDD+ has included best-practice analyses, public dialogue and information sharing and discussion among ministries on conceptual principles, mechanisms and methodologies, building on the experience gained from the ER-P area. Both the Readiness and ER-P preparation efforts build on experience already gained through the implementation of multiple REDD+ projects.

An evaluation of Madagascar's progress in achieving different facets of REDD+ readiness –as laid out in the Framework of Evaluation of the Preparation of the FCPF – was conducted in June 2017 and submitted to the FCPF Participants Committee (PC) as part of Madagascar's Readiness Package in August 2017.

The review of the REDD+ process in Madagascar was conducted in a participatory, inclusive and transparent way, mobilizing stakeholders and key groups (NGOs, civil society, private sector, development partners, government agencies) both at national and regional levels. Stakeholder consultations assessed each of the 34 criteria of the FCPF's REDD+ Readiness Assessment Framework and thus assessed progress at the national level.

Although the review is essentially related to the readiness phase, at the same time the recommendations affect both the readiness phase and the implementation phase. The output of the consultations comprises a list of the elements to be improved and the prioritization of follow-up actions to achieve a level of preparation satisfactory to all the stakeholders. It should also be noted that while the Readiness Package has been submitted, activities continue to strengthen institutions, build capacity, consult and enhance participation of key stakeholders, including local communities for effective REDD+ implementation.

Table 1 - program of consultations during theis R-Package evaluation process

Level	Location	Date	Typology of Participants	Men	Women	Total
National	Antananarivo	May 9	CSO, VOI	7	8	15
National	Antananarivo	May 10	Technical and financial partners (TFP), private sector, technical groups (safeguards and methodology)	7	9	16
National	Antananarivo	May 11	Ministries, Regions, Prefectures	7	9	16

Level	Location	Date	Typology of Participants	Men	Women	Total
Regional - Analanjirofo	Fénérive Est	May 16	CSO, VOI	17	1	18
Regional - Analanjirofo	Fénérive Est	May 17	REDD+ Regional Platform	17	2	19
Regional - Atsinanana	Toamasina	May 16	CSO, VOI	19	11	30
Regional - Atsinanana	Toamasina	May 17	REDD+ Regional Platform	12	7	19
Regional - Sofia	Atsohihy	May 23	CSO, VOI	17	7	24
Regional - Sofia	Atsohihy	May 24	REDD+ Regional Platform	15	5	20
Regional - Alaotra Mangoro	Moramanga	May 23	CSO, VOI	16	5	21
Regional - Alaotra Mangoro	Moramanga	May 24	REDD+ Regional Platform	13	5	18
Regional - SAVA	Sambava	May 30	CSO, VOI	19	1	20
Regional - SAVA	Sambava	May 31	REDD+ Regional Platform	10	4	14
			Total people consulted	176	74	250
National	Moramanga	June 21-23	REDD+ National Platform, RRPs, CSOs and regional VOIs	25	10	35

According to the representative group of stakeholders involved in the review, Madagascar has made good progress in REDD+ readiness, but effort is still needed to consolidate gains. For only two criteria of the 34, the effort required is considered more significant: (i) feedback to stakeholders (criterion 10), and (ii) development of the emissions reduction registry and monitoring activities (criterion 22). Since the evaluation there have been specific efforts to enhance stakeholder feedback opportunities by improving the BNC REDD+ website and uploading documents, by working with the regional REDD+ platforms and setting timelines for posting meeting minutes. With regards to a registry, BNC REDD+ has developed a REDD+ projects and program data management system, that includes the SIS, which currently exists in a beta version and is being prepared for live publication . It was acknowledged that Madagascar's government and REDD+ community made considerable improvements in the following areas:

▪ *Institutional arrangements*: The institutional framework for REDD+ is now designed from the national level to local implementation. Improvement and refinement are being made in certain areas such as the details of facilitating processes and defining the exact distribution of roles and responsibilities between entities, but the vision for implementation is clearly defined. To date, some entities exist and are functional and actively involved in the design of REDD+, like the National REDD+ Platform and 5 Regional Platforms (of the ER-P area). The implementation arrangements are also being refined to reduce transaction costs and improve efficiency as part of the learning process.

▪ *Development of the monitoring mechanism and the Safeguard Information System (SIS)*: A SESA has been conducted and three national environment and social management frameworks related to safeguards have been prepared. The Safeguard Information System has been designed and is available in a beta version. It is currently being updated and refined to be integrated with the REDD+ projects and program data management system on a single platform. Measures to facilitate access for those without access to the internet are being tested and summaries of safeguards instruments are made available in the local language, Malagasy. Madagascar developed national environmental and social standards through the use of REDD+ specific Principles, Criteria and Indicators (PCI-REDD+), respecting Cancun and UNFCCC safeguards, and tailored to the national context.

- *Development of National Forest Emission Reference Levels and the institutional arrangements for MRV and the NFMS*: The FREL has been reported to the UNFCCC, and a first version approved. A second version, based on updated data, has been submitted and is currently under assessment. MRV and NFMS systems are designed and under implementation. The NFMS continues to be improved to streamline institutional data sharing, enhance accessibility and collaboration among institutions.
- *Development of the Benefit-Sharing Mechanism*: strong stakeholder participation has already enabled the definition of the main underlying criteria of the benefit-sharing mechanism by focusing on the ER-P at this stage.
- *Stakeholder consultation, public communication and structuring the entities linked with implementation* (see also section 5): Extensive consultations have been conducted through the REDD+ National Platform and the REDD+ Regional Platforms, and various Technical Working Groups.
- *Development of the National REDD+ Strategy*: The National REDD+ Strategy has been completed based on broad stakeholder consultations and through the consolidation of the results of regional REDD+ strategy development in the five ER-P regions. The strategic document has been disseminated, consulted upon, and validated by stakeholders and the REDD+ platform in March of 2018. The activities described in the ER-P are consistent with the approach in the National REDD+ Strategy. For each workshop or consultation made during the elaboration of the national strategy, the ER-P was used as a concrete basis and example of the application of such a strategy, although applied in the context of the Eastern Humid Forest. This approach ensured that all studies and consultations specific to the ER-P design were informing the National Strategy (at least for the humid eastern forest), and simultaneously ensured that the national REDD+ vision was embracing the ER-P rationale and implementation process. All elements described in this ER-PD offer a solid basis for further REDD+ implementation in other ecoregions.

During the R-Package auto-evaluation process, certain recommendations were identified as priorities for follow up :

Component 1: Organization of preparation and consultation
- Operationalize the REDD+ Regional Coordination Offices (BRC REDD+) of the ER-P area as soon as possible;
- Implement the Local Consultative Structures (SLCs) (in the municipalities which do not yet have them and where REDD+ activities are planned) and strengthen the participation of VOIs (forest-dependent) in the operation of this structure;
- Clarify the roles and responsibilities of all institutions, and define the roles in a guide or handbook;
- Make communications consistent (especially for the local level), and ensure the adequacy and acceleration of feedback after consultations.

Component 2: Preparation of the REDD+ strategy
- Strengthen the intersectoral approach (decision-making, coordination, land-use planning and spatialization of activities) on a priority basis, and take migration into account;
- Ensure equity within the revenue sharing mechanism and the management of carbon related revenues, through legal texts and development of specific criteria during REDD+ project planning and prioritization;

- Place particular emphasis on alternative development solutions to reduce deforestation and forest degradation.

Component 3: Reference level for emissions
- Capitalize on the many experiences in Madagascar, and realistically adapt the methodology for Reference Level calculation to the current and near future deforestation context in Madagascar in order to ensure efficiency of the REDD+ mechanism;

Component 4: Forest monitoring systems and safeguard measures
- Involve stakeholders more strongly in the monitoring system;

The country's Readiness Package Participatory Review process integrates a specific action plan ([available on FCPF website](#)).

Beyond FCPF-specific Readiness activities, Madagascar has experience with using carbon finance to support protected area management, including two in the ER-P area: the Makira forest, operated on behalf of the GOM by Wildlife Conservation Society, and CAZ forest corridor project operated on behalf of the GOM by Conservation International. Some of these initiatives have been in operation since 2001 and have, as a result, provided a great deal of data and experience allowing for a detailed analysis of potential REDD+ opportunities and barriers in Madagascar. This is a strength of the ER-P and REDD+ overall in Madagascar.

2.2. AMBITION AND STRATEGIC RATIONALE FOR THE EMISSIONS REDUCTION PROGRAM

"Madagascar is one of eight "hottest" biodiversity hotspots in the world based on richness and endemism of plants and vertebrates[5]. According to the International Union for Conservation of Nature (IUCN) Global Red List data, **Madagascar is currently considered as a priority conservation area**, with a disconcerting number of species threatened with extinction (e.g. 88.5% of lemur species). Despite major biodiversity conservation efforts, some ecosystems of the eastern forest are so fragmented and degraded that many native large animal species have been lost, and the remainder are facing critical threats, among which deforestation and forest degradation are paramount, decreasing their capacity to maintain viable populations in the coming years. **More than 50 percent of the remaining rainforest of Madagascar will covered by the ER-P, therefore seeking to protect more than 50 percent of this unique ecosystem.**

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[5] Myers, N., Mittermeier, R. A., Mittermeier, C. G., Da Fonseca, G. A., & Kent, J. (2000). Biodiversity hotspots for conservation priorities. *Nature*, *403*(6772), 853.
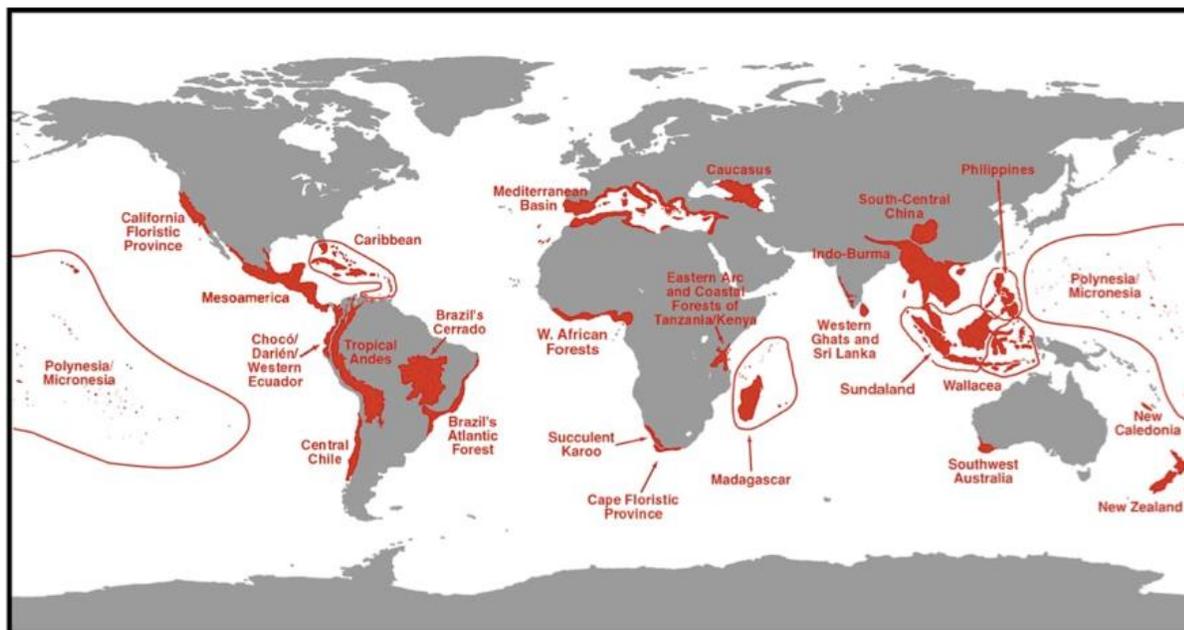
Figure 2 - The 25-world's hotspot of biodiversity[6]

Madagascar also remains among the poorest countries in the world, and has shown little improvement in indicators of the well-being of its population in recent years[7]. The development agenda of the country faces an array of challenges in reducing poverty, including (for the eastern region) severe climatic events like cyclones, agriculture, infrastructure and education[8] deficits, tenuous access to markets and global rise in food prices, and other environmental and social challenges exacerbated by the process of forest and biodiversity loss (e.g. reduced effectiveness of environmental services for agriculture activities). As a result, 70 percent of the people of Madagascar were living in poverty in 2012 and had not seen any significant improvement in their welfare during the last decades. This is all the more true in the ER-P area as poor households live overwhelmingly in rural areas and depend mainly on agriculture for their livelihood[9]. The unsustainable and unplanned expansion of the agricultural frontier has come at the expense of forests, making local people increasingly vulnerable as the environmental services ensured by forests, and on which they depend for livelihoods, are threatened. The weak level of education[10] and limited use of agricultural inputs is a major reason for low agricultural productivity in this agro-ecological region, contributing to the extreme poverty so common in the ER-P area.

The ER-P seeks to intervene at this nexus of poverty and environmental degradation. The central objective of this ER-P is thus not only to reduce deforestation but also to contribute to the economic development of the populations and provide a solid model of sustainable and reproducible development in other regions of

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[6] Myers, N., Mittermeier, R. A., Mittermeier, C. G., Da Fonseca, G. A., & Kent, J. (2000). Biodiversity hotspots for conservation priorities. *Nature*, *403*(6772), 853.

[7] 2016, *Shifting Fortunes and Enduring Poverty in Madagascar: Recent Findings*, World Bank

[8] Razafindravononona, J., Stifel, D., Paternostro, S., *Evolution de la Pauvreté à Madagascar: 1993-1999*, INSTAT, 2001

[9] Minten B., Zeller M., Randrianarisoa C., Factor Use and Agricultural Productivity, in Bart Minten and Manfred Zeller Eds, *Beyond Market Liberalization: Welfare, Income Generation and Environmental sustainability in Rural Madagascar*, Ashgate, 2000, pp. 79-118

[10] Randrianarisoa, J. C., & Minten, B. (2001). Agricultural production, agricultural land and rural poverty in Madagascar.

Madagascar. To do so, activities of the program will mainly concern the sectors of agriculture and livestock, but also energy supply as well as the forestry sector, with the clear support and engagement of local populations (including women and civil society) and local government entities (STD, CTD), NGOs, private businesses, research organizations, etc. The drivers and agents of deforestation and forest degradation are multiple and stem from different sectors, both directly and indirectly. But poverty is the main indirect driver and it prevents the adoption of sustainable practices, such as for agricultural productivity improvements at a household and local level because of the need for up-front financial investment. Exacerbated by population growth this widespread poverty is increasing the pressure on forests. In Madagascar, the stakes are high: REDD+ has both the challenge and opportunity to intervene for the survival of Madagascar's unparalleled biodiversity and forest resources, and to offer to communities an alternative to the doomed cycle of environmental degradation and diminishing agricultural returns.

One of the defining building blocks of the ER-P is the geographical dimension of watersheds, making a clear link between reducing poverty and forest conservation. Agriculture is the primary occupation of households within the ER-P area and the main opportunity for development, while simultaneously being the main driver of deforestation. The ER-P seeks to combine the protection of forest cover and its biodiversity, with development through improved and sustainable agriculture, as well as energy supply (mainly wood charcoal).

Figure 3 - Typical landscape in Madagascar
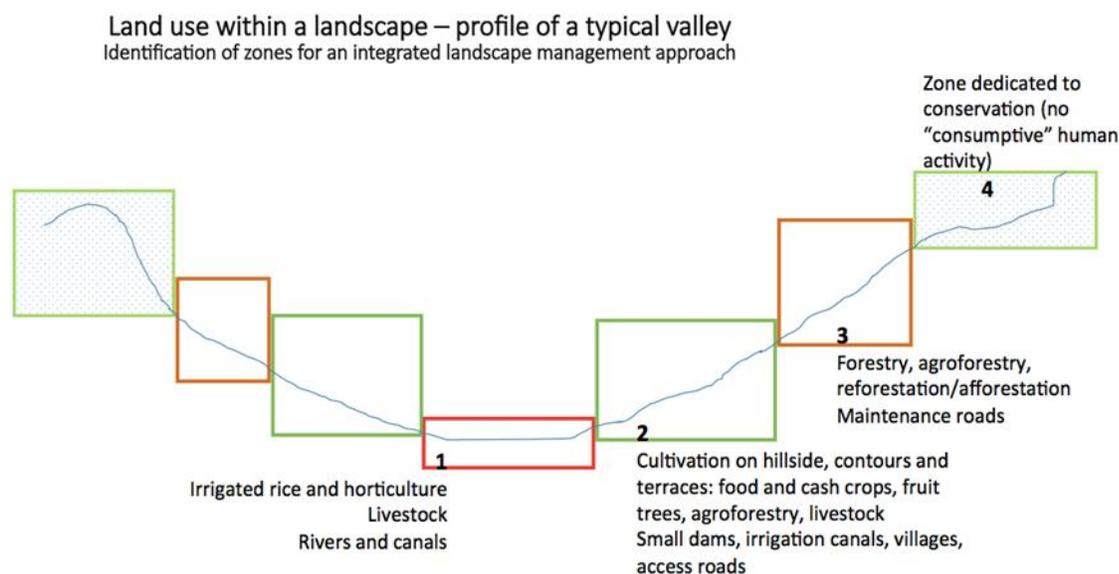
In Madagascar, forests are linked to agriculture activities through watersheds: The mountainous topography of the Eastern part of the country results in a dynamic where forests are mostly found upstream, and agriculture lands downstream. Forests ensure environmental services that are critical for agricultural productivity and livelihoods: hydrological services, regulation of the flow of water and reduction of floods and water shortages, essential services for downstream urban water users and hydroelectricity generation, reduction of soil erosion and sedimentation (which can adversely affect agricultural activities, and in

particular irrigated perimeters downstream). Watersheds are an entry point for addressing conservation and development in a coherent approach.

The ER-P area covers a total of 6,904,417 ha (more than 10 percent of the Malagasy territory) including 0.9 million ha of primary forests (PF) (14 percent of the total ER-P area), 1.1 million ha of disturbed forests, (16 percent of the total ER-P area) and approximately 40,000 ha of young secondary forests.

The ER-P area has been designed to address a significant part of future forest related emissions and removals, according to the following principles:
- High potential of emission reductions and enhanced removals:
    o High forest cover and carbon stock
    o Deforestation hotspot
    o National higher capacity for carbon stock enhancement
- Coherent geographical dimension for reducing poverty and forest conservation:
    o A continuum of 40 watersheds, with potential for cost effective interventions (linking forest conservation and development activities)
    o Respecting administrative boundaries: based on the commune's delineations.
- Presence of critical criteria for the 5-year ERPA efficiency:
    o Presence of land-tenure management offices within communes.
    o Existing protected areas and interventions to address deforestation.

The ER-P focuses primarily on deforestation (land-use change) which are also the main factor that impact on forest degradation. Internal analyses conducted by BNCR (analysis of historical changes in forest cover, forest inventories and consultations) during national REDD+ readiness process and for the development of the ER-P have shown that the process of deforestation is the major contributor of forest sector emissions (>80%) and most of forest degradation are in fact due to the implementation of farming practices at such a low scale that do not comply with the forest degradation definition. Therefore, the vast majority of deforestation (and degradation) in the immediate ER-P area is caused by the use of natural resources by local populations, who face very high levels of poverty.

The ER-P sets as a central objective to contribute to the economic development of these populations, developing sustainable income streams that lessen the pressure on forests. The area contains abundant natural resources, and with available best practices and training, can be exploited in a sustainable way. The GOM has sought to maximize the collaboration with partners in a single jurisdiction so that positive impacts can be mutually reinforcing, and create a demonstration area of sustainable and responsible management, attracting new investment as early investments begin to show results.

As discussed, the historically high rate of deforestation, the high level of threatened endemic species, and the current lack of economic and subsistence alternatives for communities engaged in forest degradation and deforestation have elevated this region as the government's clear priority for REDD+ implementation. The program contains remote areas with very little road access, and its mainly-rural population depends almost entirely on available natural resources for their subsistence and livelihoods. This combination of high threat/priority location and an innovative ecological/jurisdictional approach sets the stage for

transformational change at the scale necessary to save these forests of Madagascar, and subsequently scale up to other ecoregions.

During the five years of the ERPA, the program will mainly focus on activities that would directly lead to the generation of emission reductions in order to ensure the carbon performance and thus the REDD+ auto-financing process from the start. Thus, the main activities during the ERPA period will be focused on:

- Conservation of natural forest areas;
- Rural development of communities close to forests mainly through improvement of agriculture practices and productivity;
- Reduced-deforestation commodity agriculture including agro-forestry models;
- Promotion of sustainable sources of energy and alternatives to traditional wood charcoal production practices.

2.3. POLITICAL COMMITMENT

Numerous high-profile communications, policies, and actions demonstrate Madagascar's firm political commitment to REDD+.

Inter-ministerial action on ER-P development.
Inter-ministerial engagement underpinned the design of the ER-P from its early stages, as evidenced by the **endorsement of the ER-PIN by three different Ministers, the MEEF, the Minister of Agriculture and the Minister of Energy and Hydrocarbons**, under the overarching guidance and leadership of the Prime Minister of Madagascar. The watershed approach to avoided deforestation and degradation which encompasses a set of activities touching on community livelihoods, agricultural intensification and energy access solutions, water management and also forest conservation on higher slopes and ridges zones of watersheds, demands a high level of inter-ministerial engagement, a process that the MEEF has undertaken for the ER-P and also within the context of the PADAP project.

The **conceptualization of the ER-P was a collaborative effort among ministries through the National REDD+ Platform** (12 different ministries are represented, as are regional authorities). A national high-level REDD+ Committee, whose members are the General Secretaries of relevant ministries (see description in section 6.1), has the role of validating program direction and providing political oversight, elevating the political commitment further. The Inter-Ministerial Committee for Environment (CIME by its French acronym), chaired by the Prime Minister, has been reanimated as the piloting institution for REDD+ implementation. The Committee has been presented with the REDD+ Strategy and ER Program and although its mandate takes effect only upon ER-P implementation, it has generally endorsed the ER-P. The office of the prime minister has offered to provide support for inter-sectoral engagement, particularly for mobilizing private sectors engagement in the ER-P.

Community Forest Management
As explained above, in Madagascar the balance between natural capital and livelihoods is extremely fragile. Local, often isolated, rural populations depend on the country's natural resources to ensure basic livelihoods. Poverty in rural areas, where approximately 80 percent of the population lives, is higher (77.9 percent of the

rural population) than in urban areas (35.5 percent of the urban population) and generally the further away from urban centers the more precarious the living conditions are.

The Government of Madagascar recognized that community-based forest management is a key tool to transform this fragile poverty-environment balance into a virtuous cycle of development. Madagascar was **one of the first countries in the southern hemisphere to put in place a legal framework for community-based natural resources management**, with the GELOSE (GEstion LOcale SEcurisée) law (law 96-025) in 1996. The GELOSE promotes the transfer of management of a range of different natural resources to local communities. This was followed in 2001 by a forest-specific decree known as Gestion Contractualisée des Forêts or GCF (decree 2001-122) (see more details on section 4.4).

Protected Areas
The government's commitment to the ER-P is also built arounds its approach to Protected Areas policies. Recognizing the importance of managing the country's natural areas, as well as the limitations in capacity to meet all of the needs, the GOM has entered into a number of partnerships with different entities as delegated managers of certain protected areas. Important achievements include:

- The government created 95 New Protected Areas (NPAs) that include all six categories recognized by IUCN. When added to the long-standing Protected Areas (PAs) and National Parks, Madagascar now contains a total of 123 PAs. The network of protected areas now covers 7,082,525 ha and includes around 70% of the remaining natural forests (over 10% of the national territory).
- The creation of the Foundation for Protected Areas and Biodiversity of Madagascar (FAPBM) is contributing to the protection of more than 2 million hectares of protected areas out of the 7,082,525 hectares of Madagascar System of Protected Areas (SAPM) by using capital and sinking funds to finance PA management, but it cannot cover costs of all protected areas.
- As part of efforts to improve the conservation and sustainable development of forest resources, 281 precious wood species were included in the Appendix II of CITES (Convention on International Trade in Endangered Species of Wild Flora and Fauna) on March 2013 at the request of the CITES Management Authority of Madagascar (Directorate General for Forests).

The New Forest Policy
The government adopted a New Forest Policy (POLFOR) in 2017. BNC REDD+ was actively involved in the development of the policy, which now formally includes REDD+:

- *Objective 3.3 of the New Forest Policy aims to "Establish innovative alternative mechanisms for sustainable financing of forest actions" and offers the following guidance on REDD+. "In particular, the REDD+ mechanism must form a sustainable incentive system for emissions reductions, and deal with the many interdependent socio-economic and political factors that lead to deforestation and forest degradation. This includes: (i) encouraging development partners to support the implementation of the REDD+ with a focus on environmental and social performance and fair and equitable sharing of benefits and other advantages, and (ii) create and or strengthen entities to monitor and evaluate REDD+ activities."*

POLFOR also includes the enhancement of carbon stocks:

- *Objective 1.3 of the New Forest Policy is to "Enhance the fight against deforestation and forest degradation". This states that "It is essential that actions to combat deforestation and forest degradation be carried out in parallel with initiatives to increase forest areas and productivity by: (i) improving the management of sustainable exploitation (harvesting of fuel wood, logging permits, and operating permits) through the involvement of stakeholders in the procedure for the issuance of access, use and harvesting permits; (ii) consensual delimitation of agro-pastoral land as part of the implementation of actions for the restoration of forest landscapes; (iii) development of collective actions between the various sectors to more effectively manage bush fires, grazing fires and forest fires. In order to ensure that actions are sustained over time, it is necessary to (iv) promote environmental awareness through sustained efforts in terms of education and communication."*

Currently, BNC REDD+ is also participating in the revision of the Forestry Code, which will gather all regulatory texts linked with and necessary to the new Forest Policy, and regulatory texts for the implementation of REDD+. The revision of the Forest Code is underway, and will introduce a *definition of forest that emphasizes the functional contribution in terms of environmental (and cultural) services* rather than numbers of trees[11].

The REDD+ strategy was endorsed by the National REDD+ Platform and subsequently adopted by the MEEF. It will be presented for adoption as an application text of the Forest Policy to integrate it into the national body of legislation, strengthening the legal framework for REDD+ in Madagascar. Elements key to REDD+ implementation will be included in the legislation, such astransfer of title, benefit sharing, reference level and monitoring requirements, institutional arrangements and safeguards. The national REDD+ strategy was presented to the council of Ministers and adopted by Decree in May 2018, which paves the way for formal submission of legislative text.

National Strategy for Forest Landscapes Restoration (SNRPF)
Madagascar's commitment to AFR100[12] for the restoration of 4 million Ha of degraded and deforested land contributes to the Bonn Challenge to restore more than 150 million hectares of land by 2020. As a result, the National Strategy for Forest Landscapes Restoration clearly refers to the role played by REDD+ as a lever for mobilizing financial resources through climate finance, especially ecologic restoration of natural forests (through the Green Climate Fund, Adaptation Fund and results-based payments for REDD+ in particular).

Nationally Determined Contribution (NDC)
In 2015, Madagascar submitted its NDC[13] to the UNFCCC Secretariat, which proposes **an emission reduction contribution of at least 14 percent of national GHG, and an increase of GHG absorption of at least 32 percent (both compared to BAU).** As such, the NDC highlights a crucial role for the LULUCF sector, to contribute 61 MtCO2 of Emissions Reductions (ERs) through a variety of interventions. REDD+ is noted as one of the priority interventions within the LULUCF sector, along with reforestation, agroforestry, reduction of timber extraction and enhanced monitoring of forests.

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[11] "Forest: Ecosystem Assuring or having a purpose to provide production services, regulatory services, support services and cultural services as defined by the Charter of the Environment, and provided by woody vegetation."

[12] AFR100: The African Forest Landscape Restoration Initiative is a country-led effort to bring 100 million hectares of deforested and degraded landscapes across Africa into restoration by 2030.

[13] http://www4.unfccc.int/ndcregistry/PublishedDocuments/Madagascar%20First/Madagascar%20INDC%20Eng.pdf

<u>Overall Policy of the State</u>

The ER-P is one tool by which the Republic of Madagascar can contribute to the sustainable development policy developed by the government. This policy is part of the Overall State Policy (PGE), that states the following vision: "*To build a new Madagascar, a strong Madagascar, and thus leave to future generations a peaceful, united and prosperous country, which managed to become a world leader in the valorization and preservation of its immense natural capital while relying on a strong and inclusive growth in the service of the equitable and sustainable development of all territories*".

With this vision, Madagascar is committed to achieving a green economy. In addition, in the policy letter on environment and natural resources, Madagascar's vision includes:

- A territory where natural resources benefit everyone, where forests and fisheries are used in a sustainable manner, and where the precious wood industry is characterized by international best practices;
- A territory with healthy households, clean cities, and a prosperous, efficient and environmentally friendly mining and industrial sector;
- A territory that attracts tourists in search of the last bastions of biodiversity, traditions and hospitality, as well as unique landscapes;
- A Regional Sensitive Site for Sustainability and Biodiversity Research;

<u>National Development Plan (NDP)</u>

The NDP is the official national strategy development and poverty reduction. The NDP was developed in 2013 and includes 5 strategic development axes. Axis 5 of the NDP focuses on preserving the natural capital and reducing the negative effects of climate change. Two specific objectives include (i) Linking natural resource management to economic development, and (ii) Protecting, conserving and sustainably using the natural capital and ecosystems.

<u>National Policy to Combat Climate Change</u>

In 2010 Madagascar adopted its National Policy to Combat Climate Change (PNLCC by its acronym in French). This policy instrument highlights priorities in both mitigation and adaptation which underpin the country's efforts to implement REDD+ at scale.

<u>The Environmental Plan for Sustainable Development (PEDD)</u>

The PEDD, intended as a strategic reference document for Madagascar for environmental management and sustainable development, is currently under development. The draft of the document exists, but the final version has not yet been officially adopted by the Government.

The PEDD has identified three goals to be addressed in line with those of REDD+:

1. Green infrastructure, service providers guaranteeing socio-economic resilience and sustainable production;
2. Economic productivity growth based on the valuation of the natural capital;
3. An equitable sharing of the benefits of Nature for equitable and sustainable development in all territories.

The implementation strategy of the PEDD aligns closely with the intended outcomes of the ER-P:

- Reconciling the conservation of the natural capital and development to build the socioeconomic resilience of the country;
- Systematically emphasizing decentralization and local development to increase the responsibility of collectivities and communities in the governance of the natural resources in their territory;
- Installing reliable information and monitoring systems for the governance of natural resources at the national level.

At an international level, Madagascar's commitment to REDD+ is reflected in the ratification of numerous conventions and agreements including the International Tropical Timber Convention (ITTC), the texts of the Consistency of Investments with the Environment (MECIE), and Madagascar's commitment to the conservation and sustainable management of natural resources and the United Nation Framework Convention on Climate Change (UNFCCC).

3. ER PROGRAM LOCATION

3.1.   ACCOUNTING AREA OF THE ER PROGRAM

The ER-P is located along the escarpment of the mountain range in the Eastern part of the country, representing more than 50 percent of the remaining rainforest of Madagascar and 50 percent of this unique ecosystem. The area is crucial for Madagascar's biological diversity, as it includes a bastion of habitat for threatened plant[14] and animal species of global importance with a very high level of endemism[15].

The ER-P area covers a total of 6,904,417 ha (more than 10 percent of the Malagasy territory) including 0.9 million ha of primary forests (PF) (14 percent of the total ER-P area), 1.1 million ha of disturbed forests, (16 percent of the total ER-P area) and approximately 40,000 ha of young secondary forests.

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[14] Dumetz, N. (1999). High plant diversity of lowland rainforest vestiges in eastern Madagascar. Biodiversity and Conservation, 8(2), 273-315.

[15] Goodman, S. M., & Benstead, J. P. (2005). Updated estimates of biotic diversity and endemism for Madagascar. Oryx, 39(01), 73-77.

Figure 4 – Location of the Accounting area of Atiala Atsinanana
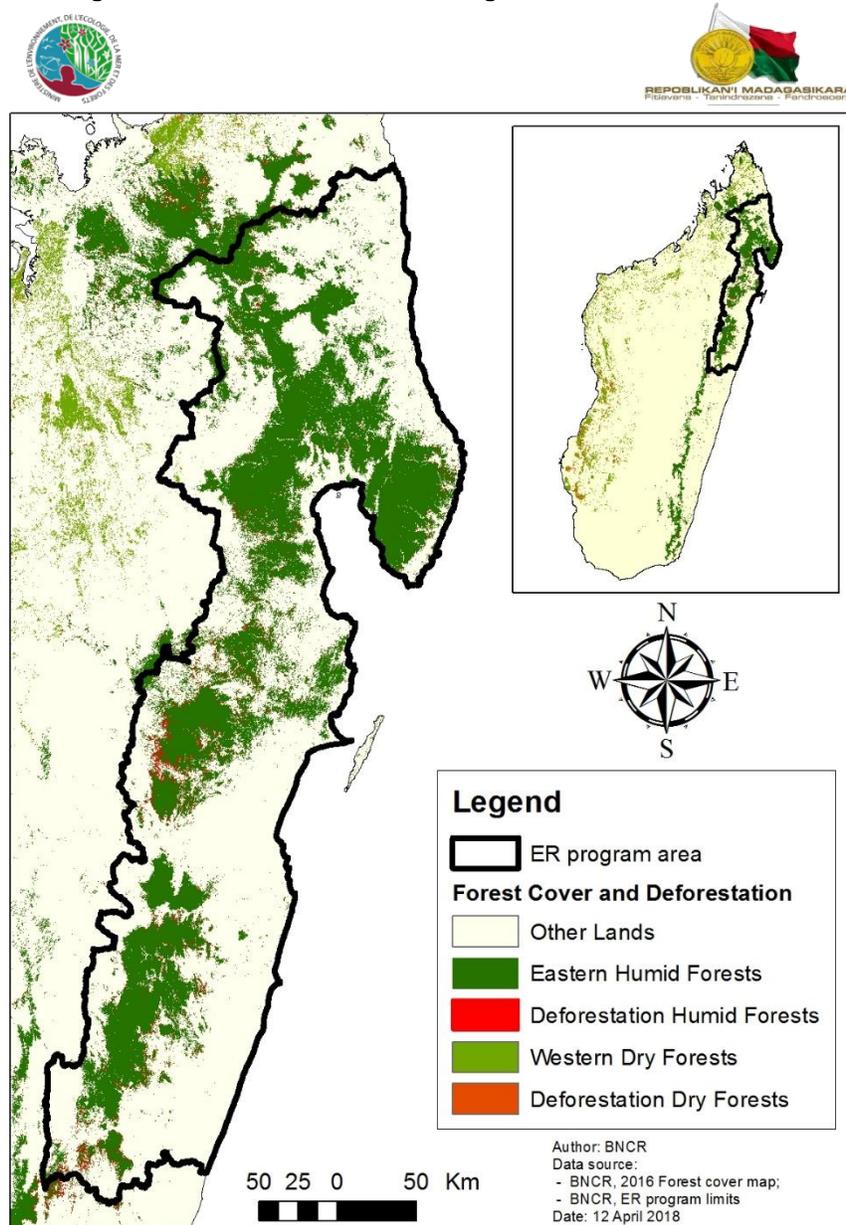
The ER-P accounting area coincides with the limits defined by the Communes, so it is a jurisdictional approach in line with the requirements of the Methodological Framework of the FCPF. The Commune level is the second administrative level, and it is below the Regional. The Commune level is the administrative structure for decision making and planning (e.g. land use planning), while the regional level is where the decentralized structure of national institutions are located.

Figure 5 – Location of Accounting area with regard to Communes and regions
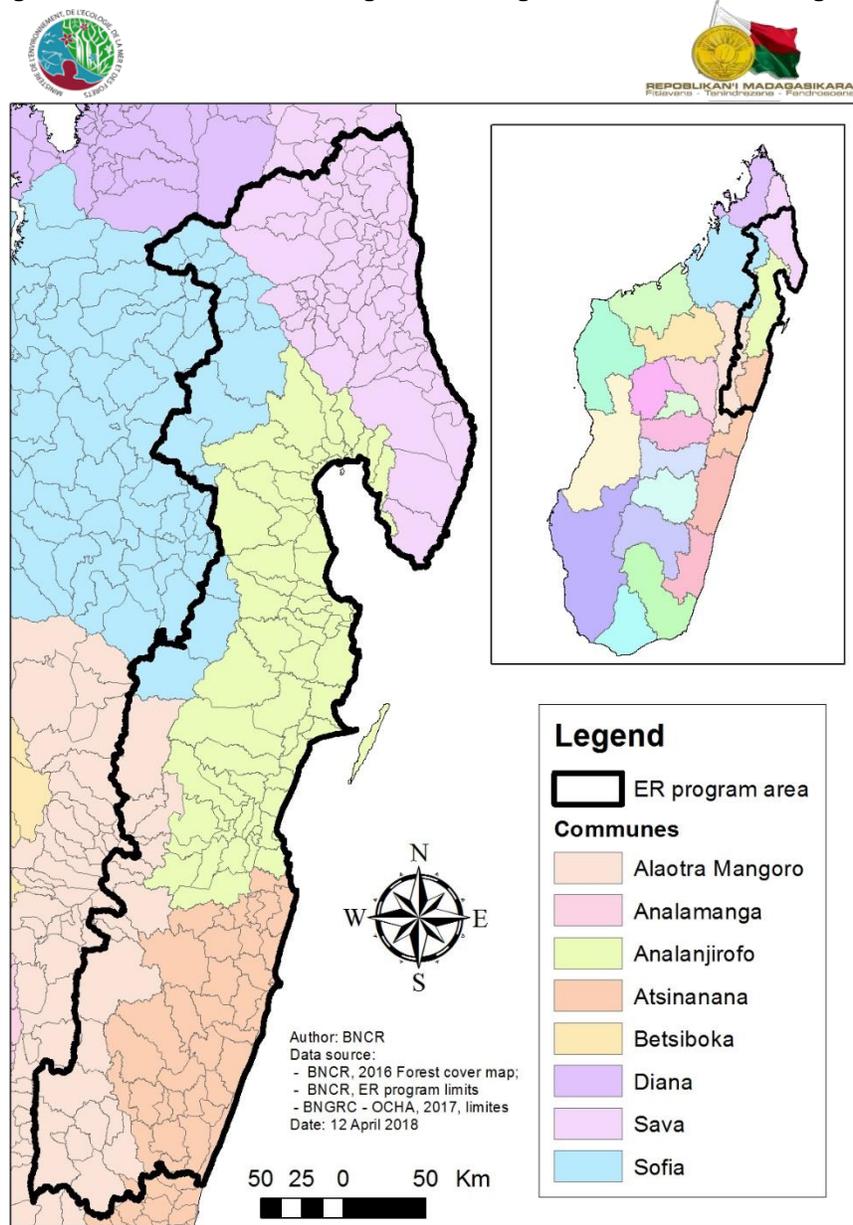
The accounting area is consistent with the strategy of the program that seeks to intervene at the nexus of forest conservation and rural development. This approach embodies multisector land use planning based on geographically and socially coherent blocks: watersheds. The current boundaries of the program resulted from a phased analysis and are based on several criteria:

- <u>High potential of emission reductions and enhanced removals:</u>

- High forest cover and carbon stock: the ER-P area is concentrated around the country's rainforests, areas with the highest carbon stocks of all ecosystems in Madagascar (around 230 Mg/ha)[16,17].
- Deforestation hotspots: These forests are facing important deforestation and degradation pressures, associated GHG emissions are among the highest in the nation[18]. The area has significant historical and ongoing deforestation rates, threatening not only biodiversity, but also the activities and the development of local populations.
- High capacity for carbon stock enhancement: The program area includes not only standing intact forest but also secondary forest (post slash-and-burn regenerated forest) and deforested areas, which have significant regeneration capacity due to the region's high rainfall. The ER-P will implement reforestation and restoration of forest landscapes to boost carbon stocks and ecosystem services. Focusing on regeneration will additionally support increased buffers for the standing primary forests, and will be closely linked to the economic livelihood activities of rural communities that have continued to increase pressure on forest resources.

- <u>Coherent geographical dimension for reducing poverty and forest conservation</u>:
  - A continuum of 19 watersheds, with potential for cost effective interventions (linking forest conservation and development activities): 15 type 1 watersheds, i.e.: oriented towards the eastern seaboard; 2 type 2 watersheds, i.e.: oriented towards the interior of the land;

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[16] Saatchi et al (2011) : Benchmark map of forest carbon stocks in tropical regions across three continents. In: *Proceedings of the National Academy of Sciences of the United States of America - PNAS*, Vol. 108, No. 24, 14.06.2011, p. 9899-9904
[17] Eco-Regional REDD+ Project for the Easter Humid Forest (PERR-FH by its acronym in French)
[18] Salva Terra, 2017

Figure 6- Watersheds and deforestation (2005 – 2013) within the ER-P area
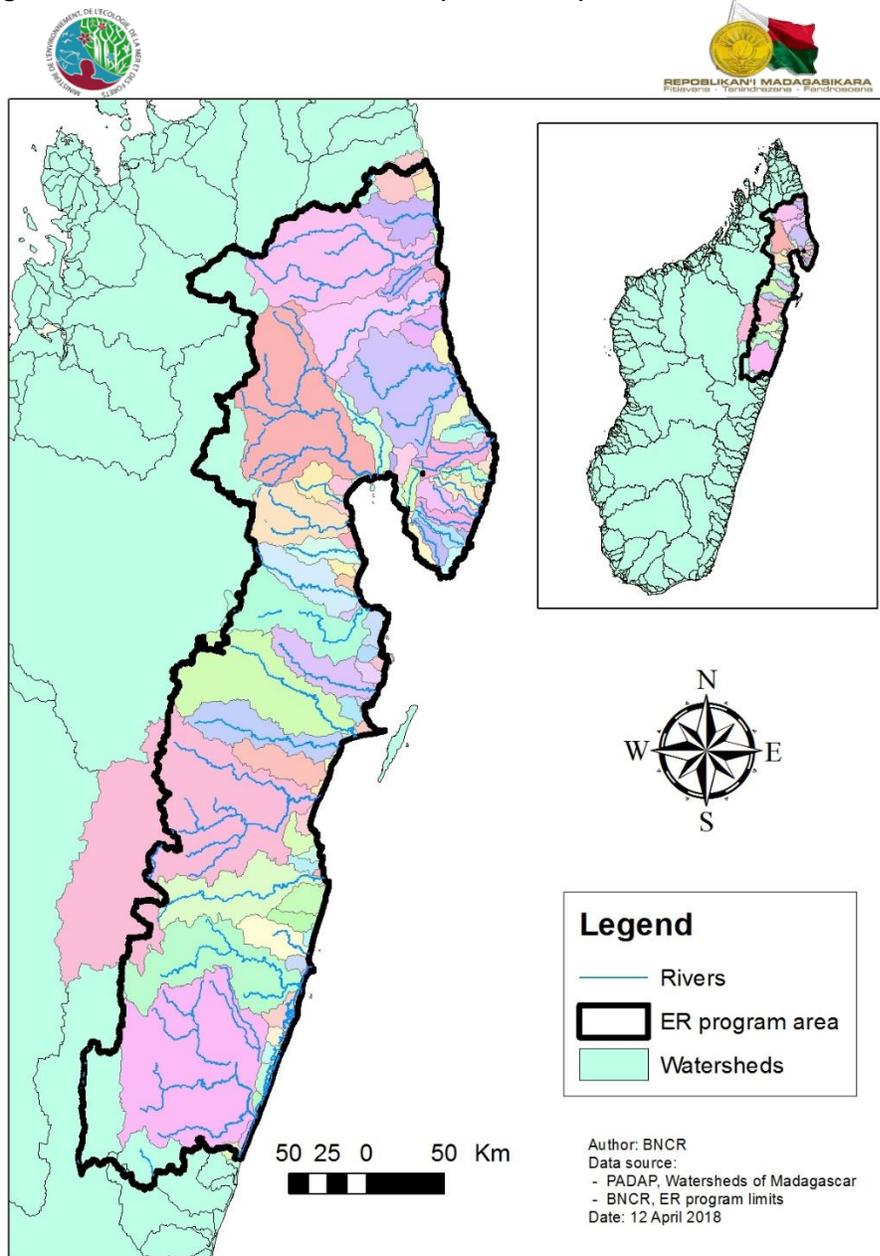
- <u>Presence of critical criteria for efficiency within the 5-year ERPA time frame:</u>
  - o **Presence of land-tenure management offices within communes.** Different analyses of drivers of deforestation cannot clearly state that communal land-tenure offices have positive impacts on reducing deforestation. However, it is clear that their presence will facilitate and catalyze the implementation of the program activities as they will contribute to securing land tenure and enhance land-use planning.
  - o **Existing protected areas and interventions to address deforestation :** Before the approval of the National REDD+ Strategy, Madagascar's strategy for protecting forests and reducing deforestation has been centered in the creation of protected areas and the implementation of interventions in the buffer zones of these protected areas. It was deemed essential for the ER-P to build on this intervention strategy by contributing to the sustainability of these

PAs and their interventions or even increase their scale of implementation to lay a strong foundation for scaling-up and for the performance of the ER-P as a whole.

Figure 7 – Location of protected areas within the ER program area
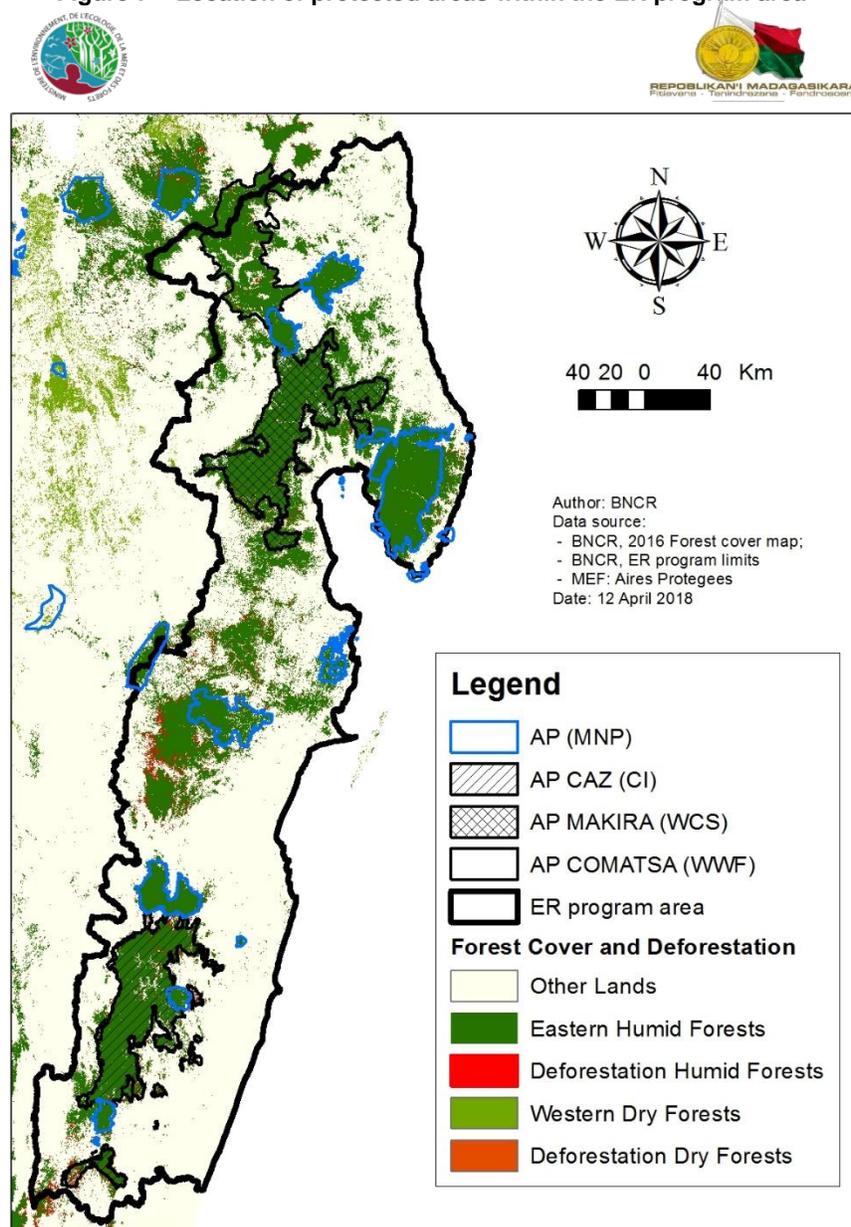
3.2. ENVIRONMENTAL AND SOCIAL CONDITIONS IN THE ACCOUNTING AREA OF THE ER PROGRAM

a. *Environmental conditions*

Type of vegetation

In 1994, a National Forest Ecologic Inventory (IEFN) was undertaken in order to determine the location and spatial distribution of various forest formations, their main dendrologic and dendrometric characteristics, some of their floristic and faunistic parameters and their shifting trends. This inventory thus allowed to describe the phytogeographic domains of the ER-P.

Table 2 : Phytogeographic areas and AGB stocks

Phytogeographic areas (IEFN 1994)	Types of forests/thickets	Stocks AGB (Tc/ha)
A. Areas of East and Sambirano (0 to 800 m)	Coastal forests	95
	Lowland evergreen dense rainforests	158
	Degraded lowland evergreen dense rainforests	45
B. Areas of the Center – Eastern slopes of middle altitude (800 – 1800 m)	Average Altitude evergreen rainforests	142
	Degraded average altitude evergreen dense rainforests	48

Major segments of remaining forests are average altitude and lowland evergreen dense rainforests, with high AGB stocks and biodiversity. In 2017, REDD+ readiness resources enabled the creation of a Geomatics Lab that collected data for the ER-P area according to a national definition of forest types. According to the estimates obtained, there are around 2 million ha of dense natural forest, with half of it primary forest and half of it disturbed forest. Secondary forests (natural regeneration from a complete slash of vegetation), agroforestry and plantations have a minimal cover. Most of the ER-P area consists of non-forest areas that have a high regeneration potential and becoming forests again after a period of 10-15 years.

Table 3. Area per forest type according to Level 3 of the national classification

Level 3 classification	Area (ha)	%
Primary forest	991,186	47%
Disturbed forest	1,079,856	51%
Secondary forest	40,474	2%
Agroforestry	5,875	0%
Plantations	7,774	0%
TOTAL	2,125,165	100%

From an ecological point of view, apart from these secondary forests there are other phases of the natural succession after disturbance which are linked to the different phases during and after the practice of "*tavy*", slash and burn agriculture. These strata were not taken into account in the development of the reference levels (REL) for this ER-P, because it is not currently possible to precisely map each stratum through spatial analysis and then quantify their respective surfaces within the ER-P. The strata that have been mapped and used for REL calculation are described in section 8.2. However, the information on secondary formations

(including first forest stage) after *tavy* are crucial for the program because they constitute the main lands where reforestation or restoration of forest cover are envisaged (for carbon stock enhancement).

Box 1. The "Tavy" system.

The "Tavy" system

According to Andriamanjara et al. (2016): "In Eastern Madagascar, traditional farming practices of slash and burn, in which the forest is replaced for agriculture by cutting and burning the trees followed by agricultural cycles interspersed with fallow periods, lead to vegetation changes marked by transition of primary forest to grassland (Styger et al., 2007).

The first fallow cycle after deforestation is associated with a tree fallow system where vegetation types are dominated by *Trema orientalis* and *Harungana madagascariensis*. From the second to the fifth fallow cycle after deforestation, endemic shrubs, dominated by *Psidia atlissima* and exotic and invasive species dominated by *Rubus moluccanus* or *Lantana camara*, replace the previous tree fallow species resulting in shrub fallow landscapes. Beyond the sixth fallow cycle herbaceous fallows or grasslands dominate, marked by development of grass species and ferns, *Imperata cylindrica*, and *Aristida sp.*[19][20] (Styger et al., 2009; Styger et al., 2007)".
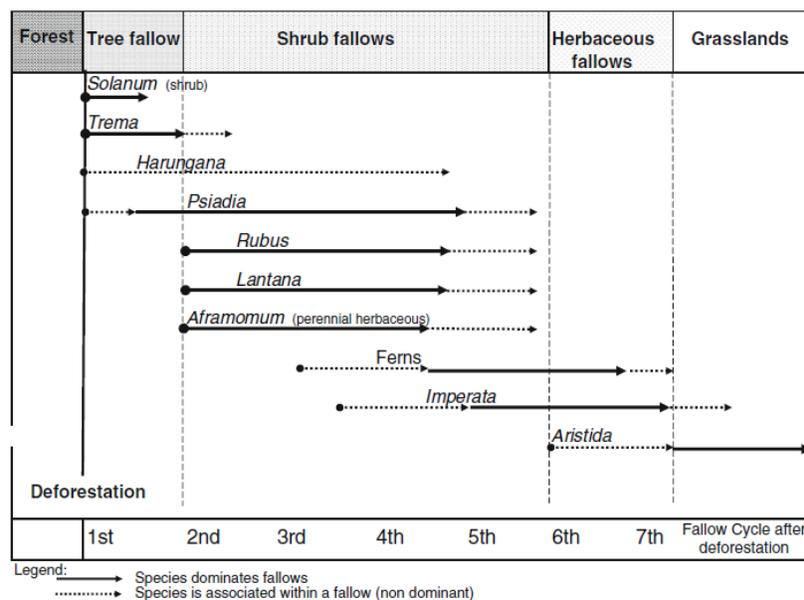
Climate Conditions

The entire area of implementation is subject to a unimodal tropical climate characterized by alternating rainy (November - April) and dry seasons (May - October). The lengths vary from region to region, but also by

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[19] Styger, E., Rakotondramasy, H.M., Pfeffer, M.J., Erick, C.M., Fernandes, E.C.M., Bates, D.M., 2007. Influence of slash-and-burn farming practices on fallow succession and land degradation in the rainforest region of Madagascar. Agric. Ecosyst. Environ. 119 (3–4), 257–269.

[20] Styger, E., Fernandes, E.C.M., Rakotondramasy, H.M., Rajaobelinirina, E., 2009. Degrading uplands in the rainforest region of Madagascar: fallow biomass, nutrient stocks, and soil nutrient availability. Agrofor. Syst. 77 (2), 107–122.

distance from the east coast and the "protection" effect associated with the escarpment. Altitude increases temperature variations: the dry season can be particularly cool on the highlands –where it can sporadically freeze. The dry season is generally less than five months long over the entire ER-P implementation area.

According to a study carried out by Cornet, A. (1974)[21], the bioclimatic classification of Madagascar was made according to the values of the accumulated water deficit and the average of the minima of the coldest month. In this context, the geographic distribution of the ER-P bioclimates belong to the humid zone with a cumulative water deficit of less than 100 mm and includes the entire eastern escarpment of the island. This humid zone can be divided into two sub-zones:

- A hyper-humid sub-zone for which the deficit is constantly zero. This subgrade includes the East Coast of Sambava at the southern tip of the ER-P from 0 to 700 m altitude.
- A humid under-zone characterized by a non-zero but weak water deficit occupies the rest of the eastern slope.

Every year in the middle of the rainy season (January - March), Madagascar is affected by damage caused by cyclones that come from the Indian Ocean or the Mozambique channel, with a frequency of at least one cyclone per year. The entire area of implementation of the ER-P is equally subject to cyclone risks. The impact of the cyclones on local populations is often dramatic. While these cyclones do not contribute to deforestation, they do play a role in forest degradation (see section 11).

Soils

The geology of Madagascar is divided into two major groups (Besairie, 1973[22])

- Sedimentary rocks that occupy all coastal areas, which is one-third of the island;
- The crystalline base on which the highlands and the escarpment rest, i.e.: two thirds of the island and the vast majority of the area of implementation of the program.

The presence of lava (basalt and gabbro) along the eastern coast of the Atsinanana region is pronounced.

The works of Roederer (1971)[23] classify the Malagasy soils in four different types:

- Ferrallitic soils with several variants, depending on the bedrock. These are the most widespread soils on the Highlands and the East Coast, occupying about 46 percent of the island's surface;
- Hydromorphic soils, more or less peaty, occupy the lowlands and are mainly used for rice growing (6.5 percent of the surface of the island);
- Alluvial soils, which are slightly developed but very fertile, are mostly found in the immediate vicinity of the great rivers of the western region (26% percentof the surface of the island).
- Ferruginous tropical soils, which form very large areas in the West and South, which account for 27.5 percent of the island;

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[21] Cornet, A. (1974). Essai de cartographie bioclimatique à Madagascar
[22] Besairie, H. (1973). *La géologie globale et ses applications à l'océan indien et à Madagascar*. Republika Malagasy, Ministère de l'économie, et des finances, Direction générale de l'économie, Direction des mines et de l'énergie, Service géologique
[23] Roederer, P. (1971). Les sols de Madagascar. Sciences de la terre, Pédologie, 5.

- ▪ These soils suffer to varying extents from erosion, due to both topography and anthropic actions such as bush fires and deforestation.

The ER-P area is thus mainly composed of Ferrallitic and hydromorphic soils. The Eastern Forest Inventory carried out in 2016 confirmed that forest soils all belong to the class of Ferrallitic soils corresponding to a tropical humid climate. The color of the soil is usually dark (brown) indicating its richness in organic matter. The depth of the litter (reserve of organic matter) varies according to the type of vegetation. The primary forest is characterized by a more or less deep litter (5 to 10 cm), which decreases according to the level of degradation of the vegetation (less than 2 cm for the Agroforestry stratum). In addition, the high biological activity in the rhizosphere improves the physical quality of the soil (texture, structure).

Presence of threatened species and habitats

Madagascar is one of eight "hottest" biodiversity hotspots in the world based on richness and endemism of plants (more than 90 % of endemic species[24]) and vertebrates (50% endemism in birds and >98% in amphibians, reptiles and mammals[25]), and on habitat loss (estimated at >90%[26]). Madagascar also stands out because of its endemism at higher taxonomic levels (genera and families) among plants and vertebrates[27]. According to the International Union for Conservation of Nature (IUCN) Global Red List data, **Madagascar is currently considered as a priority conservation area**, with 88.5% of lemur species and almost 4% of Malagasy plants are threatened with extinction. The situation is also alarming for orchids (48% endangered), palms (72% threatened) and 136 species of terrestrial reptiles (endangered and/or threatened).
The flora of Madagascar alone includes about 10,000 species of endemic higher plants. Endemism is not present the only at the species level, but also in higher taxonomy: eight plant families, five families of birds, five families of primates and all of the listed amphibian species are not represented anywhere else in the world.

As shown previously, the ER-P implementation area is crucial for Madagascar's biological diversity, as it represents part of the last bastion of the eastern rainforests. These forests contain the habitat of a majority of plant[28] and animal species of global importance with a very high level of endemism[29].

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[24] Schatz, G.E. (2000) Endemism in the Malagasy tree flora. In *Biogeography of Madagascar* (eds W.R. Lourenço and S.M. Goodman), pp. 1±9. Memoires de la Sociéteé de Biogéographie, Paris.

[25] Langrand, O. & Wilmé, L. (1997) Effects of forest fragmentation on extinction patterns of the endemic avifauna on the central high plateau of Madagascar. In *Natural Change and Human Impact in Madagascar* (eds S.M. Goodman and B.D. Patterson), pp. 280±305. Smithsonian Institution Press, Washington DC.

[26] Lowry, P.P., II, Schatz, G.E. & Phillipson, P.B. (1997) The classification of natural and anthropogenic vegetation in Madagascar. In *Natural Change and Human Impact in Madagascar* (eds S.M. Goodman and B.D. Patterson)

[27] Myers, N., Mittermeier, R.A., Mittermeier, C.G., da Fonseca, G.A.B. & Kents, J. (2000) Biodiversity hotspots for conservation priorities. *Nature*, RHQD 853±858.

[28] Dumetz, N. (1999). High plant diversity of lowland rainforest vestiges in eastern Madagascar. Biodiversity and Conservation, 8(2), 273-315.

[29] Goodman, S. M., & Benstead, J. P. (2005). Updated estimates of biotic diversity and endemism for Madagascar. Oryx, 39(01), 73-77.

b. *Social conditions in the accounting area*

The current population of Madagascar is approximately 23 million inhabitants, with an average density of 34 inhabitants per km² nationally. Population growth is relatively high. The country has increased in population from less than 2 million inhabitants in 1900 to 23 million today, with an estimated annual growth rate of 2.8 percent. The population is expected to reach 35 million by the year 2030. The majority of the population lives in rural areas and are predominantly poor.

Agriculture is the primary occupation of households within the ER-P area, a reflection of the significance of the industry in Madagascar. Agriculture is the pillar of Madagascar's economy: it employs 80 percent of Malagasy households on 2.5 million hectares of farms and accounts for 27 percent of GDP and 47 percent of primary GDP (MAEP, 2007, INSTAT, 2006). While the average area of the individual farm is generally small (0.87 ha), the potential agricultural area for arable crops, grazing areas and ranching is estimated at more than 35 million hectares. Aside from subsistence farming, there are export-oriented crops (rice, sugarcane, vanilla, cocoa, litchis, etc.) that provide significant currency receipts on a case-by-case basis.

Despite significant potential, the sector performs poorly. Irrigated agriculture accounts for 70 percent of agricultural production and for 88 percent of rice production (MAEP, 2010), meaning the sector is heavily dependent on water resources.

Madagascar remains below its potential for various commodities (essential oils, spices, fruits and vegetables in particular). Other economic activities exist, such as livestock, fisheries, mining and tourism, but these activities are still at an early stage of development and need better regulation and assistance of targeted policy reforms as well as increased investment in order to become more robust and widespread. The overall poor performance of the sector due to structural weaknesses, environmental degradation, the use of traditional and low-intensity technologies, low utilization of agricultural inputs, low access to equipment, difficult access to land and exposure to natural disasters and locust invasions. Education is an important determinant of agricultural productivity, and access to education seems an important determinant for a raise in expenditure levels and welfare[30].

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[30] Randrianarisoa, J. C., & Minten, B. (2001). Agricultural production, agricultural land and rural poverty in Madagascar.

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

4.1. ANALYSIS OF FACTORS AND UNDERLYING CAUSES OF DEFORESTATION AND FOREST DEGRADATION AND EXISTING ACTIVITIES THAT CAN LEAD TO CONSERVATION OR ENHANCEMENT OF FOREST CARBON STOCKS

The assessment of drivers for the ER-P included the following sources of inputs:
- Political economy of deforestation and degradation analysis
- Consultations at regional and local scales yielding data and subsequent socio-economic, socio-political, socio-cultural analyses
- Regulatory reforms with respect to REDD+ in Madagascar (respectively LRA 2016 and LRA 2017)
- Existing studies on deforestation and forest degradation

The drivers analysis identified the direct causes for deforestation and degradation of the eastern rainforests, spatially explicit at the regional scale. The findings were discussed with local stakeholders through a series of 10 workshops (PERR-FH 2014), and further corroborated through field surveys and spatial analysis (Salva Terra 2017). The direct causes identified are classified in five categories:

- Agriculture: slash and burn subsistence farming and cash cropping;
- Energy: collection of firewood, production of charcoal;
- Mining: rare earth minerals, artisanal mining - specifically gold, precious stones, illegal mining;
- Forest harvesting: illegal logging - timber, precious wood, charcoal production;
- Livestock: pasture fires, grazing zebus in the forest.

In order to systematically and efficiently evaluate all the inputs for the driver analysis, the information was organized according to the internationally recognized framework of Geist and Lambin[31].

Figure 8 Geist and Lambin's framework (GEIST & LAMBIN, 2001)

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[31] Lambin, E. F., Turner, B. L., Geist, H. J., Agbola, S. B., Angelsen, A., Bruce, J. W., ... & George, P. (2001). The causes of land-use and land-cover change: moving beyond the myths. Global environmental change, 11(4), 261-269

Proximate causes

Infrastructure extension
- Transport (roads, railroads, etc.)
- Markets (public & private, e.g. sawmills)
- Settlements (rural & urban)
- Public Service (water lines, electrical grids, sanitation, etc.)
- Private Company (hydropower, mining, oil exploration)

Agricultural expansion
- Permanent Cultivation (large-scale vs. smallholder, subsistence vs. commercial)
- Shifting Cultivation (slash & burn vs. traditional swidden)
- Cattle Ranching (large-scale vs. smallholder)
- Colonization (incl. transmigration & resettlement projects)

Wood extraction
- Commercial (State-run, private, growth coalition, etc.)
- Fuelwood (mainly domestic usage)
- Polewood (mainly domestic usage)
- Charcoal production (domestic & industrial uses)

Other factors
- Pre-disposing environmental factors (land characteristics, e.g. soil quality, topography, forest fragmentation, etc.)
- Biophysical drivers (triggers, e.g. fires, droughts, floods, pests)
- Social Trigger Events (e.g. war, revolution, social disorder, abrupt displacements, economic shocks, abrupt policy shifts)

Demographic factors
- Natural Increment (fertility, mortality)
- Migration (in/out migration)
- Population Density
- Population Distribution
- Life Cycle Features

Economic factors
- Market Growth & Commercialisation
- Economic Structures
- Urbanization & Industrialization
- Special Variables (e.g. price increases, comparative cost advantages)

Technological factors
- Agro-technical Change (e.g. in/extensification)
- Applications in the wood sector (e.g. mainly wastage)
- Agricultural production factors

Policy & Institutional factors
- Formal Policies (e.g. on economic development, credits)
- Policy Climate (e.g. corruption, mismanagement)
- Property Rights (e.g. land races, titling)

Cultural factors
- Public Attitudes, Values & Beliefs (e.g. unconcern about forest, frontier mentality)
- Individual & Household Behavior (e.g. unconcern about forests, rent-seeking, imitation)

Underlying causes

a. *The direct causes for deforestation and forest degradation*

Expansion of agriculture

i. Annual crops

Literature unanimously identifies slash-and-burn as the primary driver of deforestation, called "tavy" in Malagasy, in the context of eastern rainforests in Madagascar. The annual crops grown in the ER-P area are almost exclusively dedicated to subsistence farming, and low yields, low access to markets, and lack of agricultural intensification technologies, have limited the establishment of industrial agricultural production. Tavy usually involves first clearing a plot of forest, cultivation of rain-fed rice (for self-consumption) followed by maize, cassava, sweet potatoes, and then a period of fallow. During the period of fallow, the farmer will open a new plot of land and repeat the cycle.

Throughout the ER-P area, the rotation time is usually longer than 5 years. Rotation time is an essential feature of slash-and-burn cultivation systems because it determines the rate of progression of the deforestation frontier for the opening of new plots. In rainforests, rotation periods are relatively long compared with the dry forests in the west, and deforestation and end-of-rotation crops are separated in time because of the continuing degradation that is not categorized as deforestation. Tavy causes permanent deforestation since the regular use of fire during end-of-cycle fallows and before crop rotations effectively makes forest regeneration impossible, despite the potential for revegetation due to the high rainfall.

Tavy remains the most competitive agricultural system in the region, and is the most commonly practiced. However, farmers across Madagascar are reluctant to say they practice tavy, though evidence indicates that slash-and-burn agriculture is widespread. The main indicator of tavy is the stagnation of crop yields, which

can only be explained by this practice (a non-tavy, more modern or intensified system would produce measurably higher yields). Increasing household needs often leads to expansion of tavy plots and new deforestation, rather than to agricultural innovation, due to limited access to extension services and technology to support innovative approaches. Agricultural innovation is very low in this area, which relies on traditional seeds, manual plowing, basic equipment, almost nonexistent agricultural supervision, rare use of fertilizers. Lack of available land in plains and lowlands encourages rain-fed cultivation and clearing.

ii.   Permanent crops

In the eastern rainforests, permanent crops are demonstrated to be responsible for deforestation, overall. The largest areas are located mainly in an 80-km wide coastal strip in the Brickaville, Mahanoro, Marolambo and Toamasina II districts of the Atsinanana region and in the Fénérive Est and Vavatenina districts of the Analanjirofo region, as well as in the districts of the Sava region (Sambava, Andapa, Antalaha and Vohemar). Perennial crops (coffee, cloves and vanilla in particular) have had a deforestation impact in the last decade. However, anecdotal information has highlighted that the cultivation of vanilla, cloves and sometimes coffee has in some cases limited deforestation.

These competing findings are the result of the complex reality at local levels. The process of planting lucrative perennial crops follows two phases: first, (and a negative phase in terms of REDD+) farmers are encouraged to deforest to create parcels dedicated to cash crops, and second, (positive in terms of REDD+) farmers use previously cleared areas (savoka) to grow agro-forestry crops. The degraded lands are numerous and conducive to the installation of agro-forestry crops, hence they offer a potential for a stabilization or even a reduction in deforestation if the needs for which tavy agriculture is practiced can be addressed.

iii.   Livestock and pasture fires

In the ER-P area, both spatial analyses and analyses based on household surveys show that livestock farming is not an important direct driver of deforestation in intact forests, but if forest grazing exists, it mainly contributes to forest degradation in secondary forest formations.

Bush fires—a part of grazing patterns to encourage regeneration—are frequently mentioned in literature as a pressure on forests, and concern all zones and types of forests, especially secondary formations. These fires contribute to the degradation of soils and limit regeneration of carbon stocks and forests. Further, trees felled as a result of cyclones increase the effects and intensity of bush fires, as does forest degradation caused by grazing in forest edges, and firewood and domestic wood harvesting. Although the specific causes of individual fires vary depending on the local context, in general, human-induced burns clear or prepare plots for tavy (or even annual crop) and regenerate land for grazing and are the main causes of fires.

It should be noted that there are other causes for fires, but these are considered marginal compared to tavy and pasture fires. They include: cooking in the forest, cigarette butts left behind by smokers, charcoal grinders, illegal bandits (Dahalo), hunting practices using fire to flush out prey, protests and acts of vengeance or jealousy, and smoking of bees.

The prevalence of bush fire to make way for tavy and pasture shows that fires—a driver of deforestation—have a clear and direct link with agricultural expansion.

Wood harvesting

    i.   Firewood and charcoal

A large portion (80 to 90 percent) of the energy needs of Malagasy households are met by fuel wood--charred and/or raw. For example, in 2009, nine million cubic meters of wood were used directly as firewood, compared to eight million cubic meters used for charcoal production (JariAla 2009). Today, wood consumption for charcoal is thought to be the majority.

The impact of fuel wood and charcoal on forests differs depending on the area under consideration. Generally, harvesting wood for domestic raw consumption includes a wide variety of species in natural forests, with a larger impact on degradation and a marginal impact on deforestation. Whereas, the impact of harvesting wood for charcoal is less conclusive.

Consultations during the driver analysis identified divergent perspectives regarding the origin of charred wood: for some households, it is mainly wood coming from cleared parcels. The production of charcoal would then be an opportunistic activity, the clearing being motivated by the intention to cultivate. Others mention significant removals of natural forests for intentional charcoal production.

Although nationally, the majority of consumed charcoal mainly comes from eucalyptus plantations in the highlands, in the ER-P area, according to consultations, charcoal has a more important local impact on forests, because of an increase in the amount of firewood transported to certain urban areas (ex. Fénérive Est). Charcoal is predominantly consumed by households, at a low volume overall, as the market to export charcoal to urban areas is poorly developed.

    ii.   Construction, softwood and service lumber

In rainforests across Madagascar, timber harvesting for construction, softwood and service (C/O/S) now seems to have little impact on deforestation. The legal market for these products is small, and the limited information available on the large-scale illegal logging of precious wood (rosewood, ebony, etc.) mainly mentions the post-crisis boom of 2009. The majority of timber volumes (for C/O/S) are harvested in the Northeastern Regions (except for rosewood and ebony that are exploited everywhere throughout the ER-P), including in protected areas, and exported. After 2009, the country saw a fivefold increase in the volume of rosewood harvested, mainly exported to Asia. As the marketing of rosewood in the Northeast now mainly relies on stocks already harvested, new species are the target of illegal exploitation (e.g.: palisander). This dynamic could explain part of the degradation observed over the period 2005-2013 but does not seem to be as important in the current socio-economic processes causing deforestation.

Whereas the influence of the proximity of cities does not emerge from spatial analyses, sporadic cases of influence on forest degradation were highlighted as notable during consultations.

Although there is undeniable overexploitation of certain species (no cutting inventory, corruption of agents, etc.), as well as large losses during processing (40 to 80 percent of the harvested wood is lost), it is important to note that the exploitation of timber posteriori promotes the migration and infiltration of villagers into the massifs once opened. Access roads used during the exploitation can trigger more intense degradation and the subsequent deforestation if these populations practice agriculture or livestock husbandry on these newly accessible areas. However, without reliable and disaggregated data on legally and illegally exploited volumes, it is difficult to estimate the full impact of timber harvesting.

Extension of infrastructure

i.   Transport

Quantitatively, the opening of roads has had few measurable direct impacts on deforestation in recent years due to the fact that few new roads have been created. However, the low general accessibility of forests can concentrate the pressures (harvesting activities, slash-and-burn cultivation, etc.) on the more accessible forest areas. In addition, as noted above, unofficial logging roads can lead to degradation and subsequent deforestation.

In the ER-P and in Madagascar in general, roads can help locate and predict forest-related pressures within their proximities. If roads are scarce (low road density and low average forest-road proximity), pressures are concentrated in a restricted area due to the presence of a road and deforestation may be significant. If, on the other hand, traffic is facilitated within the District (high road density), pressure will be spread and deforestation will be less significant, or even replaced by degradation

ii.   Mines

Madagascar is known all over the world for its precious and semi-precious stones: sapphire, ruby, emerald, aquamarine, tourmaline, topaz, amethyst, etc. Several tons of gold are produced annually by craftsmen, sometimes grouped into partially mechanized cooperatives. In addition to colored stones and gold, many workers exploit ornamental stones, industrial minerals (quartz, mica, feldspar) and building materials (marble, kaolin, gypsum). In 2012, the Ambatovy mining project, which mines for nickel and cobalt (and produces ammonium sulphate as a by-product from refining) was launched as a world-class industrial project in the ER-P area.

Mining projects generate expectations in terms of employment and improvement in living conditions, which can transform into frustration if the developed activity does not translate into full employment or revenues that compensate for the lack of public resources. In Madagascar, the two major mining projects, one of which is Ambatovy in the ER-P area, have developed a range of activities to meet their legal obligations or as part of their Corporate Social Responsibility (CSR) programs. But since 2009, and in general, the mining sector has often been criticized by the public, and disagreements and complaints have in some cases degenerated into social conflicts. These companies also highlight the challenges of mining endeavors as recent fluctuations in global mineral prices have limited revenues, diminished the resources for meeting CSR commitments and even caused ownership of the mining operations to change hands.

Many mining activities can be characterized as artisanal in Madagascar, and there is no formalization or management of artisanal mining practices. Several initiatives have been undertaken in the past to try to formalize the artisanal exploitation of gold or precious stones, with success usually limited to the local level, and dependent on the duration of technical assistance. The informal nature of the activity and smuggling remain major challenges for Madagascar, particularly with regard to REDD+, due to the degradation or deforestation linked to mining activities. The concerned minerals share common characteristics: extraction (or collection in the case of quartz and crystal) on a small scale and artisanal (with spades, possibly crowbars, as well as panning in the specific case of gold).

The establishment of artisanal mines constitutes an important driver of forest degradation, more than deforestation, in the eastern rainforests, and in particular the Ankeniheny-Zahamena corridor (CAZ), site of a protected area in the ER-P. The degradation takes place on an ad hoc basis, first of all by removing timber for the needs of miners and their families including agriculture parcels, then the in-migrations that these farms may entail, and sometimes the settlement of these populations in a definitive manner once the extraction has been completed. At the scale of the entire ecoregion and the ER-P in particular, the impact on deforestation is still low to medium when compared with the agricultural sector. It is, nevertheless necessary to take into account the extent of the sapphire and ruby rushes in the CAZ area, which have led to increased levels of encroachment in recent months and years.

SUMMARY

Deforestation in Madagascar does not take place because of a single large-scale and homogeneous activity, but rather on a small scale and bya multitude of instances, factors and specific situations. Deforestation occurs within intact forest massifs as well as on the margins of intact forests, and close to urban and agricultural areas. Over the 2005-2016 reference period, and on the basis of the available data, the explanatory variables for deforestation differ according to the period but also according to the zones within the ER-P, demonstrating a mosaic of deforestation processes that is determined locally, and therefore difficult to generalize over the full scale of the ER-P.

Although it is expressed in different forms, traditional agriculture remains the first direct cause for deforestation. Traditional agriculture includes two phases: first, traditional tavy dedicated to annual crops (see crop sequencing as described earlier in this section, and second, after 5-year rotations, installation of new high-value-added crops with increasingly important land tenure security (e.g., cash crops, coffee and vanilla).

This second phase can unleash, from a REDD+ standpoint, somewhat conflicting processes. Planting of high-value crops can be an indirect driver of deforestation, but at the same time can also lead to reforestation if agroforestry is practiced on these previously-cleared plots, and can potentially maintain carbon stocks at a relatively high level, even close to that of natural forests and/or secondary formations. An agroforestry approach may create a physical buffer around natural forests. Conversely, medium to large-scale agriculture can also encourage an influx of large investors who wish to export these products, and also migration of populations to the site in search of income. Such an influx can accelerate forest degradation and deforestation in surrounding areas.

In spite of the dominance of agriculture as a driver of deforestation, other factors of deforestation remain significant, as they can have a cumulative impact, on an observed area:

- Bush fires related to livestock breeding and the regeneration of pasture areas – these fires can spread into secondary forests but also in the degraded edges of primary forests. This is particularly the case in areas frequently affected by cyclones, the damage of which increases the dead biomass in the forests and thus makes them more vulnerable to the spread of pasture fires;
- While fuel wood (raw wood) harvesting does not appear to have a significant impact on deforestation, charcoal production for domestic and local use contribute to deforestation, particularly in the forest massifs located relatively close to certain urban areas like Fénérive Est, Antalaha or Sambava;
- Mining, which during the reference period could be considered negligible in terms of deforestation area compared with other direct drivers, is a growing activity—particularly artisanal mining—and directly threatens the integrity of intact forests, including within protected areas (the CAZ area is already facing these pressures).

b. *Underlying causes for deforestation and forest degradation*

Demography and migration

Tavy traditionally takes place in secondary forests, but limited availability of land, population growth and migration can lead to an increase of tavy in primary forests. Migration may be due to the opening of illegal artisanal mines (for example, the case of sapphire mining in the Atsimo-Andrefana Region), illegal logging, and search for fertile lands, or agricultural opportunities in cash crops as described above. Further, migration is a cultural tendency fostered by the lack of clear land tenure and land legislation. The density and distribution of the population are also recognized as explanatory variables for deforestation. The saturation of irrigated valleys pushes the youngest and the landless people to forest areas.

Unfortunately, and as stressed by the International Organization for Migration (IOM, 2013): "The issue of internal migration in Madagascar is little known: little is known about the frequency, causes and consequences of migration. It is a relatively difficult phenomenon to observe and [...] there is a shortage of numerical data".

Economic Factors

Structural poverty among rural populations is a major underlying driving force behind deforestation, as rural populations are dependent on natural resources for their subsistence and local economy. But the lack of financial resources inhibits them from investing in sustainable practices (See section 3.2 on social conditions in the ER-P area, which discusses the widespread poverty, lack of economic opportunity, and reliance on tavy for basic subsistence).

Three types of markets are known to foster deforestation and degradation in the ER-P area:

1) Agricultural products dedicated to export of which market growth, marketing and prices can substantially fluctuate. A moderate incentive for deforestation can therefore be attributed to this economic driver when prices fluctuate significantly and incite farmers to increase their productivity

either through unsustainable practices or by agricultural expansion at the expense of forests. For example, permanent crops such as vanilla, cloves and coffee, even under agroforestry systems, can contribute to deforestation and degradation depending on the fluctuation of the purchase price.

2) Precious wood.
3) Mining and rare earth products.

Technological factors

Agricultural intensification practices are currently too infrequently implemented to play a role in reducing deforestation. Meanwhile, the productivity of traditional agriculture systems (tavy) is stagnating or even declining and intensification practices are not widely observed. Thus, it can be considered that the lack of technological advances in the agricultural sector contributes to deforestation in all areas of the ER-P. There are a few limited exceptions, which include the improved management of post-tavy fallows in the Alaotra-Mangoro region, but are only applied in select areas. In general, agricultural practices have changed little over the past decades: no motorization, little mechanization, no use of chemical inputs, improved seeds, or innovative water or soil management techniques. Populations rely on slash-and-burn to increase fertility of soils with low presence of weeds, which can be cultivated with minimum tillage. In the Analanjirofo, Sava, and Southern Alaotra-Mangoro regions and to a lesser extent the Atsinanana region, the reliance on non-plowed and non-tilled parcels may translate into a strong influence of tavy on deforestation.

In the timber market, yields are also low at all levels of the value chain (harvesting, processing, charring and combustion). The technologies are not very efficient but relatively homogeneous over the territory. These low-efficiency timber processes foster forest degradation throughout the ER-P.

Policies and Institutional Factors

Limited human and financial resources, the absence of a formalized arrangements for management between NGOs who work intensively in forest areas, and Madagascar National Parks, corruption, conflicts of interest, and the difficult implementation of the system for granting tender-based logging permits all contribute to weak forest governance, particularly at local levels. Due largely to limited provision of services to local populations, a combination of formal laws and traditional community rules are used to manage local resources. A lack of intersectoral coherence of policies, overlapping mandates, and/or lack of enforcement of policies and the existence of informal legal pluralism are also drivers of deforestation and forest degradation.

Of particular relevance to the local management of forest resources is the lack of coherence between the promotion of Protected Areas (PAs) and the transfers of natural resource management to local populations (TGRN by its acronym in French), delays in the publication of implementing texts, and weak deployment of forest management plans which are also important drivers. TGRNs and the role played by grassroots communities (COBA or VOI in Madagascar) in these TGRNs are generally known and appreciated. Although in some instances these arrangements result in conflicts of interest due to the ownership or stake of some VOI officials over logging and local resources, they are generally accepted as positive management systems.

Some successes have been demonstrated in reconciling conflicting sectoral policies and the impacts on forest resources, such as the resolution of mining / forest conflicts, the reduction of deforestation through PAs and the prohibition of bushfires and tavy, however the literature is widely divergent on the level of success to date. Some analyses, such as that carried out as part of the PERR-FH project, have shown that deforestation has been limited by certain PAs and TGRN contracts

Property and land tenure legislation

In the eastern humid forest ecoregion, traditional land tenure systems have undergone major changes over the last decade. The loss of power of village and traditional leaders, the rise of land transactions, the creation of local tenure offices (BIF) and the introduction of land certificates have altered the traditional land tenure systems. Customary tenure rules that often do not apply to forests now coexist with the current state law.

The effects of these changes are diverse in terms of their impact on deforestation and forest degradation. They can be accelerators (e.g. development of land transactions and incentives for land grabbing for future speculation) or mitigating factors (e.g. certificates which secure tenure for farmers and encourage them to invest in the long-term management of soil fertility) of deforestation and degradation. The poorest households and migrants tend to employ strategies of agricultural colonization through deforestation in order to secure land. This is an important underlying driver of deforestation and the lack of recognition of a forest land tenure regime exacerbates the situation.

Culture

There is some evidence that rural populations perceive the forest primarily as a reserve of arable land or pasture (from field surveys and consultations, Salva Terra 2017). Further surveys indicate that most households are aware of the benefits of reducing deforestation (for water supply to rice fields, availability of wood resources, and maintenance of capital for future generations and even to fight against climate change). If intact or relatively intact forests are deforested, it seems that this is sometimes done "reluctantly," even though individual behavior can sometimes explain deforestation (no respect for protected areas, resistance to change, individualistic attitude) (Salva Terra, 2017). Discontent with local or central governments may also have some explanatory power for the starting of fires. Competition over land between ethnic groups linked with migratory phenomena explains some races for land clearing.

Finally, sacred forests and taboos provide protection to forests, but the concerned areas are too small to have a tangible impact and immigrants may be less prone to heed the established local belief systems.

Environmental Suitability

The localization of deforestation is correlated with several physical variables:

- Altitude: estimates of the most affected areas by deforestation among eastern rainforests vary between 400 and 1,000 m, mostly because the majority of low land forest has already disappeared (Salva Terra 2017);
- Slope: local communities practice tavy on slopes less than 40°;

- Soil fertility: although fertile soils are deforested first, the expansion of the frontier region is slower;
- Forest fragmentation: isolated forest patches are most likely to be deforested.

The areas that farmers target can be described in descending order of priority for cultivation by ease and productivity (high priority first)—the plains or shallows, valleys and then hills. The criteria for choosing the land to be cleared are, in descending order—soil fertility, the absence of weeds and the presence of water (Salva Terra 2017).

Summary

In the context of Madagascar, to reliably prioritize and quantify the impacts of each driver of deforestation and degradation in the entire program area has not been feasible with the available data and the plurality of drivers, each of which being difficult to spatialize and map. It is however clear that all drivers are linked and exacerbated by poverty.

Where the causes are currently well known, and identified, it remains difficult to determine their spatial representation with certainty. Deeper consultations and assessment at the commune-level have revealed qualitative detail about specific drivers within regions. The ER-P must include a certain level of flexibility in the planning of the activities to be implemented to be adapted to the input of local actors who are familiar with the issues in their specific territory and can validate the choice of priority activities and areas of implementation. Institutional arrangements for planning and implementation of activities have been designed with this approach in mind (see section 6 and 15).

Combining the findings of the driver analyses, Figure 9 summarizes the direct and indirect causes of deforestation, and Table 3 identifies the main agents/actors per category of drivers.

Figure 9: Direct and indirect causes for deforestation (and degradation)

Direct causes

| Agricultural sector | Forestry sector | Energy sector | Cross sectoral (and other sectors) |

| Agriculture expansion | Wood harvesting | Infrastructures extension |

Annual crops (and pasture fire fire) | Livestock | Firewood and | C/O/S Wood | Mines | Transport

Permanent crops

Deforestation | Degradation | Deforestation | Degradation | Deforestation | Degradation

Indirect causes

Demography | Technological factors | Property and land tenure rights

Economic factors | Political and institutional factors | Environmental predisposition

Table 4: Agents, impacts and location of deforestation per main drivers

	Agriculture expansion			Wood harvesting		Infrastructures extension
	Annual crops	Permanent crops	Livestock and pasture fire	C/O/S wood	Fire wood and charcoal	Mines
Agents	All type of farmers	All type of farmers	Farmer with cattle	Artisanal or illegal loggers Households	Households and coal merchants	Artisanal miners
Impacts in terms of deforestation	Most important driver of deforestation	During a first phase farmers could deforest in order to implement permanent crops, but in a second step, most of permanent crops are produce under agroforestry systems and could participate to carbon stock enhancement. Sometimes permaments crops are directly implement on fallow lands of secondary forests.	Impacts can be quite important when pasture fire can burn degraded or secondary forest (and forest fallows)	Low impact	Moyen	Low in terms of deforested area in the reference period, but it could be more important in the near future due to an increase in mining activities and migration effects it creates
Main impacted areas within the program	Everywhere in the accounting area	More importantly in the North East of the accounting area: from Maroanstetra to Manakara for clove production, within a coastal belt of about 50km, and from Antalaha to Mananara for Vanilla production, also within a coastal belt of 50 km.	Within Alaotra Mangoro region mostly	Everywhere in the accounting area		In the near futur some risks exist in the CAZ area and other protected areas.

c. *Policies and other activities already in place in the program area that could contribute to conservation and to the enhancement of carbon stocks*

Existing Policies and Activities in the ER-P Area

Various projects and activities in the ER-P area contribute to conservation and to the enhancement of carbon stocks. As previously described, one of the criteria for defining the ER-P area was precisely the inclusion of these existing activities. It was deemed essential for the ER-P to build on these initiatives, contribute to their sustainability or even increase their scale of implementation to lay a strong foundation for scaling up and for the performance of the ER-P as a whole. The ongoing success of these activities and their presence within the ER-P area is a key advantage of the ER-P design.

Ankeniheny-Zahamena Corridor (CAZ) Protected Area
The Ankeniheny-Zahamena Corridor (CAZ) has long been regarded as one of Madagascar's top conservation priorities and numerous studies have catalogued its rich biodiversity. In order to reduce deforestation in CAZ, the Government of Madagascar and Conservation International developed a partnership for Protected Area management, to provide direct incentives and alternative livelihood activities for communities living around the forest corridor. The CAZ Protected Area covers 370,032 hectares of Madagascar's eastern humid rainforest and provides important ecosystem services to both the surrounding area and the greater region.

Through the creation and management of the CAZ protected area, the government and CI aim to reinforce the long-term management of the protected area and to expand economic opportunities for local communities. The PA at CAZ has been developed based on a pioneering model for Madagascar that involves strong collaborative management (co-management) with local communities.

Makira Protected Area
The Wildlife Conservation Society (WCS) is the delegated manager for the Category II Makira Natural Park, which covers over 372,000 ha and which is surrounded by a 'green belt' or buffer zone of an additional 350,000ha.

Working with local communities is the hallmark of WCS' approach to management of the area, and WCS carries out a range of control and surveillance and ecological restoration activities to reduce deforestation in the protected area. The project supports 120 villages in a range of community development actions including natural resources governance through community based natural resource management, improved subsistence livelihoods (rice and small-scale livestock), conservation enterprises (cloves, cacao and raffia), and health and education. 90,000 people live in the green belt around the PA. With the support of WCS they are organised into 73 community associations that each have a management transfer contract with the designated administrator for a specific area of community forest in the green belt. These COBAs simultaneously represent the main threat and the solution to deforestation in Makira and as such are the entry point for all WCS's livelihoods work. By working with WCS, they receive 50 percent of net carbon revenues generated by the protected area.

<u>Madagascar National Parks (MNP) Protected Area</u>

Madagascar National Parks (MNP), an association under private law, is mandated by the Malagasy government to manage a national network of 43 protected areas (PAs) with a cumulative area of 2.8 million hectares (comprising one-third of all PAs of the country, and almost 5 percent of the national territory). Moreover, the park network managed by MNP represents all the ecoregions of Madagascar. The objective of MNP is to conserve and sustainably manage the national parks and reserves of Madagascar. These Protected Areas will: (i) leverage climate change mitigation and adaptation through economic incentives for conservation among local populations; (ii) attract investment (donors, private, technical assistance-NGOs) for sustainable development in the region of implementation and; (iii) ensure sustainable management by strengthening professionalization at all levels of management.

Specifically, within the ER-P area, MNP manages 11 protected areas belong to the ecoregions of the East, the Center and the High Mountains of Madagascar (513,712 ha) that are included in the ER-P area.

<u>Complexe d'Aires Protégées Ambohimirahavavy Marivorahona (CAPAM)</u>

The CAPAM area is composed of several protected areas all with the same objective: protecting the environment and landscape while contributing to sustainable development. Within the ER-P, part of the CAPAM is managed by MNP, and another part is managed by WWF under *the Programme Holistique de Conservation des Forêts* (PHCF). Funded entirely by Air France, the first phase of Holistic Conservation Program for Forests began in October 2008 and was completed in December 2012. A second phase lasted through 2017. The first pilot phase included 5 intervention sites (515,000 ha) of humid and spiny forests; currently HCPF sites will comprise 300,000 hectares within the ER-P area in the COMATSA (Corridor Marojejy-Anjanaharibe Tsaratanana) site.

<u>Missouri Botanical Garden (MBG)</u>

MBG Madagascar Program focuses on taxonomic research, botanical exploration, in-country capacity building - with special emphasis on training and disseminating botanical information, and community-based conservation at Priority Areas for Plant Conservation (PAPCs). The organisation is now promoting conservation at 12 PAPCs, which are distributed throughout the country in diverse vegetation types, which have a total area of 95,225 ha.

Policy and activity outside the ER-P area which affect land use and carbon stock in the jurisdiction.

As described in section 3.3. Political Commitment, the new POLFOR and the RPF National Strategy will contribute to the conservation and improvement of carbon stocks.

4.2. ASSESSMENT OF THE MAJOR BARRIERS TO REDD+

Poverty and precariousness of households' livelihoods

Poverty and insecurity of livelihoods (mainly for rural households) are a major problem; much of the population does not have access to new economic or better-paying opportunities. Poverty can prevent

implementation of activities to address the drivers of deforestation and degradation — especially improved agricultural practices — that require significant up-front investment at the household level. While REDD+ cannot solve structural poverty problems, it can give local people access to transformational economic opportunities through REDD+ levers such as initial investments and then carbon revenues.

Poor management of land

iii.   Lack of regional zoning

Slash and burn farming and vast areas of fallow land stem from a lack of spatial zoning to manage the interface between forests and agricultural areas. The absence of a consensus among government and smallholders on the distribution of land for different uses, and a lack of zoning for such uses means that conflicts related to use remain an ongoing risk. Conflicts over encroachment among the different sectors are not new; the most famous for forests is the overlap of mining sites and forests. As noted in the drivers section, the current growth of the informal mining sector represents a real future threat to the implementation of REDD+ because of population migration to the mine areas. The development of this sector requires strict regulation and zoning.

iv.   Uncertainty about forest management objectives outside PAs and New Protected Areas (NPAs)

Uncertainties about the purpose of forests are an additional component of the zoning problem which concerns the entire national, regional or communal territory. From the legal standpoint, only forests in PAs and NPAs appear to have a 'secure' spatial and temporal management objective, namely conservation. For other forested areas — specifically the national forest estate and the state forests — uncertainties remain regarding their purpose, or even their legal status. Even conservation-focused community associations (COBAs) may request to harvest part of the forest under their management in the event of an extension of their contract after the first 3 probationary years and an old classified forest may be decommissioned for tender-based logging.

Poor governance and failure of national policies

The low frequency of enforcement of national policies over the last 15 years has led to insecurity in the rural sector in terms of resource management, the right to land and the support to be provided by the administrative entities at the state at regional levels, as part of decentralization.

The non-continuity of public entities and the lack of a database

Forest governance structures remain poorly adapted to the situation on the ground, and largely unable to respond in real time. In general, they do not have the resources to manage the current forest areas, in terms of adequate numbers of personnel, logistics or staff capacity. Various state sectors are affected by a chronic shortage of staff to carry out their respective tasks. The forest administration is not the only one to be affected by this phenomenon and the shortage of staff is a major gap if the various public services are to be involved in a sustainable and intersectoral REDD+ approach. The lack of equipment and databases within

local entities or local administrations and even sometimes at regional level, is a limiting factor because key information can be lost during service handovers.

Low efficiency of decentralization of powers and resources

A key issue related to the ineffective implementation of the strategy of transferring management from forest administration to community is the inadequate preparation of the local communities and the lack of monitoring and support once the process has begun. The preparatory measures taken in the context of the decentralization of forest resource management are not commensurate with the expected results. COBAs, fokontany (local communities in the Malagasy term) and municipalities often lack information and effective powers to carry out their role as custodians of forest resources. The strengthening of local institutions in the context of the REDD+ program will have to go hand in hand with the strengthening of forest governance from the higher levels of public service.

Institutional constraints and lack of an intersectoral approach

The institutional and governance framework in Madagascar currently remains disparate among sectors. Although several intersectoral monitoring or collaboration committees exist, they have a limited impact in terms of implementation. Moreover, the strong competition between the regional directorates for access to finance prevents the establishment of a real collaborative dialogue and the formulation of a common framework for the implementation of the different policies. National preparation for REDD+ has already led to a change in its intersectoral nature, particularly through the REDD+ National Platform and the Regional Platforms that have already proved effective in the development of an implementation framework (See section 6). However, this intersectoral approach must also be expressed at the local level and REDD+ activities must therefore succeed in removing this barrier. The ongoing REDD+ readiness activities are actively seeking to improve capacity at local levels in the ER-P area.

Problem of land security (see sections 4.4 and 4.5)

State recognition of forest land such as fallow land or forest requires the presence of the forest administration according to existing law. However, the forest administration is not always called upon to participate when the land tenure department issues titles for cleared land. In addition, forest fallow areas are at the center of conflicting perceptions among the two sectors concerned, namely the forest sector and the land sector. While the local tenure office (BIF) can provide land certificates for agricultural purposes on any forest fallows as long as they are outside a PA, the forest administration is reluctant to permit the agricultural clearing of these woody fallow lands and would prefer them to be dedicated to forest restoration. Thus, the purpose of woody fallow land is not clarified and so, when there is a lack of agricultural land these forest fallows provide an alternative for agricultural practices in many localities, while they could constitute areas dedicated to forest restoration (and carbon stock enhancement).

The absence of an incentive system for agricultural development and changing practices

There is a significant lack of incentive systems to attract adequate investments for agricultural development and alternative energy, especially among local populations. Sector policies must be at the forefront of the transformation of the practices of local populations to ensure both the development objectives and the protection of natural resources as well as a mobilization of resources to implement the strategies and activities. Madagascar has received considerable support in recent decades for green development projects (such as the different Environmental Programs EP2 and PE3), yet these efforts have largely failed to meet the expected targets and reduce deforestation. Communities still lack financial support and incentives to invest in improved and alternative farming practices, while they are responsible for most of the deforestation, often due to extreme poverty. To date, the incentive and intersectoral policies to develop and catalyze national capacities rather than to solely depend on donors and other external actors.

4.3. DESCRIPTION AND JUSTIFICATION OF THE PLANNED ACTIONS AND INTERVENTIONS UNDER THE ER PROGRAM THAT WILL LEAD TO EMISSION REDUCTIONS AND/OR REMOVALS

a. *Vision and approach for the development of ER-P*

Vision of the ER-P

The government of Madagascar seeks to implement the first stage of its transformative vision for sustainable landscape management and climate change mitigation with the ER-P. The program will build on the pioneering work already underway to link Protected Area management and sustainable rural development through sustainable agriculture in areas around protected forests. The program will expand this landscape approach to the scale of watersheds, in recognition of the vital role of forests in the provision of ecosystem services necessary for sustainable agricultural production.

The focus on sustainable food, energy, and commodity production will allow the ER-P to address the extreme poverty that is daily life to the inhabitants of the ER-P area. In 2013 *more than 90 percent of the population of Madagascar lived on less than US$ 2 per day*, according to the World Bank. The program cannot succeed in addressing the environmental degradation threatening the forests, endemic species, and functioning watersheds of the area without a strategy to address the extreme poverty driving these processes. The introduction of resources and activities to produce food and energy locally and sustainably can begin to address the tavy agriculture at the heart of most forest degradation and deforestation. Building connections to sustainable sourcing commitments of international companies sourcing cocoa, coffee, cloves, and other commodities such as vanilla and pepper offers an opportunity to support SME's and local employment while addressing the larger-scale drivers of forest destruction and environmental degradation.

The government of Madagascar has actively sought to concentrate expertise, resources, and a range of finance types into the ER-P area, both to ensure sufficient finance to demonstrate success at the subnational scale, and to maximize future finance in the form of results-based payments, the first of which is expected to be through the payments by the Carbon Fund. This effort has leveraged the REDD+ process and the FCPF readiness resources to secure several finalized or in-process funding opportunities, including:
- An approved Green Climate Fund project which includes grant funding for the management of the CAZ Protected Area as well as investment finance for the development of private-sector focused activities in sustainable agriculture and energy production.
- A large-scale development project, financed by World Bank, GEF and AfD focused on agriculture landscapes has been partially relocated in order to better align with the structure and geographic focus of the ER-P.
- A proposal to the UNFCCC NAMA facility has been developed which is focused on areas of the ER-P not currently covered in terms of finance for activities.

- The GCF has invited Madagascar to submit a proposal to its private sector window to build upon the Private Sector Investment Blueprint developed for the ER-P – the blueprint and the concept note for this proposal are included as annexes to the ER-PD.
- The IFC and World Bank are collaborating in the development of a green bond that will support REDD+ activities and sustainable commodity supply chains in the ER-P. Madagascar's ER-p is one of the countries highlighted for potential participation in this financial mechanism.

As described in section 2.1, the National REDD+ Strategy and the ER-P development have been conducted in parallel and inclusively. The ER-P design provided a concrete basis on which to shape and guide the National REDD+ strategy. Concurrently, the National REDD+ Strategy gives a solid rationale and analysis of indirect causes of deforestation (not only specific to Eastern Humid Forest and the ER-P) as well as ensuring the political involvement and commitment for framing the ER-P.

The ER-P is designed with the intention that it will evolve and expand *(see section 6 and 15 for more clarifications)*:

- It will take time in the first years to achieve deforestation reduction across the considered area. The direct and rapid impact activities currently planned through initial investments cover only part
    The integrated watershed approach leaves ample room for adjusting management as needed. In line with national development plans, this approach includes a portfolio of development opportunities throughout the ER-P implementation zone to stakeholders (government, donors, private sector, NGO, etc.). The availability of resources will dictate where to start and develop and the ability to attract new investment will dictate how rapidly activities can be expanded. Some watersheds may also be prioritized over others for strategic purposes (e.g. new investment from the private sector) or according to the availability of means within the different relevant administrations. The flexibility of this approach provides an opportunity for implementing according to the possibilities secured and capacity available at each stage.

Tables 4 and 5 below list the types of activities that the program will prioritize, as well as their links to the drivers of forest loss – these include the activities already financed that are larger in scale as well as the categories of activities prioritized by the regional REDD+ platforms for implementation upon securing additional finance – either results-based finance following the first verification for the Carbon Fund, or as a result of additional fundraising for investment-phase finance.

Table 5 - Types of activities of the program

Category of activity	With direct impacts	With indirect impacts
Agriculture sector	AD 1 - Optimize production systems and agricultural and livestock-dedicated infrastructures	AI 1 - Support the development and setting up of small and medium-sized enterprises and/or rural cooperatives and promote the creation of REDD+ mechanism-related subsectors at the local level
	AD 2 - Improve the management of cash crop production under the agroforestry system and improve the food security of local communities' riparian to forests	
Forest sector	FD 1 - Improve the management of forest areas under the landscape approach	FI 1 - Reinforce the forest surveillance and monitoring system and regulatory text enforcement, including fire management
	FD 2 - Promote private and community reforestation, rehabilitate degraded forest areas, and reforest in consideration of local needs, without converting natural forests	FI 2 - Improve the contribution of the forest sector to economic development by promoting the use of non-wood products and other subsectors that do not affect the carbon stock
Energy sector	ED 1 - Promote improved fuel wood transformation and use techniques, as well as the dissemination of improved coal stoves in urban centers	EI 1 - Support the harmonization and development of the legal framework relating to the development of alternatives to fuel wood and sustainable fuel wood supply
	ED 2 - Develop the use of renewable energy (solar, biogas, etc.) for domestic use	
Crosscutting and other sectors	ID 1 - Enhance the benefits delivered by the conservation of biodiversity and ecosystem services	II 1 - Reinforce land security, including with reforestation actors
		II 2 - Improve the coordination and monitoring of mining and agricultural developments and ensure the setting up of compensatory reforestation
		II 3 - Reinforce decentralized management and coordination of REDD+ mechanism-related interventions at local level
		II 4 - Align the legal framework with the institutional one conducive to the good governance of the REDD+ mechanism

The table hereunder describes the main direct and indirect causes of deforestation and degradation that each type of activity is intended to address and solve in priority.

Table 6: Link between the types of activities and causes of deforestation

Sector	Activity	AGRICULTURAL EXPANSION			LOGGING				EXTENSION OF INFRASTRUCTURES		UNDERLYING CAUSES					
		Annual crops	Perennial crops	Livestock and pasture fires	Commercial logging	Fire wood	Timber	Coal	Hauling	Mining activities	Population growth	Economic factors	Technological factors	Political and institutional factors	Ownership and land right	Environmental predispositions
Agricultural sector	AD 1 - Optimize production systems and agricultural and livestock-dedicated infrastructures	✓		✓									✓			✓
	AD 2 - Improve the food security of and agricultural production management by local communities riparian to the forests		✓									✓	✓			✓
	AI 1 - Support the development and setting up of small and medium-sized enterprises and/or rural cooperatives and promote the creation of REDD+ mechanism-related subsectors at the local level	✓	✓	✓					✓			✓	✓			✓
Forest sector	FD 1 - Improve the management of forest areas under the landscape approach				✓	✓	✓	✓	✓						✓	✓
	FD 2 - Promote private and community reforestation, rehabilitate degraded forest areas, and reforest in consideration of local needs, without converting natural forests					✓		✓			✓				✓	✓
	FD 1 - Reinforce the forest surveillance and monitoring system and regulatory text enforcement, including fire management			✓		✓	✓	✓						✓		
	FI 2 - Improve the contribution of the forest sector to economic development by promoting the use of non-wood products and other subsectors that do not affect the carbon stock											✓	✓			
Energy sector	ED 1 - Promote improved fuel wood transformation and use techniques, as well as the dissemination of improved coal stoves in urban centers					✓		✓				✓	✓			
	ED 2 - Develop the use of renewable energy (solar, biogas, etc.) for domestic use					✓		✓				✓	✓			
	EI 1 - Support the harmonization and development of the legal framework relating to the development of alternatives to fuel wood and sustainable fuel wood supply					✓		✓						✓	✓	
Crosscutting and other sectors	ID 1 - Enhance the benefits delivered by the conservation of biodiversity and ecosystem services										✓	✓		✓		✓
	II 1 - Reinforce land security, including with reforestation actors					✓		✓		✓					✓	✓
	II 2 - Improve the coordination and monitoring of mining and agricultural developments and ensure the setting up of compensatory reforestation									✓				✓		
	II 3 - Reinforce decentralized management and coordination of REDD+ mechanism-related interventions at local level	✓	✓	✓	✓	✓	✓	✓		✓				✓	✓	

	II 4 - Align the legal framework with the institutional one conducive to the good governance of the REDD+ mechanism	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓

Concurrently with these activities that directly or indirectly generate ERs, the ER-P will also need to implement activities with social and incentive scope for local populations, taking the form of "rewards" (this term will be used to refer to this type of activity in the rest of the document) and allowing for addressing problems relating to:

- Population growth (family planning, education, etc.);
- Human health and the living conditions of local populations (hospital infrastructure, clinics, markets halls, etc.);
- Education, including environmental education.

b. *Description of program activities*

Certain large-scale activities already initiated form the backbone of ER-P implementation in the early years of the program's operation, due to the investment funds already provided or committed to them. These activities have been selected following separate consultation processes, and in some cases have informed the strategy of the ER-P under which they will operate once the ER-P enters implementation. These include the activities of the CAZ and Makira Protected Areas, the activities initiated by Althelia as part of the finance provided to EIB under the GCF, and the activities under the PADAP project. These activities will generate ER's in the first years of ER-P implementation, allowing finance to flow to the regions for the funding of activities prioritized in the regional land-use planning processes undertaken as part of the development of the regional and national REDD+ implementation strategies.

It is important to clarify that these region-based activities have been identified and prioritized through the consultation of stakeholders, mostly the PFN REDD+ and the PFR REDD+. Specific workshops were organized to first list all potential activities that could contribute to deforestation within the ER-P (and according to the analysis of the drivers described in section 4.1) and then to prioritize (by ranking) these activities in terms of ERs impacts and the category of impact (direct, indirect, long-term, short-term). On September 7, 2017, a workshop was organized with the PFN REDD+ and representatives of each region of the ER-P (including Chief of Region, director of DREEF, and one representative of VOI) to conduct participatory mapping and identify for each region: (i) the main driver(s) of deforestation, and (ii) a spatialization of REDD+ priority activities during the ERPA period. These maps were then further refined with the PFR REDD+ in September, 2017 and have provided the basis of the regional REDD+ strategy and priorities of implementation within the program. These maps and plans include a spatially explicit set of activities to guide regional implementation as finance becomes available. Also, in order to pursue the development and improvement of the ER-P design, BNC REDD+ will intensively work with each main sectoral ministry (Ministry of Agriculture, Ministry of Land Use Planning, Ministry of Energy, Ministry of Water, Ministry in charge of Mining) including technical as well as political representatives. This key step will focus on defining specific action plans and partnerships to ensure efficient future implementation of these activities within the program, and ensuring coherence with potential programs or projects these ministries are coordinating. More details and practical elements will be added to each of the activities presented below.

As described in section 6.1 and 15.1, these activities will be implemented through "REDD+ projects" at three different scales: communal, intercommunal/landscape, pluri-regional ("large-scale projects). The decision and implementation process mixes a top-down approach (each region uses its Regional REDD+ Strategy as a regional framework with a prioritization of activities and areas for implementation) and a bottom-up approach: the design and proposal of concrete REDD+ projects to be implemented will be realized at local level for communal or intercommunal/landscape projects. According to available funding at regional level, all REDD+ projects will be prioritized using performance criteria (see section 15.1) and implemented as planned in the project proposition. Executing agents are not predefined for each activity and can be diverse or even include several agents for one REDD+ project. The description of activities below identifies the most likely agents or partners in charge of the implementation but does not aim at constraining the further design of REDD+ projects that will contain maybe only one type of activities described here, or a mix of them, according to local deforestation drivers and local priorities for project selection.

Agricultural sector

The strategy adopted for activities within the agricultural sector aims to tackle the main issues that are directly or indirectly forcing slash and burn agriculture:

- *High levels of poverty (especially rural)*: The poverty of most rural populations prevents them from investing in more sustainable practices and better equipment, and hinders risk-taking related to changes in agricultural practices. Activities AD1 and AD2 will allow local farmers and populations to increase their revenues and access new, more productive and sustainable practices and technologies.
- *Land tenure*: Lack of secure land tenure leads to extensive agricultural practices to claim land through use. Activities AD1 and AI1 will create "non-land" jobs, decreasing the dependency of local population on land tenure (e.g. promotion of extension services and technical units in close proximity to communities, cooperatives management, transformation units, etc.).
- *Increased need for food production*: Madagascar is characterized by rapid population growth. This increase in population has resulted in an increased demand for food products, which results in increased slash and burn agriculture (increased need for land and acreage) and/or the reduction of fallow periods. Activities AD1 and AD2 will directly mitigate this issue by (i) increasing productivity of current agriculture lands, and (ii) diversifying food production. In parallel, activity AI1 will seek to increase the access to markets which will facilitate increased opportunities for rural export of agricultural products.
- *Cattle breeding and related fires:* illegal encroachment leads to illicit burning of forests, often by individuals that are not part of the surrounding communities, and do not adhere to locally established grazing grounds. Activity AD1 will tackle this issue by promoting pasture land management through the development and setting up of collective agreements and simplified development and management plans.

The activities identified below are planned based on existing projects and finance either ongoing or committed. More specific land-use planning and activity prioritization have also taken place under the coordination of the regional REDD+ platforms, and the results of their prioritization exercise have provided a next step for planning activities that will be implemented with additional finance secured by the ER-P. While some land use planning has already been supported by REDD+ readiness funds, like the regional REDD+ strategies and some communal plans, others are being supported by investments such as PADAP. The implementation of the activities prioritized in the regional strategies will depend on the availability of investment financing. The information in the financial plan provides further indications about what funding is available and what gaps remain.

<u>Sustainable Agriculture through a Landscape Approach (PADAP)</u>
The US$ 107 million PADAP project has recently been approved by development partners (the World Bank, the French Agency for Development and the Global Environment Facility). The project is managed and implemented by the Government of Madagascar jointly through its ministries in charge of Agriculture, Environment and Water. It is based on an integrated landscape management approach that aims to promote economic value chains (agriculture, forestry, livestock, ecotourism) while preserving the needed essential ecosystem services to support these activities. The project complements the ER-P as 4 of the 5 PADAP landscapes are included in the ER-P area, and its development has been carried out in close collaboration with that of the ER-P. The activities and expected outcomes of PADAP will contribute to the achievement of ER-P objectives. Paramount to the approach of the ER-P is the collaboration between sector ministries to develop a robust approach that emphasizes local development and conservation

Activities with direct impacts	**AD 1 - Optimize current production systems and agricultural and livestock-dedicated infrastructures**
Description	As described earlier, agricultural expansion is the main cause of deforestation and livestock farming is a major cause of forest degradation. Since their effects are aggravated by population growth, it is critical to promote optimized production methods and support sustainable growth of agricultural and livestock farming to improve the income levels and food security of the populations, while limiting impacts on forests. Special attention will be paid to the following activities: ▪ Reinforce extension services and technical units in close proximity to communities that help agricultural producers to access inputs, seeds, and tools, build producer capacities through workshops, as well as field training, and facilitate the use of innovative concepts and technologies that involve lesser costs and are profitable in the short term; ▪ Introduce and promote improved techniques that match the local agro-ecological conditions and are sensitive to changing climate dynamics. Madagascar is increasingly affected by this last problem which causes occasional droughts that severely impact production and drive some producers to clear forests to increase their farmed surface area to ward off risks of harsher, future droughts; ▪ Improve pasture land management through the development and setting up of collective agreements and simplified development and management plans. The ER-P will promote the setting up of improved grazing systems to reduce the impact of cattle on forest edges and prevent grazing in forests.
Location	<u>In general:</u> In more fertile zones of landscapes, in the "trough" of hilly landscape <u>Activities planned during the ERPA:</u> Through the PADAP project, the activities will be conducted in three watersheds of the ER-P, namely Andapa, Soanierana Ivongo, and Iazafo. Specifically, the following will be funded: access to improved agricultural technologies and inputs, advice and support to farmers, and the setting up of improved grazing and sustainable management methods to limit fires. Under the ER-P, existing REDD+ protected areas and sub-projects are already contributing and will contribute to improving farming practices in riparian areas in close proximity to forests (buffer zone around the protected areas) with the aim of increasing farmer and household income and reducing their need to use forest resources, as well as covering part of opportunity costs
Results expected over 5 years	5,000 livestock farmers have adopted sustainable livestock farming and grazing methods

	10,000 farmers have integrated a sustainable agriculture training and support program and have adopted improved agricultural technologies. In 5 watersheds deemed priority, the access to technologies and inputs has been substantially improved and the improved agricultural productivity of 10,000 farmers has mitigated impacts in terms of deforestation, while maintaining secondary forests and forest fallows, therefore reinforcing carbon stocks.
Beneficiaries	Livestock farmers, farmers, smallholders Farmers' federations and associations, agricultural cooperatives Extension services and technical units in close proximity to communities
Potential executing agent or partners	NGOs, local associations, STDs, economic operators

Activities with direct impacts	**AD 2 - Improve the management of cash crop production under the agroforestry system and improve the food security of local communities' riparian to forests**
Description	One of the objectives of the program is to encourage local populations to use agroforestry systems to increase their cash crop production, as an alternative to *tavy* and an additional source of income, subject to complying with a number of sustainable practices and ensuring that external events do not accelerate deforestation (cf. section 4.1). Setting up new agroforestry areas will prioritize secondary forest formations to generate benefits from the reinforcement of the carbon stock offered by these fallows. Concurrently, the ER-P aims to improve food security by diversifying food crop production. Agroforestry systems will therefore be developed in parallel to improved techniques and diversification of annual food crops, or even livestock (silvopasture), and as a complement to them. Among its key activities, ER-P therefore will: ▪ Promote agroforestry approaches where appropriate with cash crops (vanilla, coffee, clove, cocoa); ▪ Support research on the development of agroforestry integrating cash crops (vanilla, coffee, clove, cocoa) in forest areas and involving no negative effect on carbon stocks; ▪ Support village communities to improve the availability of food through food crop production diversification
Location	In general, In areas further up the hillside in a hilly lanscape Activities planned during the ERPA: Under PADAP, the watersheds of Andapa, Soenierana Ivongo, Iazafo, and to a certain extent Bealananana, will benefit from activities to promote the adoption of sustainable agroforestry practices. Existing REDD+ protected areas and sub-projects already contribute and will contribute to improving agroforestry practices (cocoa, vanilla, clove) under ER-P.

Expected results	15,000 ha of sustainable agroforestry system in the ER-P zone, leading to an increase in producer income
Beneficiaries	Small producers who are already agroforestry farmers or farmers wishing to adopt the proposed practices. Farmers' federations and associations, Agricultural cooperatives
Potential executing agent or partners	NGOs, local associations, STDs, economic operators

Activity with indirect impacts	**AI 1 - Support the development and setting up of small and medium-sized enterprises and/or rural cooperatives and promote the creation of REDD+ mechanism-related subsectors at local level**
Description	The ER-P is a major opportunity for setting part of the agriculture sector on the path to green development, especially since it offers a major opportunity for mobilizing private investments for agricultural value chains. Agricultural areas are still not farmed to their full potential because national markets are not sufficiently structured and small producers cannot have access to international ones because the local subsector lacks structure and it is difficult to collect large volumes of agricultural products. As such, the objective of the ER-P is to promote the integration of the private sector with the REDD+ mechanism, especially with respect to agricultural production, since the development of crops and increase of income (which go hand in hand with deforestation reduction) cannot sustainably materialize unless organized and professional subsectors are created. Concurrently and as a complement, ER-P will: ▪ Promote the creation of small-scale transformation units; ▪ Support small enterprises so they may gain access to transformation technologies; ▪ Set up, structure, and reinforce producers' networks to become partners of the economic operators of the promising value chains linked with REDD+; ▪ Link communities practicing market-oriented production with operators who hold part of the market (market operator and production operator); ▪ Professionalize local producers and crafts makers so that they develop entrepreneurship, hone their negotiation skills with collectors and transformation and export enterprises, and access financial resources dedicated to entrepreneurs; ▪ Set up one or several reliable and accessible economic information systems (producer networks and market); ▪ Promote bio-prospecting to use natural resources for economic development without causing deforestation or forest degradation; ▪ Promote mechanisms that bestow added value to production, such as certifications (organic, fair trade, sustainable) and labels (green job)

	▪ Through the landscape approach, the ER-P will promote the setting up of agricultural investment areas outside of forests and in low-lying areas. More tangibly, the ER-P should allow for structuring agribusiness subsectors within the jurisdiction, enabling a number of private operators to invest in these areas with the guarantee of getting a given supply of quality products, and complying with a number of environmental criteria, including deforestation reduction of the forests belonging to the same watershed. An analysis of the most attractive commodity supply chain opportunities in the ER-P area has been conducted, with the aim of developing 2-3 agribusiness projects and creating partnerships with a number of private, national or international operators. Discussions are ongoing with key companies and the GCF regarding the development of a GCF private sector window project.
Location	Across the ER-P area, in the locations identified in the Private Sector Investment Blueprint as well as others potentially
Expected results	2-3 agribusiness value chains set up, linking producers and buyers through sound and sustainable value chains and contributing to deforestation reduction.
Beneficiaries	Small producers experiencing difficulties to access markets Farmers' federations and associations, Agricultural cooperatives
Potential executing agent or partners	NGOs, local associations, STDs, economic operators

Forest sector

While deforestation is mainly due to the agriculture sector and *tavy*, degradation is largely caused by illegal and artisanal logging. In addition, the GoM has begun to consider the important role of reforestation and so far, the forestry sector has not contributed to forest restoration at scale, or more importantly to supplying local needs of timber and fuel wood. Thus, the global strategy of the ER-P within the forest sector focuses on addressing several barriers:

- *Weak enforcement of laws and regulations*: corruption and political influence of local timber operators makes enforcement of logging permit systems difficult, resulting in illegal and artisanal timber harvesting. Lack of capacity causes lengthy or ineffective processes for management transfers to communities. Activities FI1 and FI2 will increase and improve controls as well as creating economic incentives to produce timber legally both for loggers and communities;
- *Lack of adherence to reduced impact logging practices: Currently,* rotation periods are often not respected. Activity FD1 will ensure that forest management is performed under a specific landscape plan, dedicating some areas to production (including reforestation) and others to conservation;
- *Insufficient timber and wood fuel supply to local and urban population:* FD2 and FI2 will foster partnerships between communities near to the forests and private operators to quantify and supply needs for timber and fuel wood and promote community-based reforestation on degraded forest land or fallow lands.

Activities with direct impacts	**FD 1 - Improve the management of forest areas under the landscape approach**
Description	The ER-P will seek to harmonize all forest sector activities inside the landscapes in consideration of existing PAs and forest massifs and, as such, the activity will focus on the following interventions: - Systematize the implementation of master plans and forest development and management plans as part of a sustainable landscape approach to land-use planning (cf. watersheds) and in consideration of NPAs and PAs; - Reinforce the sustainable management of protected areas under SAPM and ensure their proper management. The Program will support the maintenance and development of protected area management by reinforcing or creating community management structures, supporting other livelihoods of neighboring communities (agriculture, energy), and developing strategies aiming to reduce the impact of small-scale mining; - Improve and roll out forest zoning and the KoloAla system of protecting forests according to local needs.
Location	Activities planned during the ERPA: all protected areas included in the program have a management plan that will be implemented during the ERPA.

Expected results	All areas of the ER-P that are implementing all types of REDD+ activities related to forest protection or use will have forest development and management plans.
Beneficiaries	Loggers, local communities
Partners	Loggers, STDs, economic operators and local communities

Activities with direct impacts	**FD 2 - Promote private and community-based reforestation, rehabilitate degraded forest areas, and reforest in consideration of local needs without converting natural forests**
Description	In synergy with the Forest Landscape Restoration (RPF) strategy, the ER-P will need to ensure reforestation to achieve several objectives: (i) restore degraded and strongly degraded forest spaces using appropriate (endemic) species, (ii) meet the fuel wood and firewood needs of local populations (cf. ED1 activities), (iii) increase the marketed timber productivity. With this focus, the ER-P will support the following through this activity: ▪ Build capacity and reinforce the diversification of reforestation activities with reforestation actors. The program will have to ensure that reforested areas can serve and meet several needs at local level. As such, local actors will receive assistance to identify their needs and be supported in setting up, as well as monitoring local forest planting or restoration areas. Furthermore, the program will ensure that the reforestation activities are conducted concurrently with creation of short-term income-generating activities to ensure the sustainability of planting and restoration areas (hence the ER-P landscape approach); ▪ Improve the sustainable management of forest plantations with the aim of increasing productivity through gradual diversification of the species used and introduction of improved reproduction techniques to reduce gradual degradation; ▪ Restore degraded forests to improve biodiversity connectivity and conservation through the restoration of key areas in the forest corridor; ▪ Develop financial and land incentives to enable the private sector to invest in reforestation and forest restoration.
Location	Primarily focused in forested and degraded areas
Expected results	In 5 years, where demand for timber and fuel wood is lower than supply, specific reforestation areas will have been implemented and should reach local and urban needs.
Beneficiaries	Local communities
Potential executing agent or partners	STDs, economic operators and local communities

Activity with indirect impacts	FI 1 - Reinforce the forest surveillance and monitoring system and regulatory text enforcement, including fire control
Description	Deforestation could be effectively reduced if forest areas benefited from stronger surveillance and monitoring. However, to date, such surveillance and monitoring are not conducted routinely. Various reasons account for this and the ER-P will strive to: ▪ Update the manual of texts and procedures for surveillance and monitoring of forest resources, and ensure its dissemination and the training of relevant agents to avoid conflicts of jurisdiction where actors conduct separate interventions, facilitating improved enforcement; ▪ Improve the capacity of the Ministry in charge of Justice, Customs, and Public Security, for implementing the forestry legislation and codes relating to forest management and forest product control (Forestry Code, COAP); ▪ Encourage the development and approval of *DINAs* on forest resource management (sanctions, etc.) and their monitoring at local level (VNA, KASTI, other actors) or revitalize existing structures; ▪ Develop systems to track wood and non-wood forest products (including mining products extracted from forests) with the forest administration.
Location	In forested areas of the ER-P
Expected results	STD and local communities will have higher capacity and will prove that the increase in enforcement substantially impacts degradation of forest resources. Improved identification and prosecution of illegal activities within forests by the forest administration as a result of access to better data and a traceability system on forest products.
Beneficiaries	STDs, Local communities
Potential executing agent or partners	STDs, economic operators and local communities

Activity with indirect impacts	FI 2 - Improve the contribution of the forest sector to economic development by promoting the development of non-timber forest products and other subsectors that do not negatively affect carbon stocks
Description	To encourage local actors and operators into the sustainable management of forests and maintenance of forest cover, the ER-P support the development of timber and non-timber forest product-related subsectors and markets, with the aim of increasing the profitability of sustainable forest resource use. The ER-P will mainly: ▪ Develop and facilitate partnerships among communities near the forests, producers, and economic operators, to structure the upstream part of the subsectors in such a way as to enable all actors to earn additional income or benefits; ▪ Develop sustainable supply strategies;

	▪ Quantify local and regional needs in wood to supply households and markets in a sustainable way, as well as encourage loggers with an increase in their income, owing to increased sales and access to markets; ▪ Promote promising subsectors that could contribute to reducing deforestation and degradation and ensure sustainable use of relevant non-wood forest resources with strong added value (such as the subsectors of essential oils, medicinal and ornamental plants, etc.).
Location	All areas with high forest cover
Expected results	Sustainable value chains of timber and non-timber products based on partnership with private sector and forest-dependent communities will be created within communes and districts with important forest cover, creating employment, including non-land based jobs.
Beneficiaries	STDs, Local communities
Potential executing agent or partners	STDs, economic operators and local communities

Energy sector

Energy sector activities of the ER-P will aim to address both situational and structural issues:

- *Growing needs for fuel wood*: ED1 and EI1 are dedicated to the improvement of energy efficiency in the overall value chain of wood fuel production and use, as well as creating legal and institutional frameworks necessary to create incentives for producers and consumers;
- *Lack of energy alternatives or efficient technologies:* more efficient fuels are not available or prohibitively expensive or inaccessible in rural areas, and efficient production practices and improved technologies require investments that are not accessible to many poor producers. Activity ED2 will specifically seek to reduce the share of charcoal in the full energy mix by promoting energy alternatives like agrofuels or micro-hydropower and solar systems. In addition to the activities envisioned for implementation by Althelia with GCF finance, the ER-P will seek to attract and create specific partnerships with appropriate investors and private operators in order to accomplish these aims.

Activities with direct impacts	**ED 1 - Promote fuel wood produced in sustainable ways and the dissemination of improved coal stoves in urban centers**
Description	To ensure sustainable production of charcoal, the ER-P proposes to focus on three key points: - The use of improved charcoal making techniques to improve efficiency of production. To pass these improved charcoal making techniques on to charcoal makers, they (or existing associations) will be provided training on (i) the species that should be used in consideration of the Malagasy legislation, the tree's growth, and the quality of the charcoal produced, (ii) the use of the improved charcoal making technique, as well as (iii) the setting up of the production zone, the quota to be produced, and dedicated plantations of trees (in relationship with the FD 2 activity, the ER-P will have to promote tree plantations to divert charcoal practices from natural forests). - The product marketing and tracking system to eliminate illegal charcoal production. The produced charcoal will be grouped and sold at one same place: an "improved" and sustainable charcoal depot and sales points will be set up in charcoal-producing villages. Depending on the networks and types of means currently used to haul charcoal, controls will be reinforced concurrently with these activities. - Study and develop an economic stove production subsector through an entrepreneurial and commercial approach. Improved cook stoves allow for using less charcoal when cooking. These consumers mainly include urban populations and caterers and hoteliers.
Location	Around urban areas with important demand (Fenenerive-Est)

Expected results	30% of the production of fuel wood in the ER-P is produced under sustainable ways and linked to reforestation plantations (see activity FD2)
Beneficiaries	Local communities, charcoal producers
Potential executing agent or partners	Ministry of Energy, Local communities, charcoal producers, NGOs, Althelia

Activity with direct impacts	ED 2 - Develop the use of renewable energy for domestic use
Description	This activity has two objectives: gradually reduce the share of charcoal in the full energy mix of ER-P and decrease the overall dependency on fossil fuels. With respect to this, the ER-P zone has substantial assets especially in terms of hydropower and biofuel production potential. The ER-P will therefore seek to collaborate with the Ministry of Energy to properly identify and locate these assets, while attracting the investments needed to set up energy production sites, providing a large part of the domestic energy locally and therefore reducing the impact on forests.
Location	Around and in urban areas
Expected results	30% of population currently located within areas dependent on unsustainable forest resource use for wood fuel production is benefiting from facilitated and low-cost energy alternatives systems.
Beneficiaries	Local communities,
Potential executing agent or partners	Ministry of Energy, Local communities, NGOs, economic operators, Althelia

Activity with indirect impacts	EI 1 - Support the harmonization and development of the legal and institutional framework related to sustainable fuel wood supply, as well as the development of alternatives
Description	The development of the energy sector and its potential to attract investments are hampered by the lack of an appropriate legal framework. Draft texts have been developed but do not contain clear political and strategic foundations, i.e. objectives and needs are not defined[32]. As such, the challenge for Madagascar is to develop a renewable energy strategy and policy that enables the country to use its full potential and take advantage of this opportunity, from the economic, as well as environmental and social perspectives, while setting up a framework favorable to the development of investments in this subsector. Without claiming to change the legal framework on its own, the ER-P is the opportunity for demonstrating in a very tangible way that the development of the energy sector is compatible with deforestation reduction and decrease of the dependency on fossil fuel resources. To this end, ER-P will need to

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[32] « Plan directeur de la recherche sur les énergies renouvelables , 2014 – 2018 », Ministère de l'Enseignement Supérieur et de la recherche Scientifique, 2015

	work in collaboration with relevant ministries to facilitate biofuel and solar, wind, and hydraulic energy production (cf. activity ED2). Fuel wood will, for the foreseeable future, remain the main source of energy used in Madagascar, especially at household level, since a large proportion of households gather wood. When they want to buy energy, charcoal and firewood still prove the most competitive on the market. Actions in the fuel wood subsectors will have to improve management of the fuel wood stock and address demand through the promotion of economic cook stoves. As such, actions will focus on revision and updating of regulations, multiplication of local community initiatives through fuel wood resource management transfer contracts, the use of development plans to set the acceptable use quota, and capturing lessons learned from the different areas of experimentation of Madagascar in the implementation of regional orders aimed at sustainably supplying the population with fuel wood and supporting a tax reform on charcoal in the different regions.
Location	-
Expected results	New renewable energy strategy developed and appropriate regulatory texts are applied structuring and facilitating activities ED1 and AD2
Beneficiaries	-
Potential executing agent or partners	Ministry of Energy

Intersectoral activities

In order to facilitate deforestation and degradation reduction activities mentioned previously, and also to address the underlying causes of deforestation in a long-term view, the program will finance enabling strategies in terms of governance, institutional and legal frameworks, and land tenure. The activities presented below constitute a multi-level support for all stakeholders to create the necessary conditions for a transition towards sustainable development and efficiency of the ER-P. The aim of the actions outlined here is to strengthen significantly the institutions and the governance of natural forest resources

Activities with direct impacts	**ID 1 - Increase the advantages delivered by biodiversity and ecosystem service conservation**
Description	This activity mainly pertains to the development of PES schemes whose potential in Madagascar is very high. Madagascar is currently developing a national committee for PES in order to develop a specific national strategy, with the support of GIZ. This clearly shows that there is a political willingness to valorize natural resources in a sustainable way through PES schemes, and that in the future they will be important to take into account when promoting green development in Madagascar. The stakeholders participating in the design of the ER-P have identified PES schemes as an important element of the ER-P design, in order to more explicitly acknowledge and value the services that can be prioritized beyond carbon. Given the watershed approach of the Program, and the obvious extremely high biodiversity potential, the Program is specifically interested in approaches that increase value for actions that support water conservation as well as threatened biodiversity. One option under consideration is to identify those activities producing ER's that represent the highest additional value in terms of water or biodiversity, and incorporate that value into the price of the carbon, or to market this value through access to or design of more local-national programs that may support these efforts based on their impacts on water and biodiversity rather than carbon. By financing small to medium-scale PES systems, the ER-P will create an incentive that recognizes the added value to the country and to the world of these services, and may enhance effectiveness beyond carbon alone. It is noted that Madagascar is increasingly interested in PES schemes and that a national strategy is being developed.
Location	No specific areas yet identified.
Expected results	2 or 3 model PES projects within the ER-P will be ongoing in 5 years and will have proved their capacity to support a sustainable use of natural resources linked to forests and thus reducing deforestation of forest degradation
Beneficiaries	Local communities and natural resources monitoring entity
Potential executing agent or partners	Local communities and natural resources monitoring entity

Activity with indirect impacts	**II 1 - Reinforce land security, improve land-use planning, including with reforestation actors**
Description	As explained earlier, land security that strictly consists in granting titles does not support the reducing of deforestation. However, land security remains a very important consideration for local actors, especially to address conflicts between customary rights and laws. To this end, the ER-P will: ▪ Initiate consultation, define activities, and share responsibilities among the different sectors involved in forest area security (including secondary forests and forest fallows); ▪ Update communal zonings by supporting the development and implementation of land use planning schemes/strategies at the regional and communal level (SACs, as well as SARs and their SRATs) where deemed necessary by regional stakeholders; ▪ Reinforce the operational implementation of the Act on Land Security in relation with Reforestation (LSR); ▪ Support the acceleration of the registration of protected forest areas; ▪ Support the forest mapping and spatial land-use management plan process initiated by the national and regional REDD+ platforms, and register these forest areas in the regional and communal development plans, ensuring consideration of traditional structures.
Location	Everywhere in the ER-P where REDD+ activities are implemented. Clear land-use plans will be required before the implementation of specific activities in the different sectors.
Expected results	All REDD+ activities within the ER-P will have contributed to the elaboration of communal zoning plan in coherence with their activities
Beneficiaries	All communities concerned by a REDD+ activity
Potential executing agent or partners	-

Activity with indirect impacts	**II 2 - Improve the coordination and monitoring of mining developments and ensure the setting up of compensatory reforestation**
Description	Over the coming years, the mining sector could actively contribute to the country's development, although, over the past years, a strong increase in small-scale and illegal mining within these same protected forest areas provides an indication of how poorly managed the sector is. The country should once again commit to formalizing and enhancing the added value in small-scale mining subsectors. Numerous initiatives attempting to formalize small-scale gold or precious stone mining were conducted in the past and their successes were most of the time limited to the local level and the duration of the technical

	assistance. The informal character of the activity and smuggling remain major challenges. Whereas the national production is estimated to range between 2 and 10 tons per year, gold declarations registered in 2010 and 2011, for example, are anecdotal. Obviously, the loss of revenue for the Government amounts to millions of dollars. The revenues that the Government officially derives from small-scale gold mining are very low. Although prospects that these revenues will substantially increase are limited (international experience shows relatively little success in this area), without access to funding and other guarantees offered by official registration, small-scale miners' chances of escaping poverty are very low. The success of the activities to be undertaken is conditioned by the definition of a plan to formalize the gold and precious stone subsectors; this plan should allow for laying the foundations of good governance and preventing and mitigating the impacts of small-scale mining. Although ER-P cannot claim to solve all problems relating to the mining sector, it will need to: ▪ Support the decentralized management of small-scale mining activities to ensure local revenue collection, management, and sharing ▪ Participate in the compliance control of the legislation and Mining Code ▪ Sensitize and, where applicable, train communities and actors of the subsector and enable them to structure themselves into associations to defend their interests. ▪ Ensure the environmental conservation of forests by setting up a mineral warning system to avoid rush of artisanal miners, and also setting up prevention and management system or by promoting the environmental rehabilitation of mining sites. ▪ Improve the added value of the sector. This value is currently marginal in small-scale mining as most stones and metals are exported in a raw state. The ER-P could especially support the efforts of the Madagascar Gemology Institute (IGM) to address this problem.
Location	Mostly in the CAZ area, but also in other PAs (for example, managed by MNP)
Expected results	Increased number of artisanal miners will be realizing their exploitation in a legal, sustainable way, inclusively with local communities in order to share benefits. In the same time, communes involved in such processes will have implemented partnerships with operators to operate compensatory reforestation.
Beneficiaries	Artisanal miners and local communities
Potential executing agent or partners	Artisanal miners, Ministry of Mines and Oil

Activity with indirect impacts	**II 3 - Reinforce decentralized management and coordination of REDD+ mechanism-related interventions at local level – land use planning at sub-regional level**

Description	To ensure effectiveness and stakeholder commitment, as well as better coordination of actions at the local level, the ER-P will support the creation of SLCs where none are set up yet, ensuring gender parity, and will sensitize these SLCs and build their capacities regarding REDD+ issues and local-scale land-use planning, as well as the ER-P and its operational arrangements and sustainability in relation with performance. Considering the lessons learned and previous results of the management transfer evaluation, it appears necessary to build the capacities of the communities both regarding existing management transfers and new TGRNs to be set up. As such, the ER-P will have to build local capacities relating to Natural Resource Management Transfers (TGRNs). Lastly, to ensure intersectoral coordination at the local level and consistency among all economic activities, the ER-P will also build the capacities of the agents of administrations of sectors other than forestry but linked with REDD+ issues (MPAE, Communes, etc.), depending on local needs: STDs and CTDs.
Location	-
Expected results	All communes concerned by REDD+ projects will have structured and operationalized SLCs. When necessary, TGRNs will be implemented to support/monitor projects.
Beneficiaries	-
Potential executing agent or partners	Regional REDD+ Cells, deconcentrated technical agencies

Activity with indirect impacts	**II 4 - Align the legal framework with the institutional one conducive to the good governance of the REDD+ mechanism**
Description	▪ In line with the National REDD+ Strategy, the ER-P will provide a tangible foundation for the development of a legal and institutional framework favorable to the good governance of forest resources in general, including REDD+: ▪ Revise and complete regulatory texts in force (decree, order, etc.) to ensure the integration of the REDD+ dimension into sectoral policies. ▪ Reinforce the staff numbers, equipment, and technical capacities of the forest administration in charge of implementation at all levels (DREEF, BRC REDD+, PR REDD+, etc.). ▪ Improve the legal framework governing Natural Resource Management Transfers (TGRNs) to develop community-based forest resource management (for protection of forests and/or forests dedicated to sustainable production).
Location	-

Expected results	A set of different decrees or other regulatory texts will clearly define all legal aspects of the REDD+ mechanism and enable its efficiency as a real intersectoral and green economy policy. This means a strong coordination with other sectoral ministries will be ensured. This process is already underway, but will continue as the program enters implementation phase.
Beneficiaries	-
Potential executing agent or partners	-

c. *Location of REDD+ activities*

Based on the national-level identification of categories of activities to address drivers of forest loss, and on the analysis and consultations completed for the implementation of large-scale activities such as the PADAP program, and the community activities underway in the CAZ and Makira PA's, the regional REDD+ platforms have conducted individual assessments of more localized drivers, land-use assessments, as well as identification and prioritization of activities by district within the regions. The Table below compiles the more detailed results of district-level planning to the regional level, by activities selected. The report which contains the more detailed prioritization and geographic planning of activities for each district within the five regions of the ER-P may be found in BNCR's website: http://bnc-redd.mg/index.php?lang=fr . Maps with the location of these activities may be located in Annex I and further below.

Table 7 - Regional Activities prioritized by the five regions of the ER-P

Regions	Activities identified

ALAOTRA MANGORO	AD2:
	   - Extension, intensification and promotion of cash crops and agroforestry
	   - Development and extension of food crops and income-generating activities
	F1
	   - Strengthening of monitoring
	FD2:
	   - Reforestation and forest restoration reinforcement
	ED1:
	   - Development of infrastructure (construction of hydro-agricultural dam)
	II1:
	   - Strengthening land tenure security

Regions	Activities identified
ATSINANANA	**AD1:** - Development of infrastructures (construction of hydro-agricultural dam) **AD2:** - Development and extension of food crops and income-generating activities - Propagation, intensification and promotion of cash crops and agroforestry **F1:** - Strengthening of monitoring and forest control **FD2:** - Reforestation and forest restoration reinforcement
ANALANJIROFO	**AD2:** - Development and extension of food crops and income-generating activities - Propagation, intensification and promotion of cash crops and agroforestry **F1:** - Strengthening of monitoring and forest control **FD2:** - Reinforcement of reforestation and forest restoration - Forest management and sustainable management of forest resources
SAVA	**AD2:** - Development and extension of food crops and income-generating activities **F1:** - Strengthening of monitoring and forest control **FD2:** - Reforestation and forest restoration reinforcement **AD2:** - Propagation, intensification and promotion of cash crops and agroforestry **ED1:** - Production of coal in accordance with improved techniques - Development and / or extension of improved coal stoves in urban centers

Regions	Activities identified
SOFIA	AD2: - Propagation, intensification and promotion of cash crops and agroforestry FD1: - Strengthening and forest control - Development and sustainable exploitation of forest areas by landscape approach ED2: - Infrastructure development (construction of hydro-agricultural dam) FD2: - Reforestation and forest restoration reinforcement II1: - Strengthening land tenure security ED1: - Development and / or extension of improved coal stoves in urban centers

Figure 10 – Zoning of activities according to the Regional REDD+ Strategy
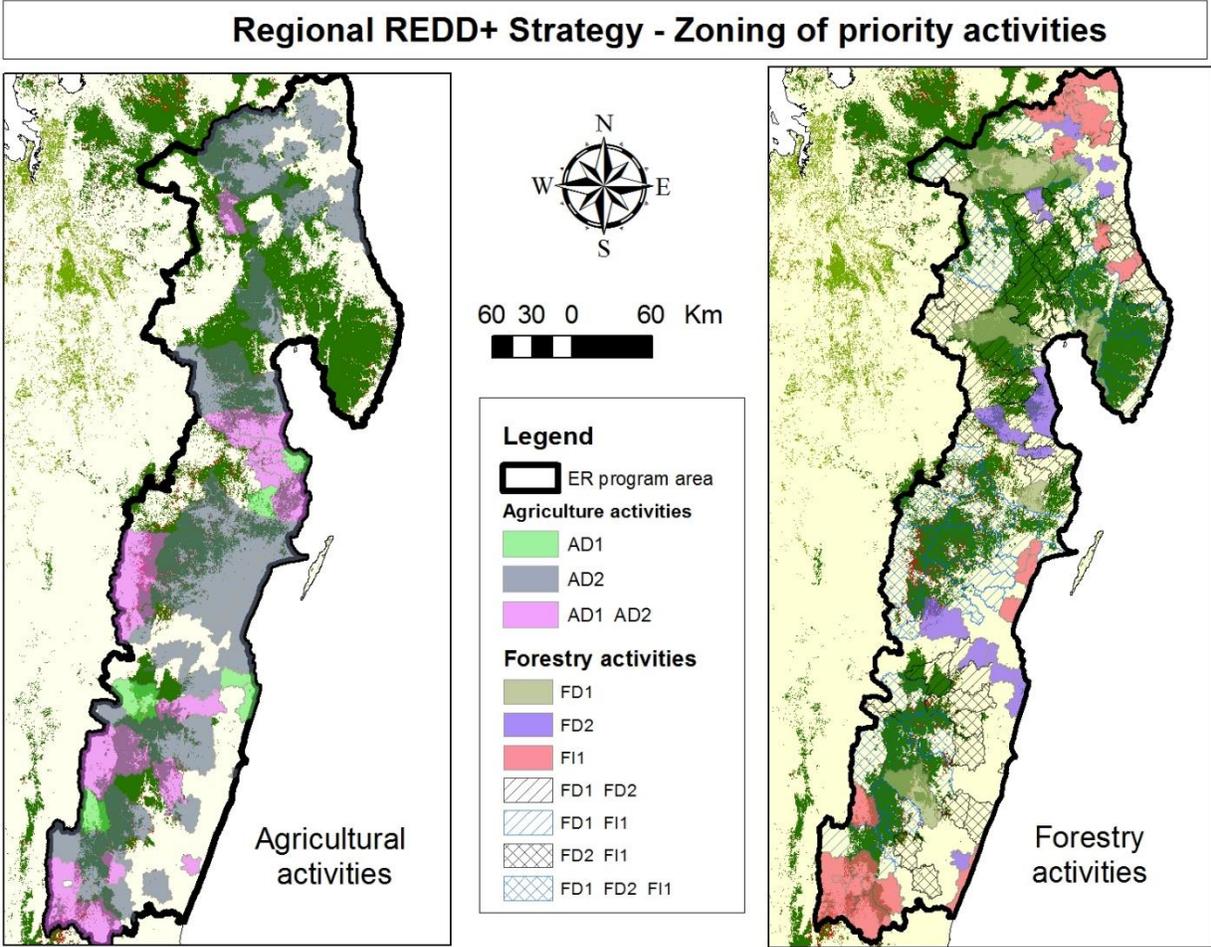
Figure 11 - Zoning of activities according to the Regional REDD+ Strategy
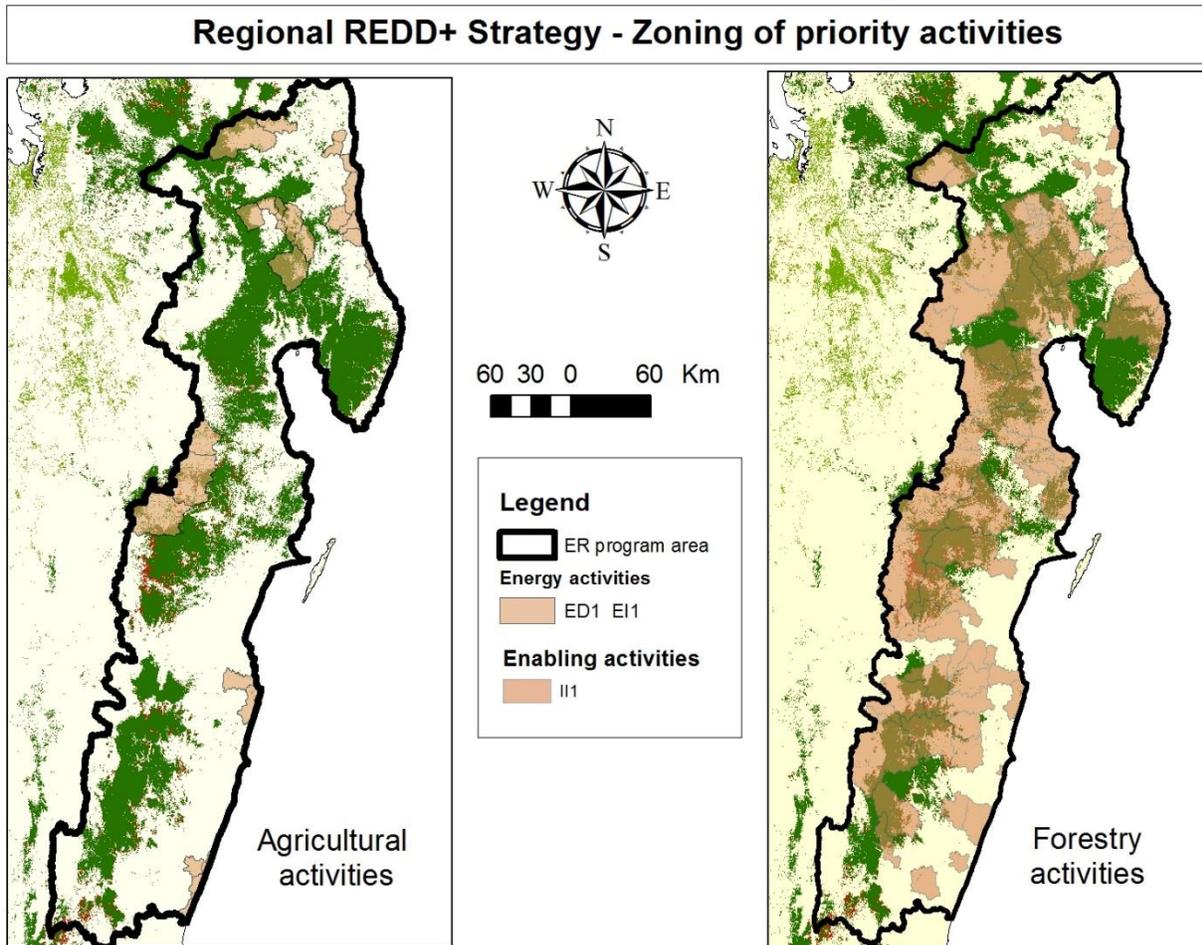
4.4. ASSESSMENT OF LAND AND RESOURCE TENURE IN THE ACCOUNTING AREA

a. *Overview of forest and land tenure in Madagascar*

The Madagascar forest and land tenure act is based on the country's Constitution - the most recent constitutional document was adopted in 2010 - and on specific acts and legislations, including the 2005 Land Act, the Act on Ownership and Obligations (Civil Code), the 1997 Forestry Law, as well as on community-based governance tools.

Principle of public ownership

While recognizing individual right to property (Article 34), the 2010 Constitution does not include any references to land or natural resources, except in its preamble and in Article 139 which stipulates that "any land that is unoccupied and without owner shall belong to the State...".

The *presumption of public ownership* dates back to precolonial times. This system created a legal environment where any land that is not registered to an individual automatically belongs to the State.
The act laying down the principles governing land status (2005)[33] and the act laying down the legal provisions applicable to private non-titled land ownership (2006)[34] - which are the key elements of the modern land reform - have largely rejected the principle of public ownership.

Together, these recent acts are going against the default provision that any land that is not registered to an individual belongs to the State. Instead, land needs to be registered in the name of the State, public establishments, or decentralized jurisdictions ("CTDs") [35] to be validly titled to the State. Furthermore, individuals have been given the right to claim, and the procedural means to provide evidence for it, that a particular non-registered piece of land is theirs ("non-titled property")[36] (Art. 21 of the 2005 Act).

The 2006 Act specifies that private non-titled ownership is acknowledged on all lands, "urban, as well as rural, [...] on which ownership was gained according to the customs and practices of the time and place" (Article 2).

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[33] Act n°2005-019 laying down the principles governing land status.

[34] Act #2006-031 laying down the legal provisions applicable to non-titled land ownership.

[35] It is noted that although the decentralization of the government in Madagascar is an integral part of the Constitution - cf. Article 139 stating that CTDs "having legal personality and administrative and financial autonomy, form the institutional framework of effective citizen participation in public affairs management..." and that they "have assets that include a public domain and private domain..." - no transfer of ownership has yet been affected.

[36] This term encompasses all "urban and rural lands subject to land holding systems expressed through actual, evident, and permanent individual or collective holding, as per the practices of the time and place, and according to the intended land use [...]" (Art. 33 of Act 2005) - indirect (and conditional) confirmation of customary rights.

It is noted that the management of non-titled property registration - including the procedural roll-out-falls to CTDs, and that recognition of non-titled property positions, in all cases, is subject to the existence of a Local *Land Use Plan* (also to be prepared by CTDs, in collaboration with the Land Agency ("*Services domaniaux et topographiques*") to provide land demarcation data, Article 4 of the 2006 Act). Both individuals as well as groups of persons may apply to have their non-titled property recognized (Art. 6 of the 2006 Act). The recognition procedure is "public and attended by all concerned parties", and conducted by a local recognition committee (Art. 11). Where the application is approved, the applicant receives a "land certificate" (Art. 13) which "shall entitle the holder [...] to perform any legal act pertaining to real rights and any of their dismemberments recognized by the legislation in force" (Article 17).

It is specified in implementing regulations[37] that CTDs provide special services - "Land Offices" - that encompass the recognition process of private non-titled ownership as a whole, including the conversion of the land certificate into a full land title ("registration"). Such conversion is an option to the holder, not an obligation.

It should be noted that there are remnants of the previous 'presumption of public ownership' system. The 2005 Act excludes from its scope any vacant, unused land, specifying that "lands that have never been occupied or owned" are the private property of the State (Article 18). ("State" always refers to the central government - not CTDs.)[38]

It is also noted that land covered by the Protected Areas legislation, as well as any "area [...] legally defined as covered by the Forestry Law..." remains excluded from the provisions on non-private ownership (Article 38). However, both exclusions do not create a simple fallback to the presumption of public ownership. The *act on the private property of the State, Decentralized jurisdictions, and legal entities under public law* (2008)[39] clarifies that even in the absence of a process for individuals or groups to claim (non-titled) property rights, the public claim is not automatic. Instead, the State must trigger a registration process in its own right. Any "non-titled land that is not developed [...] shall be registered in the name of the State according to a simplified procedure [...]" (Art. 18).

Forest governance

Under the 1997 Forestry Code,[40] "natural forests such, as Natural Integral Reserves, National Parks, Special Reserves, Classified Forests, State-owned Forests, and Forest Reserves" (Art. 12) are, among others, subjected to the provisions applicable to forests. Private forests are subject to the provisions applicable to

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[37] Decree #2007-1109 implementing Act #2006-031 dated November 24, 2006, laying down the legal provisions applicable to private non-titled land ownership.

[38] Cf. Article 4 of Organic Law #2014-018 governing the jurisdictions, organizational and operational arrangements of Decentralized jurisdictions, as well as those for the management of their own business: "Decentralization is transferring to Decentralized jurisdictions, jurisdictions that are their own and distinct from those of the State."

[39] Act #2008-014 dated July 23, 2008.

[40] Act #97-017 on the revision of the legislation.

forests if the owner has submitted a specific application (Art. 13). The law does not specify any prior right based on non-titled customs. It only recognizes the possibility for the Ministry in charge of Forests (represented in this case by its regional offices) to deliver "timber permits […] for strictly personal needs to individuals" to allow for "the effective participation of rural populations in the sustainable conservation of renewable natural resources […] and exercise of their traditional individual or collective rights of use" (Art. 40 and 41). The title of the section refers to the "*Fokonolona*" (the traditional clan-based governance system[41] recognized by the Constitution as the "foundation of development and sociocultural and environmental cohesion" - Art. 152).

The Forestry Law, as such, does recognize the existence of customary laws but does not provide legal guarantee that they can be claimed in any particular situation ("timber permits *may* be granted… ", Art. 40)[42] and is far from offering any way of registering property.

It is noted that a Forest Policy was adopted in 2017. The Policy introduces a new definition of the forest, emphasizing operational contribution in terms of environmental (cultural) services rather than numbers of trees.[43] The new Policy creates the legal framework for the establishment of the national REDD+ mechanism. More specific definitions and guidance for benefit sharing, safeguards, eligible activities, etc, will be defined in the coming months as regulatory text of the overarching Policy.[44]

Grassroots governance

As provided for under the 1997 Forestry Law, one needs a permit[45] to use the forest – either a "timber permit" as per the Forestry Code, or, as per the 1996 "**GELOSE**" Act[46], a "management contract" on specific renewable resources including "forests, fauna, and flora" (Art. 2 of the GELOSE Act), negotiated between the Government (or CTD), on one hand, and a "grassroot community" (*"Vondron'Olona Ifotony"* or simply "V.O.I."), on the other hand. Grassroot communities are, according to the law, "any group of individuals that gathered on a voluntary basis, united by the same interests, and abiding by common rules of life" (Art. 3). The process involves different steps and requires the signature of different institutions (including the Mayor and relevant Communes). There are no *a priori* restrictions on space or land. Any land belonging to

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[41] "Foko" means "clan" and "olona" "person", cf. A. Deliège, *Pratique économique et transactions avec les ancêtres* (2012).

[42] Italics added here.

[43] "Forest: Ecosystem ensuring or designed to ensure production services, regulation services, support services, and cultural services as defined by the Environmental Charter and provided by woody vegetation."

[44] "Forests eligible under REDD+: Any area covered with woody plants (trees, shrubs, and bushes) whose minimum surface area, height, and coverage are defined by regulatory means…"

[45]It is however noted that some ambiguity exists regarding the act governing right of use when there is no formal permit or authorization deed. The Forestry Code fails to address the matter. Ministerial decree #98-782 stipulates under its Art. 5 that "subject to specific provisions governing the exercise of rights of use, no forest product subject to the provisions applicable to forests may be collected without a logging agreement, logging permit, timber permit, collection permit or a management contract entered into as per Act #96-025…".

[46] Act #96-025 dated September 30, 1996 on the local management of natural renewable resources ("GELOSE").

the State (or a CTD) is *a priori* eligible, as long as it is customarily developed by the relevant community. So far, only State-owned land has been put under contract under the GELOSE system.[47]

In spite of the intersectoral intentions and commitments, including preferential tax treatment, and advanced compliance structures focusing on customary governance and dispute settlement procedures ("dina"), few local communities initially engaged with the GELOSE framework.[48] To remedy this, in 2001, the Ministry of Water and Forests introduced a specific and simple version of forest management at grassroot level: contract-based forest management ("*gestion contractualisée des forêts de l'État*" or "GCF").[49] GCF contracts are bilateral agreements between the forest administration and the "grassroot community" or V.O.I. (normally a village or group of villages) that do not require the additional approval of the "local committee" made up of the mayor, a member of the Commune Council, and a representative of the forest subdivision (Article 10 of the decree). The management contract is initially entered into for a period of three (03) years (Art. 7) and is renewable for a period of ten (10) years. The rights and obligations of the grassroot community are laid down by a logging agreement (Art. 21). The results yielded by the GCF mechanism (approximately 1,250 contracts had been negotiated as of late 2015)[50] were but partially conclusive in terms of natural resource protection and livelihood improvement (cf. hereafter, Chapter 4.5). The GCF were simplified versions of the GELOSE that enable communities to be recognized managers of natural resources, particularly forests.

Large-scale logging concessions

As per the act, no logging permit (including on mangrove forests and estuary forests) may be granted unless a management plan has been prepared.[51] Management plans include volume to be extracted, time frame and timber and forest land concessions come in several forms and may be granted for forest areas classified as production forest. The collection, haulage, and marketing of specific types of wood is totally prohibited.[52]

Protected areas

The Protected Area land tenure system - as consolidated in *Act 2015-005 on the restructuring of the Protected Area Management Code* - makes the distinction between the different types of sites: national parks and natural parks, special reserves, natural monuments, protected harmonious landscapes, and natural resource reserves.

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[47] M. Ramamonjisoa / G. Ruta, Analysis of Community Forest Management (CFM) in Madagascar (World Bank 2015).

[48] I. Scales, Conservation and Environmental Management in Madagascar (2014).

[49] Ministry of Water and Forests, Decree #2001-122 laying down the implementation conditions for contracted management of State forests. It is noted that this decree was introduced under the legal mandate of the Forestry Code and not under GELOSE.

[50] M. Ramamonjisoa / G. Ruta, op. cit.

[51] Decree #98-782 (Art. 7 and Art. 10).

[52] Decree #2010-141.

Types of Protected Area governance include public governance, shared governance or co-management of the collaborative or joint type, private governance, and community governance. Customary rights of use are generally recognized and an actual identification procedure exists for all Protected Areas. Nevertheless, the act provides for - and authorizes against compensation - the restriction of rights of use "[required] by the setting up and management measures of a Protected Area" (Art. 6 of Act 2015). [53]

Agricultural land

Seventy-seven percent (77%) of the rural population lives under the national poverty threshold and the poorest are the ones who do not own land. Land ownership in Madagascar is extremely fragmented. The average surface area of the plots amounts to approximately 1 hectare, ranging from an average of 0.5 hectare for the poorest households to an average of 1.8 hectare for the wealthiest.[54]

The fact that all lands (with the exception of vacant lands) are no longer subject to the principle of public ownership and the emergence of mechanisms for allocating land to individuals beyond formal titling through the introduction of "*non-titled property*" and the establishment of "land offices" across the country, have made it possible to incrementally formalize and consolidate the land rights of local populations, especially subsistence farmers..[55] It is estimated that 90 percent of farmers farm their own land[56] but most of them do not have the formal recognition granted by a title. Once fully implemented, land offices will make the use of "small papers" - i.e. informal and non-legal documents issued by *Fokontanys* (institutions of grassroot *Fokonolona*) as replacements of the formal land title.

Mining

Madagascar is an important mining country, as it is home to different minerals and precious and semi-precious stones, including sapphires, gold, uranium, and rare soils. The government is seeking to increase the sector's contribution to the GDP from 2% to 15%[57]. The key legal instruments governing mining are Act 0999-022 dated July 30, 1999 on the Mining Code, amended by Act #2005-021 dated October 17, 2005 and Decree #2006-910 dated August 19, 2006 on the implementation of the Mining Code. The code lays down that all mineral deposits are the property of the State (Art. 3). Beneficiaries of mining permits must either be citizens (small-scale permits; small-scale miners) or residents (large-scale permits) of Madagascar.

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[53] For a critical discussion, cf. S. Aubert / S. Rambintsaotra / J. Razafiarijaona, *L'insécurité foncière dans et autour des Aires Protégées de Madagascar*, 4 Développement durable et territoires (2013) 1.

[54] USAID, Property Rights and Resource Governance (2009).

[55] T. Crowl, Land Rights Among Subsistence Farmers: An Examination of Madagascar's Land Reform and Prevailing Systems of Land Tenure in Betafo (2014) notes that the conventional registration procedure (titled lands) is comprised of fourteen (14) steps and lasts 6-10 year on average.

[56] Bellemare, Marc F. 2009. Sharecropping, Insecure Land Rights and Land Tenure Policies: A Case Study of Lac Alaotra, Madagascar. Development Policy Review 27(1):87–106.

[57] http://www.rfi.fr/afrique/20170116-madagascar-projet-refonte-code-minier-est-rails.

Mineral exploration can be conducted freely across the national territory, outside of protected areas (Art. 20). Mining permit holders have the obligation of maintaining good neighborly relations with local populations in general, land owners, traditional occupants, and especially usufructuaries (Art. 307 of the 2006 Decree). Where a mining permit holder wishes to conduct business on a land belonging to the private domain of the State, decentralized jurisdictions, or any other legal entity under public law, it must enter into a contract with the authority in charge of the domain's management, as well as with traditional occupants and usufructuaries - where applicable, before beginning any work or operation.

b. *Rights to Emission Reductions*

Forests under administrative or delegated management

Although Madagascar has pioneered the use of carbon finance to support conservation of forests and biodiversity, the legal concept of carbon rights remains vague. Some reference to the linkage of "environmental services" and "carbon markets" can be found in the country's key programmatic policy document, the Environmental Charter (Act #2015-003 Environmental Charter) which stipulates that "[all] legislative texts, sectoral policies, plans, programs and projects must consider: [...] fair sharing of the benefits derived from environmental services through: [...] the use of the income generated from "carbon" markets [...]" (preamble).

Regarding specific legal instruments, Madagascar law has implemented the Kyoto framework[58], including provisions relating to the *Clean Development Mechanism* (CDM which leads to the creation of a form of international credits). Explicit statutory recognition of "carbon rights" or "title to emission reductions" is missing, however. There is a single reference, in delegated legislation (Decree #2013-785, adopted by the Ministry of Waters and Forests), to the term "les *carbones forestiers*" ("forest carbon"). The decree in question lays down the delegation arrangements of State-owned forests to public and private entities, under the Forestry Code and the Protected Area Management Code, among others.[59] The decree, however does not offer any explanation of the term or specific detail of what "forest carbon" (the original language uses, in fact, the plural ("*carbones forestiers*") is or what it represents. It is also noted, in this context, that the new Forestry Policy, which introduces the concept of REDD+, does not use the term "forest carbon" ("carbones forestiers").

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[58] Decree #2012-690 dated July 1, 2012, laying down the Procedures for carbon project approval and national carbon register setting up and management in Madagascar; Order #24317/2012 defining the Conditions relating to the implementation of Decree #2012690 dated July 10, 2012, laying down the Procedures for carbon project approval and national carbon register setting up and management in Madagascar.

[59] *"All wood and non-wood forest products, material or non-material, including forest carbon, shall remain State property and their management shall exclusively fall to the Forest Administration."*

To understand the meaning of rights and claims to REDD+ emission reductions in the context of Malagasy law, one needs to describe the REDD+ concept with domestic legal terms. Three characteristics seem central to the REDD+ concept and its expression in the Malagasy legal sphere:

1. The implementation of a set of actions linked with the forest ("*service*");

REDD+ activities represent an *effort* ("environmental service" in the language of the Malagasy Environmental Charter) concerning the forest; yet such service is not inherent in a particular piece of land or a tree. The effort may consist in reforestation activities of a particular stretch of land or – further removed from particular lots of land – in introducing certain practices (e.g. patrolling) or policies (e.g. concerning supply chain controls) with an impact on country- or jurisdiction-wide deforestation.

2. The generation of a result in terms of increased sequestration or greenhouse gas emission reduction ("*result*");

REDD+ is incomplete as an activity alone; it is essentially a 'results-based' concept. The reforestation activities must result in permanent sequestration gains and the introduction of certain practices or policies must show in actual emission reduction results.

3. The translation of these results into exchangeable units ("*valorization*").

A REDD+ transaction involves the commodification of the REDD+ results adding transparency obligations – in the form of a registry – and exclusivity obligations, namely the guarantee that the same REDD+ results will not be commodified again and that the same REDD+ activities will not give rise to additional compensation from another REDD+ transaction.

The domestic legal regime that applies to these core characteristics is the Malagasy Code civil, whose law of obligations gives the provider of a service, which gives rise to a valuable result, a right or remuneration, either on the basis of a contract or tort using the principles of negotiorum gestio (*gestion d'affaire*) and unjust enrichment (*enrichissement sans cause*). The right of remuneration is guaranteed for all stakeholders (then 'service providers') that actively and voluntarily contribute to the specific REDD+ activities and REDD+ result.

It is noted that the service rendered to the ultimate beneficiary of, i.e. the recipient of the commodified good, is a dual one: It consists, first, in the emission reduction (and sequestration) gains, and second in the guarantee not to market the same REDD+ results to anyone else (whether in the country or beyond).

It is also noted that the Malagasy Code civil (and the relevant set of judicial rights) does not only give rights to those stakeholders that actively contribute to achieving the REDD+ result, but also to those that are negatively impacted in their property or in other land tenure rights. The latter stakeholders are given protective claims both in the form of injunctive relief in the form of compensation.

c. Description of land rights in the ER-P area

The forms of tenure in the program area vary, on one hand, according to levels of urban development and according to types of landscape, on the other.

Titled land is almost exclusively found in urban areas or rural centers. Communes with a higher level of urban development sometimes also have a land office. This allows for registering land considered as non-titled property. The more distant urban or rural centers are, the scarcer titled or registered (non-titled property) land becomes, and owner-farmed land becomes the standard (small plot farming).

Owners who farm their own land farm three of the four types of land. The first type is the irrigated bottom of a valley with its rivers and main channels, where rice farming, horticulture, and cattle farming are most widespread. The second type is characterized by slopes where contour and terraced farming is practiced, and some cattle farming, various forms of agriculture, and tree fruit production. Type three refers to the higher slopes where reforestation and forestation through forestry and agroforestry are possible. The fourth type includes protected areas and intact forest corridors (cf. section 5.3.1).

Approximately 70 percent of the program area falls in the fourth category, two thirds of which are designated protected areas. Inside and outside of the protected areas, a string of grassroot communities (V.O.I.) has been set up and mandated to (co-)manage a forest area. Part of the program area (outside of protected areas) is classified as production forest and is under forest concession with a State-owned company.

A number of active mines occur across the wooded areas; the largest ones are managed on the basis of formal concessions; the smallest ones are considered as small-scale mines for which mayors grant semi-legal ad hoc permits.

The 30 percent remaining of the project area are agricultural or urban lands. Agricultural lands are occupied by smallholders who have non-titled ownership. The process for formalizing ownership (registration) is ongoing in a number of Communes who have set up Land Offices. Most Communes do not yet offer land office services (nor local management plans needed to ensure registration). *Small papers*, issued in lieu of official titles, are largely used; disputes are settled by traditional authorities.

Forest lands are still being incrementally encroached on by the *tavy* system - a traditional practice that is little regulated by formal law - and mining.

d. Challenges on ER-P and program inputs intended to overcome them

Land ownership control in the program area and sustainable planning with land partners face a number of difficulties, most of which are related to lack of capacity and procedural efficiency.

Regarding the certification of non-titled property, this can occur by the Land Office following the provisions of the Law 2006-031 and its application decree 2007-1109. These certificates have the same jurisdictional attributes as a land title (transfer, mortgage, guarantee,…), however this certificate can be cancelled if another party demonstrates its right over the land. In order to effectively secure the land, a title is needed. An additional weakness of the certificate approach is that there often is no Land Office set up and the development of local land occupation plans - a condition to the issuance of land certificates - is often delayed. Although this does not directly impact forests, it has indirect consequences in that it removes the need for clear delineation of plots, protection (as well as taxation) and encourages forest encroachment.
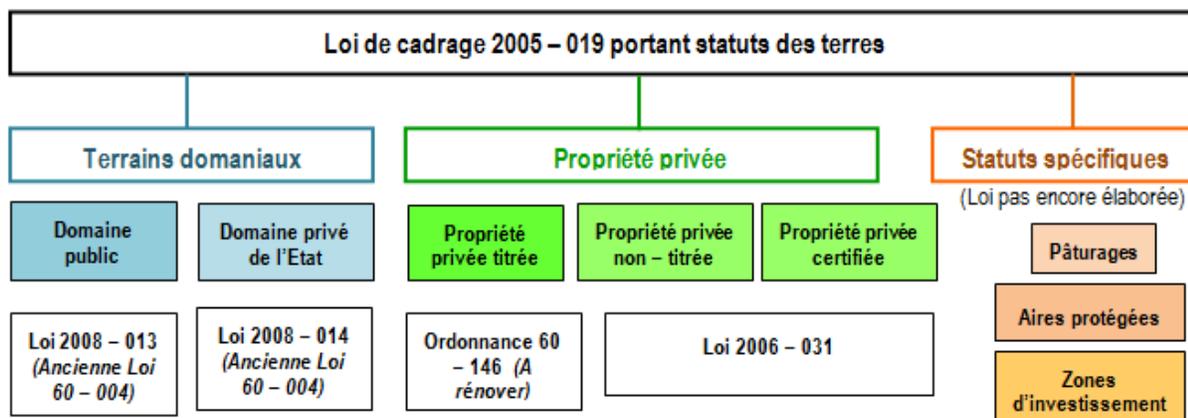
Figure 12. Legal framework in Madagascar foreseen in 2005. Ratsialonana Rivo, 2015

The ER-P cannot replace and compensate for the incomplete land reform process; however, the program will help with various aspects that may compensate for some of the related challenges:

- It will build capacity at all government levels, helping ultimately the process of land recognition;
- It will reinforce community-focused measures (notably, in the beginning, PADAP) and engage with self-governing bodies through the process (see the chapter on Institutions and, in particular, the use of Local Concertation Structures); and
- It will secure rights for remuneration (carbon or non-carbon benefits) for everyone actively engaging with the program, notably including farmers – irrespective of whether their claim to the land has been formally approved or not – and as program stakeholders and participants, they will benefit in accordance with the Benefit Sharing Plan;

In particular, ER-P, through the sustainable landscape management it proposes, will build the capacities and equipment of government institutions in charge of providing rural households with specific services and inputs, including agricultural service centers and communal land offices ("Land Offices"). As for local government institutions, the preparation and validation of REDD+ and landscape management plans, and their implementation will improve the planning, budgeting, monitoring & evaluation, and execution capacities of the landscape approach, including the protection of conservation areas and biodiversity. The land-use zoning and activity prioritization process already initiated by the regional REDD+ platforms is a key example of the value the ER-P is adding to a land-use planning mechanism across the program area.

Regarding forest land registration – the lack of which incites communities and their representatives to deliver mining titles and *tavy* permits - the program will help implement full and complete delineation of the program area and beyond.

In forest areas, activities with local communities were not always successful and some questioned the environmental merits of grassroot governance (GELOSE and protected area governance system).[60] Other people commented that the lack of success was due to the fact that the communities had too little incentives to manage forests in a sustainable way.[61] The ER-P aims to create real benefits for the communities and develop their natural resources through performance-based financial support.

This analysis is reflected in the description of Activity II1 in Section 4.3.3.

4.5. ANALYSIS OF LAWS, STATUTES AND OTHER REGULATORY FRAMEWORKS

The proposed program activities are compatible with the international treaties and covenants ratified by the Republic of Madagascar, as well as with the relating national legislation.

- African Convention on the Conservation of Nature and Natural Resources;
- Convention on Wetlands of International Importance especially as Waterfowl Habitat;
- Convention concerning the Protection of World Culture and Natural Heritage;
- Convention on International Trade in Endangered Species of Wild Fauna and Flora;
- Convention on the Conservation of Migratory Species of Wild Animals;
- United Nations Framework Convention on Climate Change;
- Convention on Biological Diversity;
- United Nations Convention to Combat Desertification in Those Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa;
- African Convention on the Conservation of Nature and Natural Resources;
- The 2006 International Tropical Timber Agreement;
- The Kyoto Protocol to the United Nations Framework Convention on Climate Change;
- The Nagoya Protocol on the Fair and Equitable Sharing of Natural Resources.

More recently, the Republic of Madagascar actively participated in the negotiation of the Paris Agreement. The government introduced its Nationally Determined Contribution ("NDC") which defines the targets and scope of its commitment for the coming years. The Malagasy NDC particularly mentions the dual role that the forest and biodiversity play in "REDD+ promotion"-based adaptation and mitigation which is one of the key activities mentioned. For a specific analysis of the incidences of private and public law on the considered perimeter, cf. Chapter 4.4. above.

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[60] Rasamoelina, Ruta et al., Analysis of Community Forest Management (CFM) in Madagascar (World Bank 2015).

[61] Bertrand et al., Madagascar, politique forestière: Bilan 1990 – 2013 et propositions, 9 Madagascar Conservation & Development (2014) 20.

Table 8: Summary of the main acts having incidence on the existing land occupation and use system

Legislative act	Type of legislation	Description	Impact on the program
2010 Constitution	Constitutional Act	▪ Lays down the constitutional provisions and principles of public governance; ▪ Guarantees the right of ownership and individual legal protection;	▪ Constitutional framework for the long-term continuity of the program;
Act laying down the principles governing the land status (2005)[62]	Parliamentary Act	▪ Defines the presumption of non-titled ownership; ▪ Specifies that non-titled ownership does not apply to protected areas and other forests;	▪ Impact on all agricultural lands;
Act laying down the legal provisions applicable to non-titled land ownership (2006).[63]	Parliamentary Act	▪ Defines the non-titled property registration procedure (local land use plans, land certificates, etc.) ▪ Legal source of "Land Offices";	▪ Land offices were set up in several communes of the program, but others still lack them; ▪ Local land use plans often missing;
The act on the private domain of the State, Decentralized Jurisdictions, and legal entities under public law (2008)[64]	Parliamentary Act	▪ Provides a simplified procedure for forest domain registration;	▪ As long as registration is not completed, forest encroachment is legally possible (development through tavy and mining especially); ▪ The program will seek to facilitate full registration;
1997 Forestry Law[65]	Parliamentary Act	▪ Provides the definition of forests; ▪ Legal foundation for the classification of forests and their administration;	▪ The program area is for the most part comprised of forests (cf. nevertheless the regime specific to Protected Areas, infra);

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[62] Act n°2005-019 laying down the principles governing the statuses of land.

[63] Act #2006-031 laying down the legal provisions applicable to non-titled land ownership.

[64] Act #2008-014 dated July 23, 2008.

[65] Act #97-017 on the revision of the forest legislation.

Legislative act	Type of legislation	Description	Impact on the program
		▪ Facilitates the effective participation of rural populations in the sustainable conservation of natural renewable resources... [and] individual or collective exercise of their traditional rights of use; ▪ Recognition of the "Fokonolona" governance; ▪ Decree	▪ The program area includes, among others, forests classified as production forests;
New Forest Policy	2017	▪ Includes a holistic definition of forest ecosystems; ▪ Lays the legal groundwork for the implementation of REDD+; ▪	▪ Future implementing acts will be needed to fully outline the legal framework of REDD+;
Act 2015-005 on the revision of the Protected Area Management Code	Parliamentary Act	▪ Defines the current framework for setting up and governing protected areas;	▪ The program area several PAs;
Decree #2013-785 setting the delegation arrangements of State-owned forests to public and private entities	Delegation act under the 1997 Forestry Law and Protected Area Management Code	▪ Allows for delegating the management of forests and protected area to public individuals or legal entities, "especially formal Associations, NGOs, and any formal organization in the case of Protected Areas"; ▪ Sets the obligation of fees on ecotourism (art.50); ▪ Provides for a "public-private partnership to find sustainable funding" (Art. 51); ▪ Defines "forest carbons" as a forest product (Art. 52) and provides for the adoption of an implementing order to	▪ Two (02) cases of delegation of the management of Protected Areas: delegation to WCS and to CI; ▪ provides a sectoral legal classification of "forest carbon rights";

Legislative act	Type of legislation	Description	Impact on the program
		define the "forms of development and percentages earmarked for the Forest Fund (Art. 53)";	
Act #96-025 dated September 30, 1996 on the local management of natural renewable resources ("GELOSE")	Parliamentary Act	▪ Allows the transfer of forest governance and management powers to local communities;	▪ A set of forest areas within program boundaries is under community management;
Ministry of Water and Forests, Decree #2001-122 laying down the implementation conditions for contracted management of State-owned forests.	Delegation act	▪ Simplified version for community-based forest management.	▪ A set of forest areas within program boundaries is under community management.

4.6. EXPECTED LIFETIME OF THE PROPOSED ER PROGRAM

In order to ensure its full efficiency in the long term, the program is expected to last a minimum of 10 years. Financial analysis and preliminary planning of activities cover a total of 10 years, e.g. financial plan.

5. STAKEHOLDERS CONSULTATION AND PARTICIPATION

5.1. DESCRIPTION OF STAKEHOLDERS CONSULTATION PROCESS

a. *Creation and consultation of managing entities of the ER-P*

As described in Section 2.1, national preparation for REDD+ has made significant progress in Madagascar. Progress has been achieved in large part through active participation of stakeholders at national, regional and local levels, but also because the ER-P development process ran in parallel to the national REDD+ readiness process, which allowed for the design of a national REDD+ mechanism to be based on a concrete example of application. It is also worth noting that the since the conception of the ER-PIN the process has been led by multi-stakeholder and multi-sector bodies.

As of today, some of the institutional structures core to the implementation of the ER-P are already in place and operational, and have been actively participating in the development of the ER-P design:

- The **National REDD+ Platform (PFN REDD+)** was officially created by Ministerial Order[66]. This multi-stakeholder platform, with a mix of government (12 ministries are represented) and non-government representation, ensures the strategic orientation of the REDD+ process at the national level and is playing a central role in the development of the ER-P.
- The **Regional REDD+ Platforms (PFR REDD+)** for the ER-P zone (Analanjirofo, Alaotra Mangoro, Sava, Sofia, Atsinanana). These bodies have already convened several times with the active participation of BNC REDD+. Most recently they completed the first major step in the development of geographically-specific prioritization of REDD+ activities for each district within the five regions. The PFR REDD+ also participated in the various consultations carried out as part of the technical studies commissioned by BNC REDD+, including: review of deforestation and degradation drivers, SESA, development of the GRM, SIS and analysis of the political economy of deforestation. With their involvement in the process, the PFR REDD+ ensured that regional priorities and issues were addressed. These platforms were set up as an expansion of the previously existing Forestry Commissions but with the inclusion of additional stakeholder representatives including an expanded role of civil society. The regional orders officially creating these platforms were promulgated in 2017.
- The **REDD+ Civil Society Organization (CSO REDD+)** platform was established in early 2017 as an informal coalition solely consisting of civil society members, to enhance the sharing and dissemination of information to civil society, and provide a consistent CSO voice. The role of this platform, although not as formal as other platforms, is to support the REDD+ and the ER-P consultation processes through the preparation and implementation phases, and to ensure that

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[66] Ministerial order No. 14569/2016 from October 2016

social issues, information and participation of all stakeholders, including vulnerable populations, are routinely taken into account and addressed.

- The **Carbon Methodology Group (GMC)**: this working group has been operating informally in collaboration with the PFN REDD+ and BNC REDD+. It is comprised mainly of technicians and experts in the methodological aspects of carbon accounting and forest monitoring such as forest inventories, MRV and NFMS systems, calculation of baseline levels, etc. Its members are representatives of many REDD+ partner entities and the government agencies that participate in the group's activities on a volunteer basis according to the topics addressed. It should be noted that, for the preparation of the ER-P baseline, a specific smaller group was created, named the **REL Technical Group**, bringing together experts with experience in satellite image spatial analysis and calculation of baseline levels. This group was set up to monitor the technical details of the different stages of the ongoing work and to provide recommendations with respect to the methodology and results of the ER-P baseline level. They have continued to debate, modify and validate the technical aspects of carbon methodology so that is appropriate for the specific context of Madagascar.

- The **Technical Group on Safeguards (GTS)**: this working group has been operating informally in collaboration with PFN REDD+ and BNC REDD+. The group focuses on all aspects of safeguards and on identifying measures that could be put in place to assess and mitigate the social and environmental risks of REDD+ investments. Work has been focused largely on the ER-P zone. The group took an active part in clarifying the Cancun safeguards and their interpretation in the national context, leading to the design of the principles, criteria and indicators (PCI-REDD+) to be monitored in the SIS, the interpretation and comments on the results and synthesis of the field work in the framework of the SESA, and the development of the GRM. The group further supported a review to improve strategic options and REDD+ activities as well as the institutional arrangements to allow for proper implementation, and suggestions of methodologies for the identification of project-affected populations (PAP) and vulnerable populations. Similar to the Carbon Methodological Group, it is not formalized but remains a fully functioning group that meets according to the needs expressed by the PFN REDD+ and BNC REDD+ for specific thematic guidance.

Throughout the preparatory studies, consultations were held with a wide range of actors and institutions in the ER-P zone from various sectors and scales of interventions (members of village communities, administrative authorities - *fokontany*, communes, district and regions - and STD officers). In addition, capacity-building activities were carried out on an ongoing basis to better engage relevant stakeholders, including civil society organizations.

The following table summarizes the consultations carried out.

Table 9: Consultations with stakeholders

Thematic of consultation	Groups consulted	Dates	Consultations' contents and issues
Consultations of entities related to ER-P management	PFN REDD+	September 21 and 22, 2016	Initial proposal of strategic options and activities and presentation of future improvement steps (through the various studies) Initial identification of activities and interventions for the ER-P based on the expert opinion of the National REDD+ Platform members
		December 14 and 15, 2016	Recommendations on the institutional arrangements for ER-P management. Refining of ER-P activities.
		January 30 and 31, 2017	Improvement of ER-P national policy options and activities Reflection on the implementation framework and the articulation between the monitoring tools (SIS, GM, NFMS) Development of the initial outline for the institutional arrangements for decision-making, implementation and monitoring of activities. Initial discussions related to the ER-P benefit sharing mechanism.
		February 22 and 23, 2017	Improvement and prioritization of ER-P activities Detailed description of some of the institutional arrangements.
		April 04, 05 and 06, 2017	Detailed description of the institutional arrangements as a whole and in-depth reflection on the monitoring tools: SIS, MRV/NFMS, revenue sharing mechanism.
		May 02, 03 and 04, 2017	Refining all elements of the ER-P before submission of the project proposal.
	PFR REDD+ (for the 5 ER-P Regions)	November/ December 2016	Presentation of the stages of national preparation for REDD+, the agenda for the development of the ER-P and the first elements already well defined (accounting area, sector of activity, principle of performance-based payment).
		April 2017	Presentation of the ER-P according to five main topics: (i) Overall concept of the ER-P, baseline and principle of performance-based payment, (ii) Drivers of deforestation and forest degradation in the accounting area and ER-P activities and interventions, (iii) institutional arrangements for decision-making and implementation of activities, (iv) environmental and social safeguards and grief redress mechanism, and (v) principle of benefit sharing.
	GMC	May 2016	Creation of the GMC following a methodological workshop organized with all REDD stakeholders in Moramanga in April 2016, which allowed for defining the methodologies of forest and ecological inventories in the secondary and degraded forests in the ER-P zone.

Thematic of consultation	Groups consulted	Dates	Consultations' contents and issues
		October 20, 2016	Progress status of national REDD+ preparation and ER-P development activities Methodological approach for improving the ER-P delineation
		January 18, 2017	Relationship between national strategic options and ER-P activities Institutional arrangements necessary for the proper implementation of the activities.
		March 13 14, 2017	Finalization of MRV/NFMS institutional arrangements
	REL Technical Group	February 14, 2017	First meeting of the group and presentation of the stakes and the group's working steps for the development of the ER-P's Reference level
		February 2017	Evaluation and recommendations on the methodology for calculating REL Analysis of spatial image data to estimate the level of degradation, as an exercise
		March 2017	Validation of the results of the tests carried out on the exercise data Assessment of the first deforestation maps established by the service provider
		April 2017	Assessment and recommendations for improvement of deforestation, degradation and carbon stocks maps, and ensuring consistency with inventory data
	GTS	September 28, 2016	Meeting to revitalize the Technical Group on Safeguards created for the R-PP preparation phase progress status of activities related to the national REDD+ preparation and ER-P development
		November 04, 2016	National clarification and interpretation of the Cancun Safeguards Presentation of the results of the SESA methodologies and development of the grief redress mechanism
		January 18, 2017	Relationship between national strategic options and ER-P activities Institutional arrangements required for the proper implementation of the activities.
		February 07, 2017	Restitution of results from: - surveys in communes on priority environmental and social issues (SESA) - public consultations at the regional level on improving strategic options
		April 07, 2014	Methodology for identifying project-affected populations and vulnerable populations

Thematic of consultation	Groups consulted	Dates	Consultations' contents and issues
Consultations in relationship with the preliminary studies for ER-P development	Analysis of the drivers of deforestation and forest degradation	September/October 2016	Municipal consultation (households and resource persons), followed by a restitution and consultation workshop in the ER-P regions National Restitution Workshop that provided additional critical information and further refinement of the analysis.
	SESA	September/October 2016	The SESA was carried out through several consultations: (1) national launch workshop to inform on the SESA, to identify national experiences (environmental and social issues) and to validate the consultation plan (2) village and commune-level consultations to prioritize environmental issues, improve Strategic Options of the National Strategy under development and identify activities; (3) consultations at the regional level to identify environmental impacts and recommendations for safeguard measures.
		5th of July 2017	National workshop for presentation of the SESA and the Environmental and Social Management Framework (ESMF), the Process Framework (PF) and the Population Resettlement Policy Framework (PRRF) to the PFN REDD+ and representatives from all regions that were consulted before. This final workshop allowed BNCR to receive some final recommendations from all stakeholders.
	Design of the FGRM	August/September 2016	The development of the FGRM required several consultation steps: (i) at the national level through surveys of natural resource managers and civil society organizations and officers at sectoral ministries that can be involved in REDD projects (Ii) community and village-level consultations: the stakeholders surveyed include all institutional actors (project promoters, administration and CTDs, local authorities, economic operators, NGOs) but also local communities, forest-dependent communities, traditional authorities, mayors and other municipal officials, fokontany, community-based organizations, farmers, etc.
		6th of July 2017	National workshop for presentation of the FGRM to the PFN REDD+ and representatives from all regions that were consulted before. This final workshop allowed to receive some final recommendations from all stakeholders.

Thematic of consultation	Groups consulted	Dates	Consultations' contents and issues
	Review of the political economy of deforestation and forest degradation Collection of socioeconomic, sociopolitical, sociocultural analysis elements and on regulatory reforms for REDD+	February/March 2016	Consultation with NGOs and ministries at the central level and consultations at the regional and local community levels with institutions working in environmental management.
		August / September 2016	Consultation in the 151 communes of the ER-P on stakeholder's vision and perception of the current situation and future change scenarios for their landscapes and the role to be played by REDD+

Gasy Youth Up, a CSO aimed at empowering youth, has partnered with BNC REDD+ to support the REDD+ process by building capacity of CSOs and local communities in Madagascar, in part through an FCPF grant targeting support for CSOs in Carbon Fund countries, to actively participate in the REDD+ process. Gasy Youth Up has engaged in awareness raising activities and capacity building in four regions across Madagascar and youth leaders they have supported been active participants in consultations for ER-P development. Overall 240 youth participated in programming of Gasy Youth Up centered on climate change, of which REDD+ was part of the program, including representation and participation in the PFN REDD+.

The findings of the consultations on the preliminary studies for the development of the ER-P are disseminated through consultation reports validated by the BNC REDD+ and uploaded on the MEEF and BNC REDD+ website (www.bnc-redd.mg) in electronic format. The findings of the consultations are also shared and discussed at various meetings, platforms and the thematic groups.

b. *Dissemination of information and access to information*

A national REDD+ communication strategy was developed for Madagascar with the participation of stakeholders from December 2016 to April 2017 through local consultations, workshops and meetings at different levels. The overall objective of this strategy is to "promote stakeholders' participation in the REDD+ mechanism".

To date, the dissemination of information on the development of the ER-P has been carried out through several communication channels:

- Communication to the ministries and departments of the Government of Madagascar and Parliamentarians (MPs) is carried out with the support of the Minister of the Environment, Ecology and Forestry, and members of the BNC REDD+;
- Meetings, workshops and awareness-raising campaigns have been organized by BNC REDD+ in five regions of Madagascar to inform and sensitize the various stakeholders on the progress of the ER-P (see table above);
- Meetings to present and validate study findings were organized in the ER-P regions in Madagascar (see previous table);
- Use of existing media: interviews and press releases are used to frame and disseminate information and messages related to REDD+ and the ER-P. A training was provided to environmental journalists to update them and to promote a partnership in supporting the ER-P, and additional sessions are planned for November and December 2017. A televised debate on REDD+ in Malagasy language was organized and aired on a National Television station during the "Madagascar REDD+ Academy" in October 2016 and provided an opportunity to disseminate and share information on the progress of the REDD+ process as well as the preparation of a large-scale program in Madagascar.
- Communication tools specific to the BNC REDD+ have been developed:

  - ✓ REDD+ Newsletter for Madagascar (www.ecologie.gov.mg): The newsletter was developed in early 2017 with the objective of maintaining a dynamic link with the public and stakeholders. This quarterly newsletter serves to disseminate information on progress and events. The first issues focused on progress made in the national preparation process, and are moving towards emerging perspectives about the ER-P.
  - ✓ BNC REDD+'s website: The website (www.bnc-redd.mg) was created in March 2017. It has a pivotal role in the communication for the promotion of REDD+ in Madagascar and of the ER-P more specifically. Its objective is to facilitate access to information and documents and information, as data updated regularly. Moreover, it will have an international scope, which is fundamental to develop the ER-P and to attract additional financing and investments for activities within the jurisdiction.
  - ✓ Social networks: Information (news, calls for tenders, etc.) is currently conveyed through the Ministry's Facebook account (Meef Madagascar). BNC REDD+ provides periodic updates related to the REDD+ program through this page.

It should be noted that one of the central roles entrusted to the Civil Society Organizations (CSO) is to support disseminating information and mobilizing stakeholders at national, regional and local levels.

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

Through consultations with the National and Regional REDD+ Platforms, Technical Groups and CSOs, BNC REDD+ has been able to gather a large amount of relevant feedback that has fed into the ER-PD. The following table summarizes the main recommendations and feedback (often repeated by multiple stakeholders in different workshops), as well as proposals for action and solutions to resolve concerns and stakeholder expectations for inclusion in the final ER-P.

Table 10: Summary of mains concerns and recommendations expressed by stakeholders, and their incorporation within the ER-P development

Theme discussed	Concerns, comments, potential risks mentioned by stakeholders	Incorporation or next steps
General concept of the ER-P	It might be complicated for the program to ensure carbon stock enhancement on forest fallow lands. They are traditionally used for agricultural rotation and never aimed at becoming secondary forest.	Activity AD2 was modified in order to ensure that it would aim at ensuring that permanent crops with high value will be implemented on forest fallow land when possible and ensure the formation of a forest cover and promote agroforestry system as an alternative to traditional rotational agriculture.
	For some stakeholders, REDD+ is a new and very complex mechanism compared to usual projects implemented in Madagascar. Also, to ensure efficiency of the program and the participation and engagement of stakeholders, consistent effort will be needed for capacity building and information sharing at all level.	BNC REDD+ will continue working with regional and national entities responsible for the program to build capacity. During the implementation phase, and to ensure participation and engagement of local stakeholders, the Technical Support Staff (TSS) of each RRC (see section 6) will play a key role in supporting stakeholders at sub regional level, providing a continuous and "learn-by-doing" capacity building.
	The REDD+ mechanism and the program will not be able to reach their objectives without strong implication of other sectors responsible of deforestation, including financially.	The cross sector approach was systematically at the center of the ER-P design. The willingness to create and sustain entities such as the CIME, the PFN REDD+ and the PFR REDD+ are a testament to the commitment of this approach. Activities of the program have been defined so far according to needs identified by stakeholders. Partnerships and action plans between MEEF and other sectoral ministries are emerging and need to be strengthened. (Further explained in section 4.3)
Drivers of deforestation	An issue that does not appear clearly in the drivers analysis is the negative effect of invasive species on natural forest.	While the studies did not identify the potential link between deforestation and invasive species, however research will look into further examples of whether there is evidence of this

Theme discussed	Concerns, comments, potential risks mentioned by stakeholders	Incorporation or next steps
& Activities of the Program		phenomena and if some dedicated activities are needed to tackle this a cause of deforestation.
	The non-enforcement of laws and related sanctions are an important handicap for ensuring sustainable management of forests.	Activity FI1 had been created in order to focus specifically on this aspect of governance and law-enforcement.
	Limiting the access to natural resources by local population without offering economic alternatives will lead to displacement of activities and inhibit sustainable management of forests.	This critical issue is captured in the design of the institutional arrangements of the program, particular attention was paid to ensuring that local stakeholders need to be in charge of planning their activities.
	Stakeholders do not have enough capacity to implement REDD+ activities	The TSS team of each Region REDD+ Cells will be in charge of ensuring that stakeholders will have enough capacities to implement REDD+ activities, or to identify other entities able to provide support.
	Activities of the program should not focus too much on increasing revenues of local population but rather on improving their well-being, including by ensuring a sustainable access to natural resources.	This recommendation has been taken into account when developing the vision for non-carbon benefit (see section 16).
	Activities suggested for reducing deforestation have to be planned at local level.	Institutional arrangement was designed to do so (see section 6.2)
	Natural and extreme climate events could have an impact on deforestation thus the program needs to ensure that there is a system to compensate the potential loss of emission reduction.	The reversal analysis does integrate this risk, and 3 percent of emission reductions will be set-aside as a buffer.
Institutional arrangements	Institutional arrangement are complex and it might require a lot of time to take decisions.	This one important issue that BNC REDD+ with PFN REDD+ and PFR REDD+ have been working to address. Procedures are being refined to facilitate the decision-making process. An example is clarifying that not all bodies are involved in every decision, once local authorities authorize a set of activities not every single activity plan will have to be re-validated.
	Some local decision-making structures already exist and only need to be trained in order to be operational for the program	The ER-P has incorporated this insight, and has sought to use already existing institutions rather than adding new ones. An example is SLC which are being strengthened to include REDD+ specific functions and basing the Regional REDD+ cells on existing forest platforms with additional stakeholders and capacities.

Theme discussed	Concerns, comments, potential risks mentioned by stakeholders	Incorporation or next steps
	All planning tools and plans (SAC, SRAT, PCD) will have to be updated according to REDD+ activities.	This has been added in the institutional arrangements (see section 6.2) and in activities FI1 and is considered as part of strengthening the enabling environment.
Environmental and social safeguards and Feedback and Grievance Mechanism	The type of compensations when relocation of population or restriction of access to natural resources occur needs to be defined according to local specificities, rather than a standardized formula.	It is not expected to be the case because each activity with potential impact for restriction of access or displacement will have to develop a specific Resettlement Plan (RAP) in line with local specificities (see section 14.1).
	A specific committee for grievance mechanism is necessary et each level, and the different actors involved need to be trained for this role.	A GRM has been developed taking into account the sensitivity of this issue, and capacity building will be conducted in the coming year to ensure that each level will have appropriate representation and familiarity with procedures to ensure effectiveness of the grievance mechanism.
Benefit Sharing mechanism	Prioritization criteria for planning activities need to be (well) defined in order to ensure equity when distributing revenues	These criteria have been developed and will continue to be improved based on experience (see section 15.2)
	It is important to manage the incentive system to avoid creating local conflicts of interests.	In order to reduce the risks of conflicts, the allocation of activity funding will be negotiated initially during the project design in order to ensure the participation of all stakeholders (SLC) (see section 15.2), this should also help in avoiding elite capture.
	The benefit sharing mechanism should not be based exclusively on performance but also on the effort provided to implement planned activities aimed at reducing deforestation.	This has been considered in the criteria and selection process (see section15.2) especially in considering equity, this will be spelled out further in the specific procedures for selecting and approving.

6. OPERATIONAL AND FINANCIAL PLANNING

6.1. INSTITUTIONAL AND IMPLEMENTATION ARRANGEMENTS

The Institutional and implementation arrangements for the ER-P were developed based on the framework for implementing the national REDD+ strategy designed with REDD+ platforms at national and regional levels. It also uses and capitalizes on existing government and multi-stakeholder structures.

REDD+ governance, planning and decision making is carried out mainly by three (3) multi-stakeholder entities at the national and regional levels (National REDD+ Platform, Regional REDD+ Platform and the SLCs), while the operations and management of the program is ensured by four (4) national and regional entities (CIME, BNC REDD+, REDD+ regional cells and REDD+ activity promoters), as shown in the figure below.
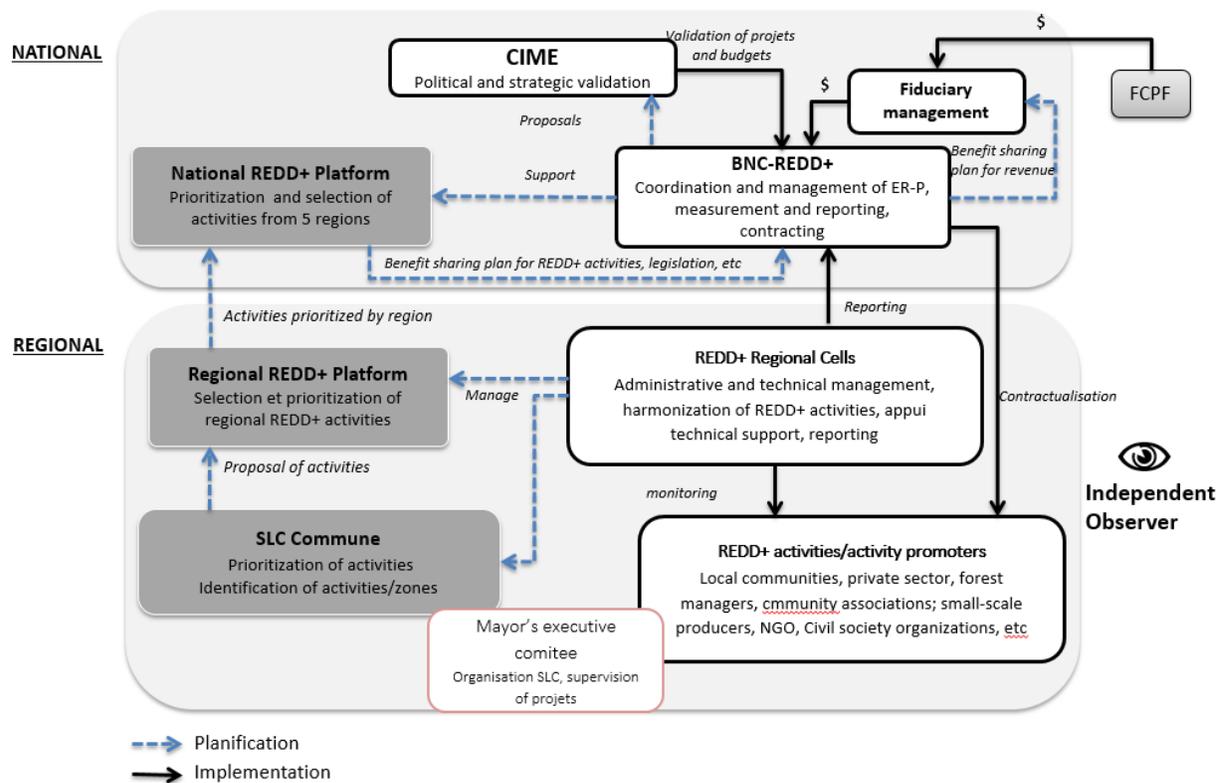
Figure 13 - Planning and Operations arrangements for the ER-P

a. *Governance, planning and decision-making processes*

National planning and decision-making processes are intrinsically linked to the benefit sharing mechanism (see section 15), and as such have been developed as a mix of a top-down process for the general approach and identification of priority areas (through the National and Regional REDD+ Strategies) and a bottom-up process for the choice of activities and design of specific REDD+ activities to implement. The summary of the roles and responsibilities of the three (3) entities involved in the governance and decision-making process is provided below.

Table 11 – institutional arrangements: Entities and roles and responsibilities in governance and decision-making process

Entities	Roles and responsibilities
1. National REDD+ Platform (PFN)[67] *Made up of REDD+ stakeholders at the national level, meeting at least two times per year*	− Consultative body providing strategic guidance at the national level, chaired by the Secretary General of the Ministry responsible for forests; − Proposes legislation specific to REDD+ (arrêtés, décrets, etc.); − Prioritizes and selects REDD+ activities to be financed based on proposals of the five regions of the ER-P and national REDD+ proposals; − Elaborates benefit sharing plan for validation by CIME with support of BNC REDD+; − During 2017 the PFN REDD+ met eight times to finalize the implementation arrangements for REDD+.
2. Regional REDD+ Platforms (PFR)[68] *Made up of REDD+ stakeholders at the regional level, meeting at least two times per year;*	− Consultative bodies providing strategic guidance at the regional level, chaired by the Chef de region; − Translates regional REDD+ strategies into spatial planning schemes down to the communal level; − Mobilizes and raises awareness of the main actors and sectors for the development of regional regulatory texts required by the ER-P; − Selects and prioritizes REDD+ activities to be financed by carbon revenue within each region on the basis of specific criteria − In 2017, each REDD+ PFR met five times to finalize the implementation arrangements for REDD+.
3. Local Consultation Structures at the commune level (SLC)[69] *Made up of REDD+ stakeholders at the*	With the technical support of the REDD+ Regional Cells, the SLC ensures: − Identification of REDD+ activity promoters and potential areas for the implementation of REDD+ activities; − The prioritization of REDD+ activities to be implemented at the local level;

[67] Created by Ministerial Arrêté N°14569/2016 from July 12, 2016

[68] Created by regional Arrêté.

[69] Created by decree n ° 2105-957. This structure brings together representatives of the executive and the deliberative organs of the decentralized community and decentralized technical services in its constituency, economic operators, civil society organizations, traditional and local leaders, political parties and local organizations, women's, youth and vulnerable groups as well as existing consultative bodies.

Entities	Roles and responsibilities
commune level, meeting only during the planning phase	− This information will be described in a REDD+ activities document, covering a maximum of 5 years.
Support Structures	
National Coordination Office for REDD+ (BNC REDD+)[70]	− Supports the identification of national projects to be financed by carbon revenues to be submitted to the PFN and CIME; − Support the PFN in identifying potential regional and community REDD+ activities; − Consolidate the 5 Regional REDD+ Activity Plans.
Regional REDD+ Coordination Cell (RRC) in each of the 5 ER-P regions of the ER-P	− Supports the selection of REDD+ activities proposed by the SLCs; − Consolidate the REDD+ activities proposed by the SLCs for each region; − Conduct the approval of REDD+ activities presented at the level of the PFR;
Mayor's Executive Committee	− Supports the organization of SLC meetings

Note: *Planning at the SLC level is done in one phase only and will be valid for five years. If updates are required, these will be carried out only at the RPF level. Although Regional REDD + Strategies already define eligible REDD+ activities, a "REDD + Implementation Guide" will be available in local dialects to facilitate planning and implementation of ER-P activities by local actors.*

This guide will be drawn up by REDD+ regional cells and TSSs, with support and oversight of BNCR, and will provide the following information:

1. A detailed description of the REDD+ program;
2. Identification of implementing practices and methods;
3. A description of monitoring criteria: proxy ERs, safeguards, etc.;
4. Estimated costs of categories of activities;
5. Identification of potential implementing partners;
6. Identification of categories of direct and indirect beneficiaries of activities, and general guide to allocation of monetary and non-monetary benefits.

b. *Operational arrangements for ER-generating activities*

Once the ER-P has completed monitoring and carbon revenues are made available, the REDD+ activity promoters and developers will initiate implementation, based on the completion of the REDD+ activity selection process. The actors involved in the operational system will vary according to the scale of application. More information on the process itself is provided in Section 15 while the roles and responsibilities of each entity is provided in the following table.

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[70] Created by Ministerial Arrêté n° 21718/15-MEEMF in February 2014 taken by the Minister of Environment, Ecology and Forests.

Table 12 – Institutional arrangements for the ER generating activities

Entities	Roles and responsibilities
At national level	
1. Interministeriel Committee for the Environment (CIME)[71] composed of 12 Secretaries General of key Ministries for REDD+	− Political, strategic, and budgetary validation body chaired by the Minister responsible for forests; − Ensure validation and use of carbon revenues for activities as per planning processes of communes and regions.
2. National REDD+ Coordination Office (BNC REDD+)[72]	− Coordination structure for the REDD+ mechanism at the national level, and technical, financial and administrative entity for the ER-P ; − Compiles technical and financial reports; − Ensures contracting; − Ensures management of databases for REDD+ activities, SIS and GRM; − Ensures MRV linked to the SNSF.
3. Regional REDD+ Coordination Cells in the 5 regions of the ER-P	Regional-level management unit responsible for the implementation of the program housed at the Regional Directorate responsible for forests: − Ensure the monitoring and evaluation of REDD+ activities; − Support safeguards monitoring measures for each REDD+ activity; − Provide technical support to REDD+ activity promoters; − Provide technical and financial reports as well as ensuring administrative management; − Maintain and update information databases for REDD+ activities, SIS, and GRM.
4. Financial Manager of carbon finance and REDD+ revenues	− Ensure fiduciary management of carbon revenue and complementary financing for REDD+ from financial partners.; − Ensure security, fluidity and transparency for the utilization of funds; − Allocate funds to BNCR to ensure program management and disbursement to the regions for specific activities, − management of financial reserves − management of financial flows of incentives based on the benefit sharing plan validated by CIME; − *The exact institutional arrangements for managing carbon revenues linked to REDD+ is currently under discussion.
Support Structures	

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[71]Created by decree N°2017-1106 on January 11, 2018

[72] Created by Ministerial Arrêté n ° 21718/15-MEEMF in February 2014 taken by MEEF.

Entities	Roles and responsibilities
National REDD+ Platforms (PFN REDD+)[73] Composed of representatives of key REDD+ stakeholders, meet at least two times per year.	Technical validation of reports and national communications as well as preparation of documents to be sent to CIME for review and validation.
Regional REDD+ Platforms[74] Composed of representatives of key REDD+ stakeholders, meet at least two times per year.	Technical validation of reports, identification of regional strategies and prioritization of activities within each region
Mayor's executive committee	Political oversight of REDD+ activities

c. *Monitoring, evaluation and reporting activities*

The activity reports include the monitoring of the ERs (proxies) that will then allow for distributing revenues (see Section 15). For monitoring and evaluation of safeguards and emission reductions, please refer to respective sections 14 and 9.

Payments from the Carbon Fund will be made directly to a specified account within the fiduciary management structure. This account will be used to channel results-based payments for investments under the National REDD+ Strategy.

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[73] Created by Interministerial Arrêté N°14569/2016 on July 12, 2016

[74] Created by regional arrêté.
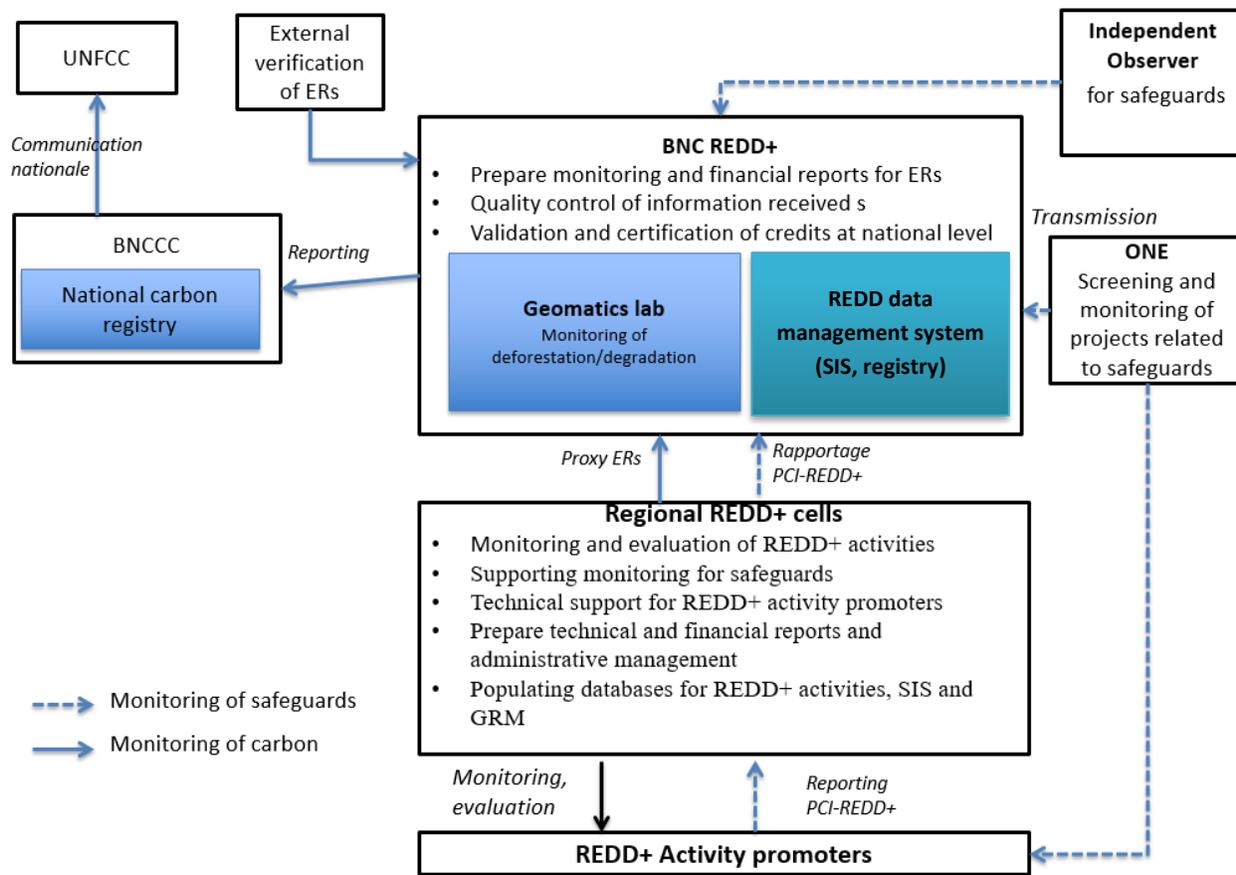
Figure 14 - Institutional arrangements for monitoring, evaluation and reporting activities.

An independent observer will guarantee the transparency of the information on safeguards.

This entity, mandated by CIME, is not yet defined. This entity will not be involved, directly or indirectly, in the implementation of the ER-P. Its mission will be to "independently verify" the quality and veracity of safeguards data and processes and to publish a "public and objective" report that will be incorporated into Madagascar's submissions to the UNFCCC and FCPF.

A multitude of actors for the implementation of activities in the field

The activities will be implemented by stakeholders of varying profile and level, on the basis of a performance-based REDD+ contract. These contracts will be established between the BNCR or the RRC and the activity promoter, generally falling into one of the following six categories of stakeholders:

- Grassroots communities, structured and active around forests;
- Managers, by legal right, of forest resources, which may be cooperatives of local people, associations and groups of small producers and processors (charcoal producershunters, , animal and/or agriculture farmers, small mine operators ...);
- Management bodies of a landscape, protected area or sustainable forest area "koloala." These organizations act as the delegated activity manager for the Government of Madagascar.
- Actors in the forestry and agricultural sectors of indirect influence, and who procure from producers namely, processors, distributors and buyers;
- Private investors who lead initiatives to reduce emissions

- Administrative actors who can carry out REDD+ activities under the authority of the GOM: the municipality, the region, or the decentralized technical services.

d. *Financial management*

The ER-P will experience a lag period between when activities are first initiated and when carbon revenues can supply sufficient finances to cover program implementation costs (section 6.2 provides more details on the budget). Given this likelihood, the ER-P is actively seeking additional investments from a range of sources, including from the private sector, and at the same time will seek to direct development and environmental project plans to concentrate efforts inside the ER-P area.

Financial flow and carbon revenues reporting will only be released when the General REDD+ Activity Plan of the ER-P has been validated by CIME, the approval entity of the ER-P. Revenues from the sale of emissions reductions and finance from other funding partners to support the implementation of the ER-P will be housed in an account managed by a fiduciary manager. Discussions on the nature and status of this structure are currently being discussed and evaluated for maximizing efficiency, transparency and effectiveness.

Payments from the Carbon Fund will be made directly to a specified account within the fiduciary management structure. This account will be used to channel results-based payments for investments under the National REDD+ Strategy.

BNC REDD+ ensures the technical and financial management of the ER-P. It will receive the corresponding amounts for each category of expenditure: investment / incomes and management costs.
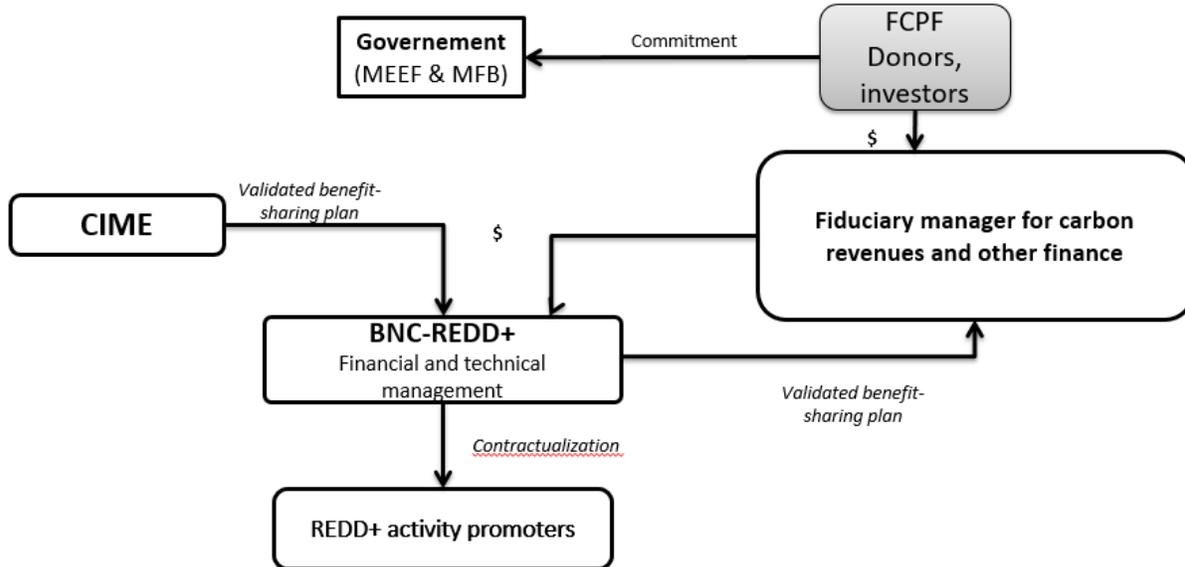
Figure 15: General financial management process for REDD+ activity implementation within the ER-P

e. *Support activities for stakeholders: training, workshops, ongoing support, etc.*

Although stakeholders have not yet clearly identified all of the decision-making and implementation processes for activities, the ER-P will need to provide for training and workshops to ensure capacity-building of officers and stakeholders involved in the management and operationalization of the ER-P as well as the beneficiaries of activities at the local level. A continuation of the capacity building already initiated under the readiness process is planned, with a move to more concrete training and tailored preparation for specific activities.

6.2. ER PROGRAM BUDGET

The ER program budget considers the two-phase process where up-front finance from public and private funding sources are used to invest in REDD+ activities, which will subsequently generate Emission Reductions that will provide carbon finance that will then be used to re-invest in the expansion of the REDD+ activities.
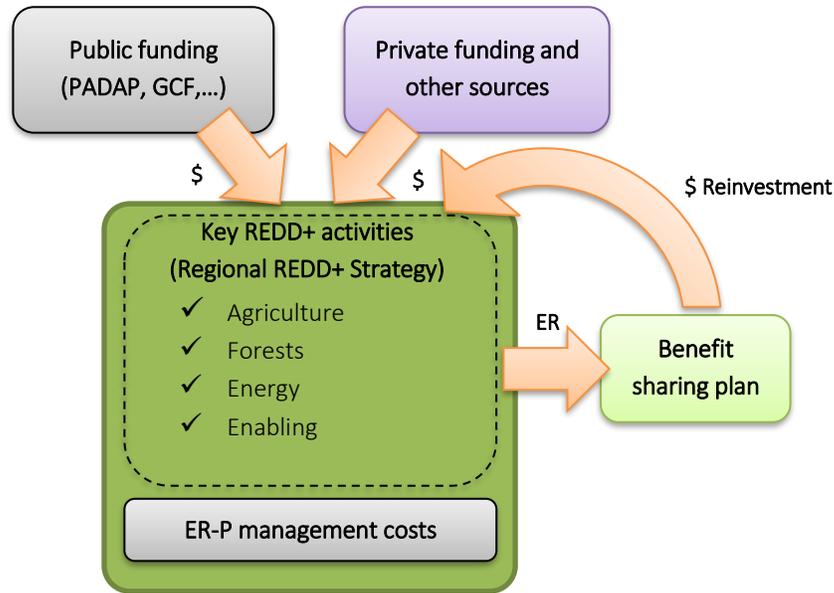
The budget for the ER-P covers the costs and revenues of the implementation of REDD+ activities and the program management mechanism until 2025 (year of the last ER revenue received) and 2028. It includes existing financing considered as initial investments of the program, revenues from the sale of emission reductions, the first payment of which is expected three years from the start of the program (in 2021) and additional grants or financing from other sources.

a. *ER program budget for REDD+ activities is based on budgets of already financed REDD+ activities and targets defined based on the Regional REDD+ strategies*

The ER-P budget considers both financed activities (secured and non-secured investment finance) and to-be-financed activities (activities envisioned for implementation using the revenues from results-based payments). The budgets of these activities have been developed as follows:

- **Financed activities**: The Government of Madagascar together with its partners in development has sought to align different financial instruments within the ER-P area so as to be able to secure result-based-finance. As a result, different projects financed through the WB, GCF and NAMA facility will be implemented within the ER program area and will serve to generate emission reductions that ultimately will serve to implement and expand REDD+ activities. The ER-P budget is based on the budget forecasted for all of these activities:
  - o Missouri Botanical Gardens (hereafter abbreviated as MBG);
  - o PADAP project – World Bank (hereafter abbreviated as PADAP);
  - o AP Makira - Wildlife Conservation society (hereafter abbreviated as WCS);
  - o CASEF project – World Bank (hereafter abbreviated as CASEF);
  - o AP - Madagascar National Parks (hereafter abbreviated as MNP);
  - o CAZ AP - Green Climate Fund (hereafter abbreviated as GCF);

- **To-be-financed activities**: The design of the regional REDD+ strategies has served to identify high-priority activities and their location within the ER program area. This has provided BNCR a basis for defining possible targets for each of the activities and the subsequent costs associated with each activity based on existing knowledge of costs.

An implementation plan for these activities may be found in ANNEX II – SUMMARY OF THE FINANCIAL PLAN. **The total cost of implementation of activities during the period 2019-2025 is approximately 97 million USD, with 80% of this figure deriving from already financed activities.**

Table 13 – Cost of implementation of activities in the period 2019-2025

Strategic orientations	Financed activities		Results-based finance		TOTAL	
Agriculture	36,680,165	49%	4,479,500	21%	41,159,665	42%
Forest and afforestation for energy	34,882,831	46%	13,765,000	63%	48,647,831	50%
Energy	138,000	0%	1,590,000	7%	1,728,000	2%
Enabling environment activities	2,939,500	4%	1,907,500	9%	4,847,000	5%
Monitoring and others	564,125	1%		0%	564,125	1%
TOTAL (2019-2025)	75,204,622		21,742,000		96,946,622	

The activities invested with carbon revenues would be equivalent to the total ERPA value if the period is taken to 2028.

b. *ER program management costs*

The ER program management costs include all costs related to the operation of the ER-P. **These have been developed to ensure cost efficiency in the use of the national resources. The current estimated costs of the ER program management is approximately 1,390,258 USD/year.** These costs include:

- **Governance and national coordination**: These include the REDD national platform (PFN REDD+), the COPIL (COPIL REDD+) and BNC REDD+, which are needed for overseeing the ER program implementation and operation and for the management of the ER program
- **Coordination and regional operationalization**: These include the regional platform (PFR REDD+) which is needed for the coordination at regional level. The costs of the regional teams REDD+ ("Cellule regional REDD+") is also included, as these are needed to support the regional and the local developers in the preparation of their proposals.
- **Sub-regional planning**: These include costs of operation of the local structures. As described in the previous section 6.1, REDD+ activities could be proposed by the existing Communal Concertation Structures (SLC) and Inter-Communal Concertation Structures (SLCI), and the monitoring and evaluation in these cases would be done at a communal level.
- **Monitoring and Evaluation**: These costs include the operation of the SIS and the MRV system.
- **Feedback Grievance Redress Mechanism**: The costs of operating the full FGRM process.
- **National communication and builiding capacity of relevant ministries on REDD+**: This item includes all costs related to communication at the national level and building capacity within the government on REDD+ and the implementation of the ER-P.

- **Support management of the Makira PA**: The ER-P will provide financial support to the Makira PA as it will have a gap in the budget of the protected area as a result of not being able to sell their emission reductions in the voluntary market.

Table 14 – Budget of ER program management costs

Item		USD/year
Governance and national coordination	COPIL REDD+	15,000
	PFN REDD+	18,000
	Capacity building of stakeholders	30,000
	BNC REDD+	241,120
Coordination and regional operationalization	Cellule regional REDD+	240,200
	PFR REDD+	52,500
Sub-regional planning	SLCI	18,000
	SLC	120,000
	Monitoring and evaluation by the Communes	12,000
Monitoring and Evaluation	MRV	257,335
	SIS	68,173
Feedback Grievance Redress Mechanism		67,930
National communication and capacity building of relevant ministries		50,000
Support management AP		200,000
Total		**1,390,258**

c. *Secured finance sources or to-be-secured finance sources cover 70% of the total ER program area or 80% of forests*

As indicated previously, the Government of Madagascar has prioritized the ER-P in terms of allocation of resources and implementation of investment finance instruments. The total finance from secured and non-secured finance is about 75 million USD that will be implemented in the period from 2019 to 2025.

Table 15 – Secured and non-secured financing sources

Financing source		Total	%
Secured	MBG	930,500	1.2%
	AP Makira - WCS and others	345,847	0.5%
	PADAP - WB	46,979,886	62.5%
	AP - MNP	4,828,389	6.4%
	AP AZ - GCF	7,400,000	9.8%
Non-Secured	BNCR - NAMA	14,720,000	19.6%

TOTAL	75,204,622

In terms of area, all these financing sources cover 47% of the total area of the ER-P and they cover 70% of all forests in the ER program area. **Considering the buffer areas of Makira PA and CAZ PA where REDD+ activities are implemented, this means that 70% of the area and 85% of the total forest area is covered with existing finance sources**.

In addition, as part of the financing provided through the GCF, EIB and Althelia will likely seek to invest approximately 40% of their pipeline of projects (total Investment Fund noted as $50 million USD) inside the ER-P area. Due to delays in processing this GCF financing, EIB and Althelia have communicated that they cannot provide an estimate of projected activities. Once this information is provided, the financial plan and planned activities will be updated.
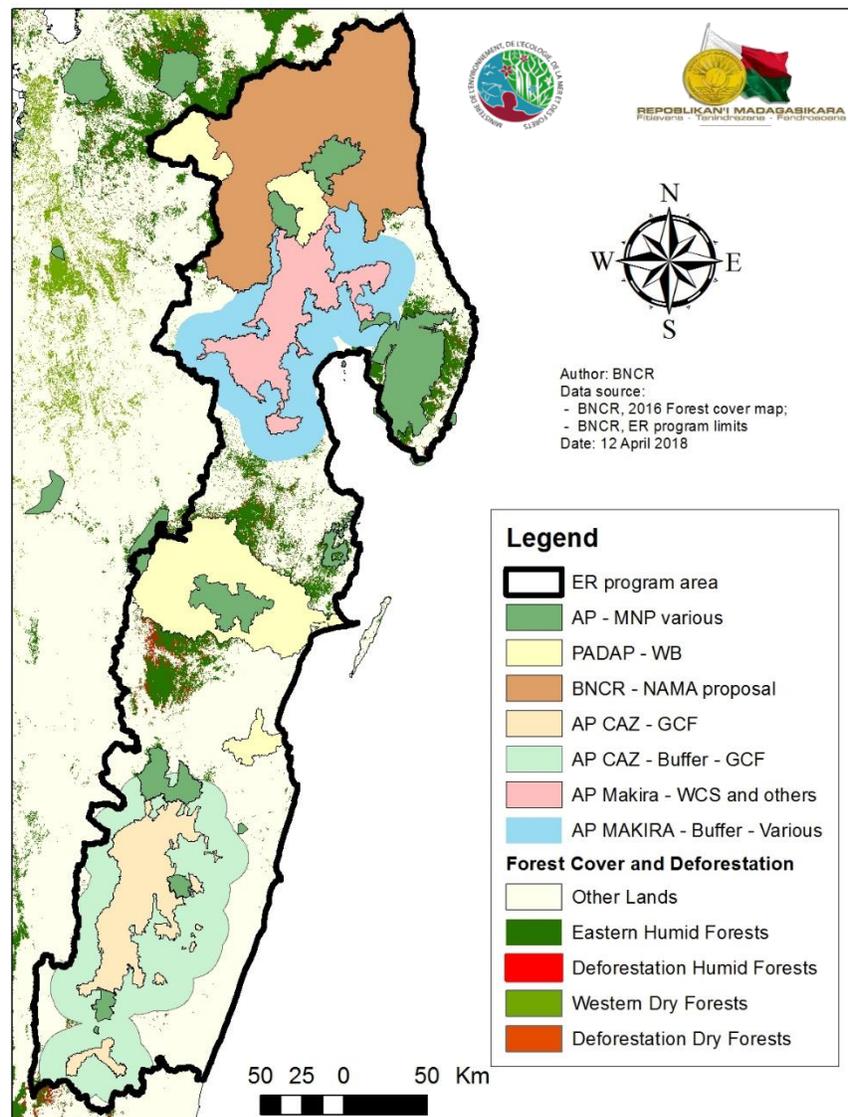
Figure 16 – Location of funding sources

In addition, the ER-P continues to mobilize additional financial resources to increase the overall volume of funding, through a fundraising strategy based on 2 complementary approaches:

- **The incentive for private investment in the program area**. In 2017, BNCR commissioned the development of a Private Sector Investment Blueprint for the ER-P. This first study identified three commodity sectors - cocoa, cloves, and coffee, for further development as potential sustainable supply chain priorities for the ER-P. Investment areas, REDD + compatible business plans and potential partners have been identified. During the presentation of the study, international and national sector operators expressed their interest. In 2018, the aim is to produce one or more partnership agreements with supply chain actors/investors. The government is currently working with potential partners for the submission of a proposal to the private sector window of the GCF, under the invitation of the GCF.

- **Continued consultation with international donors**, through a financial roadmap, to expand the range of program-based enabling and sectoral activities planned, based on the priority landscapes identified in the SRATs.

d. *Results-based finance*

Considering the forecast of ER generation during the ERPA term (XX tons, Section 13), an ER volume of 16.4 million ERs as indicated in the Letter of Intention signed between the World Bank and Madagascar, and an indicative price of 5 USD/tCO2e, the expected delivered result-based finance was estimated. It was assumed that monitoring occurs yearly since year 2020 and that every monitoring event occurs at the end of the first semester of each year. Revenues would be received the following year, but payments would occur against verification in years 2021, 2023 and 2025, while the other years would be against the monitoring report (interim payments). Moreover, following the benefit sharing plan, 10% of the revenues are placed in reserve and carried forward to the following monitoring event.

Table 16 – Expected revenues from the payment of emission reductions

Vente	2019	2020	2021	2022	2023	2024	2025
Revenues from CF (USD)			5,704,262	7,654,340	11,370,618	15,842,884	24,427,896
Reserve (USD)			570,426	765,434	1,137,062	1,584,288	
Results based finance (USD)			5,133,835	7,459,332	10,998,990	15,395,658	26,012,185

e. *National contribution from the Government of Madagascar*

Although, as shown above, financial support for the ER Program has been provided by public funding sources such as the WB, GCF or the NAMA facility, it is important to note that the GoM is assuming a significant part of this investment through in-kind and financial contribution.

- In-Kind-contribution: As indicated in Section 2, the Government of Madagascar is contributing through the commitment of government officials for supporting the ER program. Most of the

governance and management structures, together with monitoring activities, require significant staff commitments.

- Financial contribution: The PADAP investment is partially a grant and partially a Loan. The **Loan part is equivalent to 12.03 M USD** and has a planned interest repayment schedule over 30 years and interest rates indicated at circa **1.56% per annum**. The loan has a 5-year grace period and will mostly start eliciting repayment terms from the end of the ERPA period.

f. *Final budget and financial plan*

The following table shows the summary of the financial plan. The full financial plan may be found in ANNEX II .

Table 17 – Financing plan 2019 – 2025 of the ER program (million USD)

	2019	2020	2021	2022	2023	2024	2025
REDD+ activities - Financed investments	7.36	15.74	20.74	12.39	8.97	5.07	4.93
REDD+ activities - To-be-financed investments	0.00	0.00	2.80	5.64	5.35	7.94	8.15
ER program management costs	1.29	1.39	1.39	1.39	1.39	1.39	1.39
Total Costs	**8.65**	**17.13**	**24.94**	**19.42**	**15.72**	**14.41**	**14.46**
Finance FCPF Readiness	0.60	0.00	0.00	0.00	0.00	0.00	0.00
Finance secured and non-secured	7.36	15.74	20.74	12.39	8.97	5.07	4.93
Carbon revenue	0.00	0.00	5.13	7.46	11.00	15.40	26.01
Total Finance sources	**7.96**	**15.74**	**25.88**	**19.85**	**19.97**	**20.47**	**30.94**
Benefit	-0.70	-1.39	0.94	0.43	4.25	6.06	16.47
Cumulative benefit	-0.70	-2.09	-1.15	-0.72	3.54	9.60	26.07

According to this plan, there would be a gap in the financing would be equivalent to 3.47 million USD until the first monitoring event.

Table 18 – Gap in the investment

Deficit 2019 - 2020	2,085,388
Year 2021	1,390,258
GAP the first three years	3,475,646

7. CARBON POOLS, SOURCES AND SINKS

In order to understand the sources and sinks that are significant as defined by the Methodological Framework, a Key Category Analysis was conducted following the 2006 IPCC GL and based on Tier 2 and Tier 1 data. GHG emissions and removals for deforestation, degradation and enhancement of carbon stocks (afforestation/reforestation) were estimated with Tier 2 data, except for the litter and SOC pools. GHG emissions and removals from forest management in forest plantations was not included.

Table 19. Results of the Key Category Analysis

REDD+ general activity	Change category	Source	GHG (tCO2e/year)	Contribution absolute
Deforestation	Forestland to Other Land	AGB	6,562,257	59%
		BGB	1,588,721	14%
		DW	354,564	4%
		LT	128,695	2%
		SOC	387,311	3%
		non-CO2	460,093	2%
Degradation	Forestland remaining forestland	AGB	1,621,793	9%
		BGB	389,230	2%
		DW	0	0%
		LT	0	0%
		SOC	0	0%
		non-CO2	352,007	1%
Sustainable management of forests	Forestland remaining forestland	-	0	0%
Enhancement of carbon stocks	Other Land to Forestland	AGB	88,719	2%
		BGB	17,744	0%
		DW	34,833	0%
		LT	14,669	0%
		SOC	22,073	0%
		non-CO2	0	0%
Total absolute GHG emissions and removals			12,022,712	100%

7.1. DESCRIPTION OF SOURCES AND SINKS SELECTED

This section discusses the consideration of different sinks and sources which are considered by the proposed ER Program. Following Indicator 3.1 of the FCPF Methodological Framework (MF), the Program is required to identify sinks and sources of any REDD+ general activity[75] accounted for under the ER Program.

The different REDD+ activities are defined by Decision 1/CP.16, §70.a-3. The table below discusses the inclusion / exclusion of sinks and sources in the ER Program for each of these activities.

Table 20. Sources and Sinks accounted for under the ER-Program

Sources/Sinks	Included?	Justification / Explanation
Emissions from deforestation	Yes	• According to the Key Category Analysis presented in Table 19, GHG emissions from deforestation represent 79% of total absolute forest related GHG emissions.
Emissions from forest degradation	Yes	• According to the key category analysis presented in Table 19, GHG emissions from forest degradation represent 20% of absolute total GHG emissions and removals. Consequently, the emissions from degradation are accounted for as they are considered to be significant (>10% of all forest-related emission in the reference period, cp. Indicator 3.3 of the MF).
Removals from enhancement of carbon stocks	Yes	• According to the key category analysis presented in Table 19, GHG removals for afforestation/reforestation accounts for 1% of total absolute forest related emissions. • Enhancement of carbon stocks in Forestland Remaining Forestland has not been accounted for due to lack of data.
Emissions and removals from conservation of carbon stocks	No	• There is not a national definition for this REDD+ general activity. However, there is a comprehensive accounting for GHG emissions and removals from forests so GHG emissions and removals that could potentially be included in this activity are included in previous REDD+ activities.
Emissions and removals from sustainable management of forest	No	• There is not a national definition for this REDD+ general activity, but the management of commercial plantations for timber would probably enter in this category. GHG emissions and removals from these activities are not accounted for in this version of the ERPD.

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[75] REDD+ activities in the context of this ERPD refer to project or program activities presented to participate in the benefit sharing plan. REDD+ general activities are the five general activities defined in the framework of REDD+.

7.2. DESCRIPTION OF CARBON POOLS AND GREENHOUSE GASES SELECTED

This section outlines which carbon pools and which greenhouse gases (GHG) are included or excluded under the ER Program. In total the ER program accounts for **96% of total absolute forest related emissions**.

Table 21. Carbon Pools accounted for under the ER-Program

Carbon Pools	Selected?	Justification / Explanation
Above Ground Biomass (AGB)	Yes	According to the Key Category Analysis presented in Table 19, emissions from AGB for the activities included constitute 69% of total absolute forest related GHG emissions (i.e. more than 10% of total forest related emissions in the accounting area during the reference Period). This carbon pool largely contributes not only to the emissions, but, if successful also to the emission reductions of the proposed ER Program. Hence the emissions of this pool are considered.
Below Ground Biomass (BGB)	Yes	The ER Program makes use of root-shoot ratios with an order of magnitude of 20-25% of AGB. According to the Key Category Analysis presented in Table 19, removals and emissions from this pool for the activities included represent 17% of total absolute forest related GHG emissions, hence the emissions from the BGB pool are significant (i.e. more than 10% of total forest related emissions). Consequently, this pool is considered for accounting of the overall emissions as well as emission reductions.
Dead Wood (standing)	Yes	Only emissions from the standing dead wood pool are accounted for as there is no data for lying dead wood. According to the Key Category Analysis presented in Table 19, removals and emissions from this pool for the activities included represent 3% of total absolute forest related GHG emissions, and 90% of these correspond to deforestation. Therefore, only emissions from the dead wood pool from deforestation will be accounted for.
Litter	Yes	Only emissions from the standing dead wood pool are accounted for as there is no data for lying dead wood. According to the Key Category Analysis presented in Table 19, removals and emissions from this pool for the activities included represent 1% of total absolute forest related GHG emissions, and 90% of these correspond to deforestation. Therefore, only emissions from the litter pool from deforestation will be accounted for.
Soil Organic Carbon (SOC)	Yes	According to the Key Category Analysis presented in Table 19, removals and emissions from this pool for the activities included represent 3% of total absolute forest related GHG emissions, and 95% of these correspond to deforestation. Therefore, only emissions from the litter pool from deforestation will be accounted for.

Table 22. GHG included

GHG	Selected?	Justification / Explanation
CO2	Yes	• CO2 represents the most important part of emissions from deforestation in Madagascar, mainly due to slash and burn agriculture.
CH4	Yes	• Non-CO2 GHG emissions in deforestation and degradation represents 7% of absolute total GHG emissions. • However, only GHG emissions from deforestation (4% of absolute total GHG emissions) will be accounted for as non-CO2 emissions from forest degradation does not have the necessary quality.
N2O	Yes	• Non-CO2 GHG emissions in deforestation and degradation represents 7% of absolute total GHG emissions. • However, only GHG emissions from deforestation (4% of absolute total GHG emissions) will be accounted for as non-CO2 emissions from forest degradation does not have the necessary quality.

8. REFERENCE LEVEL

8.1. REFERENCE PERIOD

The reference period for the ER-Program is 2006-2015, from 1 January 2006 to 31st December 2015. The reference period thus covers 10 years and is set 2 years before the TAP review which commenced August 2017. As such the reference period is considered to be in accordance with criterion 11 of the MF and thus no justification is needed.

8.2. FOREST DEFINITION USED IN THE CONSTRUCTION OF THE REFERENCE LEVEL

a. Forest definition

Madagascar's Designated National Authority (DNA)[76] submitted a forest definition to the UNFCCC for Afforestation/Reforestation projects under the CDM (See Table 23). This definition is consistent to the definition used in the most recent national communication submitted in 2010[77]. In April 2016, a workshop was organized for the definition of REDD+ activities and the definition of the sampling plan for the forest inventory in the secondary and degraded formations of the ER program area[78], and this forest definition was retained in the context of the REDD+. This same forest definition has been retained for the Forest Reference Emission Level (FREL) submitted to the UNFCCC in January 2016 in the context of REDD+[79].

Table 23. Thresholds of Madagascar's forest definition

Thresholds	Value
Minimum height of trees (m)	≥ 5m
Minimum canopy cover (%)	≥ 30%
Minimum area (ha)	≥ 1

In the context of the communication to 2015 Forest Resource Assessment (FRA), the evergreen forest and the other forest classes of the 1996 National Forest Inventory (IFN96) were used as an equivalency to the FAO forest definition[80]. Such classification is an ecological classification that is based primarily on phytogeographic characteristics and height of the vegetation. As part of the NFMS development process, new values will be reported and an equivalency with the FAO definition will be established.

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[76] http://cdm.unfccc.int/DNA/index.html

[77] BNCCC. 2017. Personal communication

[78] Pp. 3, SECRETARIAT GENERAL - BUREAU NATIONAL DE COORDINATION – REDD+. 2016. *Rapport de l'atelier de definition de la deforestation et de la degradation et presentation du niveau de reference*. Hôtel Bezanozano – Moramanga. 20 au 22 Avril 2016

[79] http://redd.unfccc.int/files/20170116_draft_soumission_ccnucc_frel_madagascar_fr.pdf

[80] http://www.fao.org/3/a-az264f.pdf

Sub-classes of forests

At the time of this document there is no Land Use Land Cover (LULC) stratification scheme formally approved in Madagascar and it is expected that this will happen during 2017 as part of the MRV development.
Stratification schemes adopted in past inventories and cartographies under the 1996 National Forest Inventory (IFN96) and the 2014 Humid Forest Eco-Regional REDD + Project (PERR-FH) were based on ecological zoning that distinguished four main ecoregions divided in some cases in ecological subregions: Eastern Humid Forest, Western Dry Forest, Southern Spiny Forest and Mangrove. The FREL submitted to the UNFCCC has adopted this classification in four ecoregions.

In 2016 a forest inventory was conducted by DVRF in secondary vegetation and forests not covered by the PERR-FH. As part of this inventory a stratification scheme was adopted for these specific formations in an attempt to obtain representative average estimates of these formations[81]. In this case, secondary forest formations were inventoried: Ravenala, Ravenala Mixte, Agroforestry, Savoka vieux, and Single Layer.
Following the guidance provided in the GFOI MGD, since there is no LULC stratification scheme formally adopted, forest has been stratified following the Forest Resource Assessment (FRA) convention: primary forest, modified natural forest and plantations. Primary formations are those predominantly intact that were measured by the PERR-FH, the modified natural forest are those that were measured by the DVRF inventory in 2016 while plantations were only covered partially by the DVRF inventory as agroforestry systems were measured.

Table 24. Types of forests

Level 1 (IPCC)	Level 2 (FRA definition)		Level 3 (National classes)	
Forest land	Primary forest	Essentially intact natural forest	Primary forest	Dense forest with no signs of disturbance. Located generally in remote areas and far from the forest edges.
	Modified Natural Forest	Forests with native tree species that have grown naturally where there is evidence of human activities. FRA, 2015 refers to Primary Forest, Other Naturally Regenerated Forest and Planted Forest	Disturbed forest	Dense forest with signs of disturbance or located close (<100 metres) to disturbances. This results from the degradation of primary forest. Equivalent to the Single Layer class measured by the inventory DVRF 2016.
			Secondary forest	Dense or open forest that results from regrowth after deforestation. Secondary vegetation measured by DVRF in 2016 (Ravenala, Ravenala Mixte, Savoka vieux)

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[81] Direction De La Valorisation Des Ressources Forestieres. 2016. Offre technique des travaux d'inventaire forestier et evaluation de l'integrite ecologique dans les deux ecosystemes forestiers humides de l'est et seches de l'ouest de madagascar dans le cadre du redd+

Level 1 (IPCC)	Level 2 (FRA definition)		Level 3 (National classes)	
		Agroforestry	Agroforestry systems are mainly plantations of clove or other fruit trees. Equivalent to agroforestry class measured by the inventory DVRF 2016.	
	Plantations	Forests composed of trees established through planting or seeding by human intervention. They include semi-natural plantation forests with indigenous species and plantation forests comprised of exotic species.	Forest plantations	Forest plantations established for timber production purposes.
Non Forest	This includes a range of different land not complying with the forest definition.			

In terms of representativeness of each of these areas, the following table provides a summary of the areas per forest type. As it can be confirmed the presence of secondary forests is low which is indicative of the very low regeneration that exists after clearance of mature forests. As shown below in Section 8.3, this area corresponds to just three years of deforestation.

Table 25. Area per forest type according to Level 3 of the national classification

Level 3 classification	Area (ha)	%
Primary forest	991,186	47%
Disturbed forest	1,079,856	51%
Secondary forest	40,474	2%
Agroforestry	5,875	0%
Plantations	7,774	0%
TOTAL	2,125,165	100%

More information on the operationalization of the forest definition and forest types may be found in Annex III.I .

b. *Definition of REDD+ activities*

In April 2016, Madagascar decided preliminary definitions for the different REDD+ activities that were deemed applicable to the country. These definitions were to be tested as part of the ER program. Based on comments from the TAP and the comments made by the evaluators of the IPCC, these definitions have been

modified with regards the minimum area of deforestation (previously a minimum area of 0.36 ha) and the temporal dimensions of the conversions.

Table 26. Definitions of REDD+ activities as approved by Madagascar

Activity	Definition
Deforestation	A direct human induced conversion of forestland to non-forestland, of a continuous area of at least 1 ha. Note: - Conversion of primary forest or a disturbed forest into "Tavy" system would be deforestation as it is a conversion of land use, it cannot be considered as a temporarily unstocked forest for the conditions of Madagascar. Regeneration back to forest could be possible but this would occur in 10-15 years and it is unlikely in view of the degradation processes, i.e. reforestation rates are almost negligible in comparison with the deforestation rates. - Temporary unstocked forests only apply to wood plantations such as Pinus and Eucalyptus plantations. - conversion of a secondary forest to a non-forest would also be deforestation.
Forest degradation	Long-term reduction of forest carbon stocks due to anthropogenic disturbances resulting from canopy loss, not qualified as deforestation. Note: - forest degradation may represent the transition from a primary forest to a disturbed forest. Disturbed forest is that forest that shows indication of human disturbance either by areas of forest slashed that have less than 1 ha in size or other disturbances - Conversions from primary or disturbed forest to agroforestry or plantations are also considered as forest degradation. In terms of accounting, conversion to plantations will be considered as a full loss of carbon stocks.
Enhancement of carbon stocks	Increased forest carbon stocks, either through a transition from non-forestland to forestland, or through the growth and / or restoration of existing forests. Note: - A secondary forest is the result of complete slash of vegetation, hence an area that has been deforested with the minimum area of 1 ha

In order to operationalize these definitions, the following transitions were assigned to each REDD activity:

Table 27. Attribution of transitions to each REDD activity. na = not possible; -=no changes; - = not accounted

		Land cover after conversion					
		Primary Forest	Disturbed forest	Secondary forest	Forestry plantations	Agroforestry	Non Forest
Land cover before conversion	Primary Forest	-	*Degradation*	*na*	*Degradation*	*Degradation*	*Deforestation*
	Disturbed Forest	*na*	-	*na*	*Degradation*	*Degradation*	*Deforestation*
	Secondary forest	*na*	*na*	-	-	-	*Deforestation*
	Forestry plantations	*na*	*na*	*na*	-	-	*Deforestation*
	Agroforestry	*na*	*na*	*na*	-	-	*Deforestation*
	Non forest	*na*	*na*	*Enhancement*	*Enhancement*	*Enhancement*	-

More information on the operationalization of the definitions may be found in Annex III.I . In terms of presence of the different conversions shown above, as observed in the table below, no conversions have occurred during the reference period on deforestation from secondary forest, agroforestry or plantations, and the detected forest degradation has been reduced to transition from primary forest to disturbed forest. In order to comply with the Cancun agreements, any conversion

Table 28 – Area of different conversions during the reference period

Activity	Type	Area (ha/year)
Deforestation	Primary forest	3,837
	Disturbed forest	12,876
	Secondary forest	0
	Agroforestry	0
	Plantations	0
Degradation	PF to Disturbed forest	28,268
	PF to Agroforestry	0
	PF to Plantations	0
	DF to Agroforestry	0
	DF to Plantations	0
Enhancement	Secondary forest	1,270
	Agroforestry	0
	Plantations	0

If expressed as rates, we can confirm that the deforestation rate in the reference period is -0.76% for all forest, while the deforestation rate for disturbed forest is much higher with -1.1% which is logical as disturbed forests are more threatened than primary forests. Forest degradation of primary forests is high with a -2.5% of all primary forests.

Table 29 – Deforestation and degradation rates

	Deforestation primary forest	Deforestation disturbed forest	Deforestation secondary forest	Total deforestation	Forest degradation - primary forest
Forest (ha)	991,186	1,079,856	40,474	2,111,516	991,186
Deforestation (ha)	38,372	128,765	0	167,137	282,675
Rate - Puyravaud	-0.380%	-1.127%	0.000%	-0.762%	-2.509%

8.3. AVERAGE ANNUAL HISTORICAL EMISSIONS OVER THE REFERENCE PERIOD

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

In accordance with the methodological framework, the ER Program was developed following the rules and methods proposed by the 2006 IPCC Good Practice Guidelines for National Greenhouse Gas Inventories. A summary of the equations and the Tier applied is provided in the following table. A more detailed description of the methods applied, assumptions, decisions and default values applied may be found in Annex III.I .

Source/Sink	Pool	Methods	Tier
Deforestation	Biomass	Equation 2.16 and 2.8b of 2006 IPCC Volume 4 GFOI MGD, Chapter 3.1.2	Tier 2 (aboveground) Tier 1/2 (belowground)
	Dead Organic Matter (Dead wood and litter)	Equation 2.23 of 2006 IPCC Volume 4	Tier 2 (Dead wood) Tier 1 (Litter)
	Soil Organic Carbon	Equation 2.25 2006 IPCC GL Volume 4	Tier 2
	Non-CO2 emissions	Equation 2.27 2006 IPCC GL Volume 4	Tier 1/2
Forest Degradation	Biomass	GFOI MGD, Chapter 3.1.3	Tier 2 (aboveground) Tier 1/2 (belowground)
Enhancement of carbon stocks	Biomass	GFOI MGD, Chapter 3.1.4	Tier 2 (aboveground) Tier 1/2 (belowground)

The equations and explanation of methodological choices is provided in Annex III.I . According to the methodological choices, the only parameters that are measured or estimated and not based on IPCC defaults would be the following. In essence these are activity data parameters and parameters that are part of the emission factors.

Table 30. Parameters for estimation of carbon stock changes from deforestation

Source/Sink		Parameter
Deforestation	$A(j, i)$	Annual conversion from forest type j, to non-Forest Land uses i (Non-Forest).
	$AGB_{Before,j}$	Aboveground biomass of forest type j before conversion, in tonne of dry matter per ha.
	$AGB_{After,i}$	Aboveground biomass of non-forest type I after conversion, in tonnes dry matter per ha;
	C_o	dead wood/litter stock, under the old land-use category, tonnes C ha-1.
	$SOC_{Before,j}$	Soil Organic Carbon at 30 cm depth of forest type j before conversion, in tonne of carbon per ha.
	$SOC_{After,i}$	Soil Organic Carbon at 30 cm depth of non-forest type j after conversion, in tonne of carbon per ha.
Degradation	$A(j, i)$	Annual conversion from forest type j (primary forest), to Forest type i (modified natural forest or plantations)
	$AGB_{Before,j}$	Aboveground biomass of forest type j before conversion, in tonne of dry matter per ha;
	$AGB_{After,i}$	Aboveground biomass of forest type I after conversion, in tonnes dry matter per ha;
Enhancement of carbon stocks	$A(i, j)$	Annual conversion from non-Forest Land use i to forest type j (planted forest or modified natural forest)
	$AGB_{Before,i}$	Aboveground biomass of non-forest type j before conversion, in tonne of dry matter per ha;
	$AGB_{After,j}$	Aboveground biomass of forest type i after conversion, in tonnes dry matter per ha;

b. *Activity data and emission factors used for calculating the average annual historical emissions over the Reference Period*

Activity Data

As explained above, GFOI Methods and Guidance Document (MGD) guidance[82] is used in order to estimate GHG emissions from deforestation and enhancement of carbon stocks (afforestation and reforestation). Considering these methods, the required AD is provided in the following table:

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[82] Chapter 5 of the GFOI MGD Version 2.0

Table 31. Parameters of activity data estimated for the reference level

	Activity Data	Source
$A(j,i)$	Annual conversion from forest type j (primary forest, modified natural forest), to non-Forest Land uses i (Non-Forest)	Deforestation
$A(j,i)$	Annual conversion from forest type j (primary forest), to Forest type i (modified natural forest or plantations)	Degradation
$A(i,j)$	Annual conversion from non-Forest Land use i to forest type j (planted forest or modified natural forest)	Enhancement of carbon stocks (afforestation/reforestation)

The AD has been estimated following the methods described in Section 5.1.5 of the MGD. Following the decision framework of Figure 12 of the MGD, a stratified random estimator based on new reference data has been selected for estimating activity data and variance since:

- The use of forest cover change maps to produce activity data was planned (1, 2), the reason being that spatially-explicit LULC and LULC change information is desired for the ER program area for various purposes: definition of risk areas useful for planning purposes and benefit sharing; testing methods in order to feed into the NMFS development and operationalization; etc.
- No reference samples of change observations (3) were available. Only reference data from single date inventories were available, so it was decided to collect newly reference data based very high, high and medium resolution imagery available.

▪ A stratified estimator was selected (5) as the forest cover change map can be used for stratification purposes and the variable of interest is a proportion, not a continuous variable.
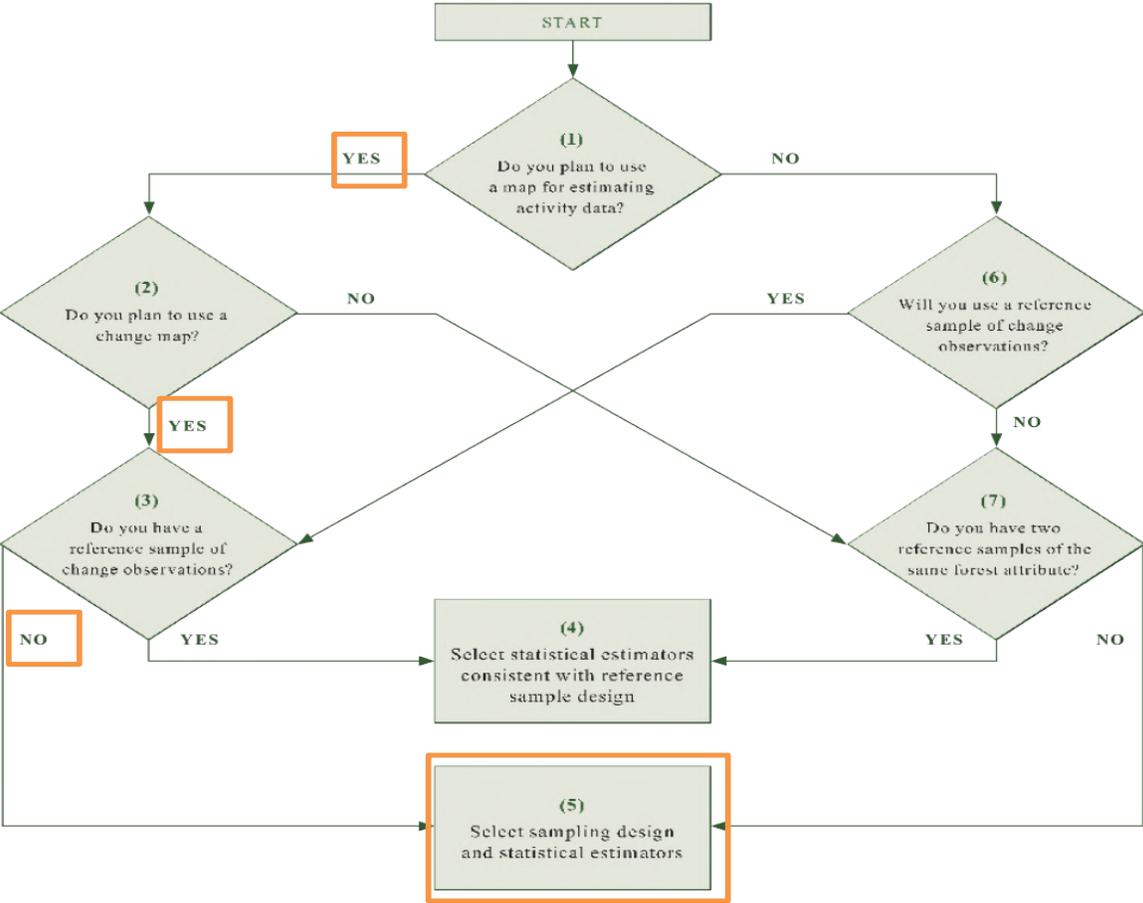
Figure 17. Decision framework as shown in Figure 12, in Section 5.1.5 of the MGD

The sampling design is presented following the structure proposed in Olofsson et al. (2014) and is found in the table below.

Table 32. Parameters of Activity Data

Description of the parameter:	$A(j,i)$ - Annual conversion from forest type j (primary forest, modified natural forest), to non-Forest Land uses i (Non-Forest) in period 2006-2015 $A(j,i)$ - Annual conversion from forest type j (primary forest), to Forest type i (modified natural forest or plantations) $A(i,j)$ - Annual conversion from non-Forest Land use i to forest type j (planted forest or modified natural forest) in period 2006-2015
Sources or sinks:	Deforestation, forest degradation and enhancement of carbon stocks
Data unit:	ha/year

Activity	Type	Area (ha/year)
Deforestation	Primary forest	3,837
	Disturbed forest	12,876
	Secondary forest	0
	Agroforestry	0
	Plantations	0
Degradation	PF to Disturbed forest	28,268
	PF to Agroforestry	0
	PF to Plantations	0
	DF to Agroforestry	0
	DF to Plantations	0
Enhancement	Secondary forest	1,270
	Agroforestry	0
	Plantations	0

Source of data or description of the method for developing the data:

As indicated previously, design-based inference of reference sampling units and the forest cover change map as stratification map has been used in order to estimate the activity data. All the steps below were made following a set of Standard Operating Procedures which may be found in the website of BNCR http://bnc-redd.mg/index.php?option=com_content&view=article&Itemid=103&id=91&lang=fr.

Sampling design
Estimator:
Stratified random estimator of a proportion

Stratification:
A forest cover change map is used as stratification criteria. This map is a combination of a forest cover map for 2005, a deforestation map and a forest gain map, which was further simplified in the legend shown below. This map was resampled to 90 meters and the classification system was simplified. A decision tree was applied in order to assign the stratum to each pixel. More information on the methods for production of the maps is provided in Annex III.III .

Table 33 – Stratification used for the activity data estimation

Strata
1. Forest
5. Deforestation
9. Non Forest
10. Gains

Precision and confidence level:
Relative margin of error of 20% at 90% of confidence level as requested

Calculation of the sample size:

For the calculation of the sample size, the equation from Cochran (1977, Eq. (5.25)) was used assuming that the cost of sampling each stratum is the same:

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

Where:

W_h Weight of stratum *i*;

S_h Standard deviation of variable of interest in stratum i;

$S(\hat{O})$ Standard error of the variable of interest;

N Number of sampling units in the region of interest (i.e., population size);

The sample size was estimated through an iterative approach and using proportion of total deforestation as the variable of interest:

- First of all, 100 sampling units were collected per stratum.
- A calculation of the sample size was done, and as a result 300 additional samples were added in all strata.
- A new calculation of the sample size was done and resulted in 250 additional samples added to each stratum.

Sample allocation was based on a proportional approach as shown in the below table.

Table 34 – Calculation of number of samples per stratum

Code	Class	Proportion	Weight	Number of samples	No Samples retained
1	FH	0.011	0.38	2000	677
5	Deforestation FH	0.083	0.25	1311	699
9	NF	0.000	0.34	1791	422
10	gains	0.002	0.03	143	400
Total					2198

Drawing of samples

The region of interest is divided in 90 m x 90 m sampling elements which corresponds to the pixel size of the stratification map. The drawing of samples was done by selecting 90 m x 90 m squares within each stratum, i.e. a finite population approach[83]. An example of the location and adjustment of a sampling unit is provided below.

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[83] http://wiki.awf.forst.uni-goettingen.de/wiki/index.php/Approaches_to_populations_of_sample_plots

Figure 18 - Example of stratification and sampling unit

This was done through an R script that may be found in the SOPs that may be found in BNCR's site http://bnc-redd.mg/index.php?option=com_content&view=article&Itemid=103&id=91&lang=fr.
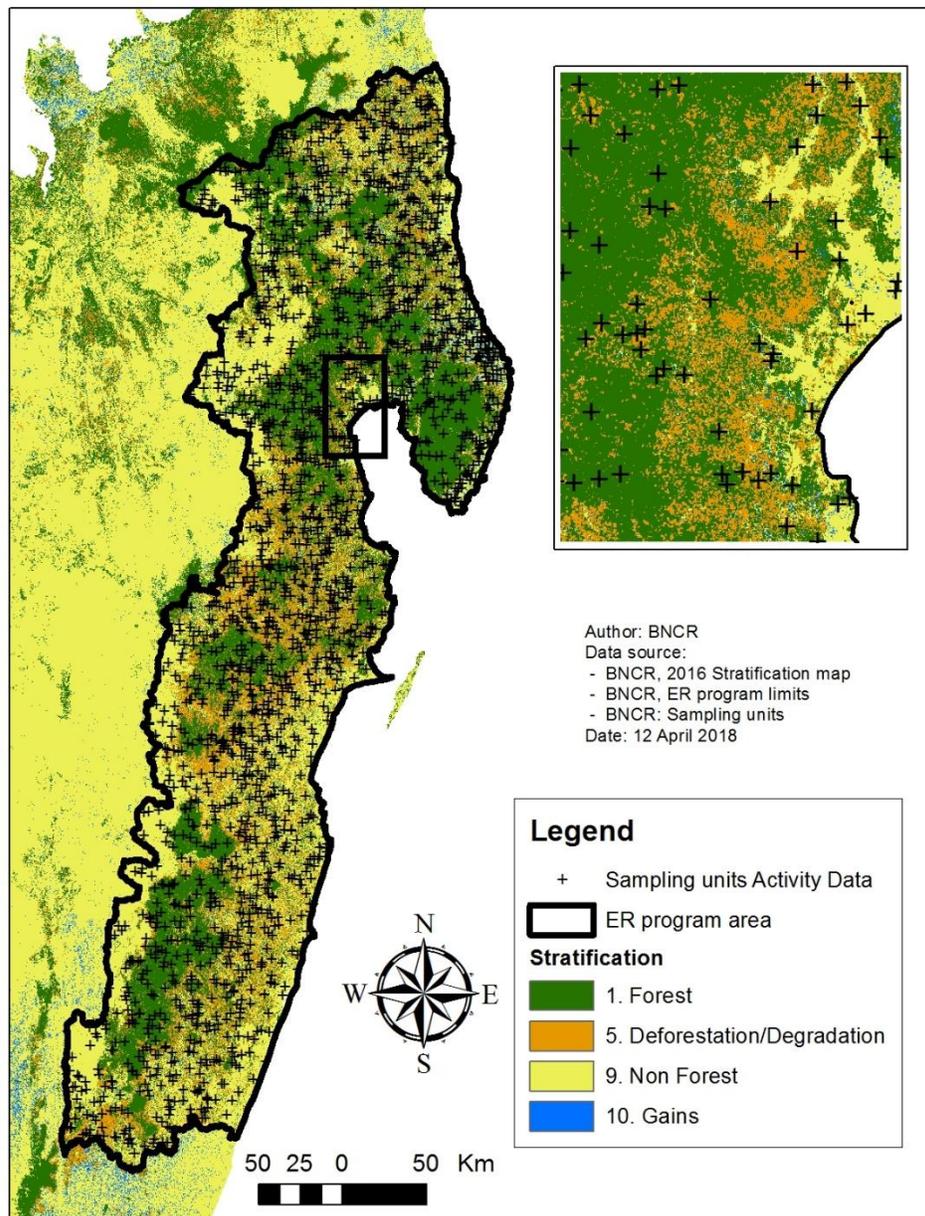
Figure 19. Example of location of sampling units and stratification

Response design

Spatial assessment unit:

The spatial assessment unit is a squared area of 90 meter of side which contains 25 points inside and which is centered on the random point selected from the sampling frame. Considering the acceptable geolocation error of Landsat imagery is 30 metres, this spatial assessment unit would be justified.

However, in terms of spatial support the information beyond the limits of the plot were used to assess whether one object within the assessment unit would comply with the minimum mapping unit.
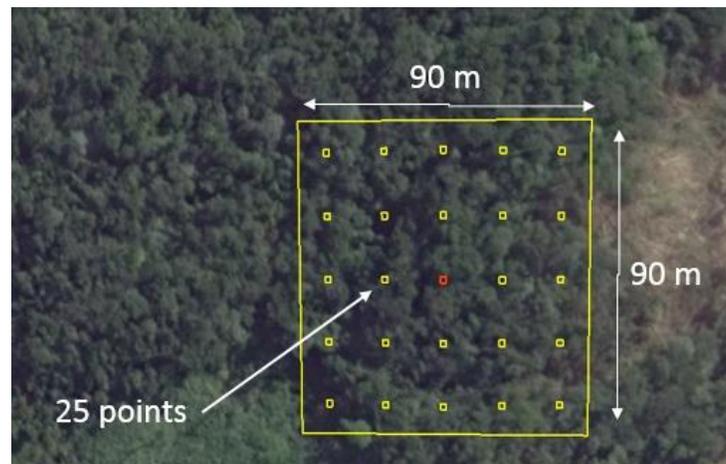
Figure 20 – Assessment or sampling unit

Source of the reference data:

The reference data in this case will be collected through visual interpretation of all satellite imagery available to the country. This includes:

- SPOT 6/7: High resolution imagery (5 m resolution) for 2014/2015
- Google Earth and Bing: All high and very high resolution imagery accessible through Google Earth and Bing. The spatial coverage of very high resolution imagery in the ER program area is relatively high, with many areas with coverage from 2005 to 2015.
- Aster: Resolution of 15 metres from 2000 to 2009
- Landsat 5 TM and 7 ETM+: Available through google earth engine.
- Landsat 8 OLI: Available through google earth engine for 2013-2017.
- Sentinel 2A MSI: Available through google earth engine for 2015-2017.

It is considered that these are reference data as most of the interpretations will be based on direct interpretation of higher resolution imagery for different periods which provides the necessary temporal contextual information.

Reference labelling protocol

- Forest/Non Forest classification: In order to attribute the condition of forest to the sample, the interpreter would evaluate how many points of the grid would fall over forest (a differentiated object that has at least one ha in area and has 30% of tree canopy cover). If at least 13 points (>50% of points) fall in forest, the point would be classified as forest, otherwise as non-forest. This method ensures that there is not a overrepresentation of forest, which happens with hierarchical classification systems. In the example below, although only 10 points fall over canopy, 18 points fall in forest area, so the sampling unit would be classified as forest.

Figure 21 – Example of interpretation of sampling unit

- Forest types: If the sample is classified as forest, the sample would then by attributed to one of the 5 forest types based on the majority class present:
    - Primary forest
    - Modified Natural forest – Disturbed forest
    - Modified Natural forest – Agroforestry
    - Modified Natural forest – Secondary forest
    - Plantation – Plantation for wood
- Interpretation has been based on a protocol which be found in the website of BNCR http://bnc-redd.mg/index.php?option=com_content&view=article&Itemid=103&id=91&lang=fr.
- QA/QC: A number of QA/QC procedures have been applied:

The results of the interpretation are the following:

Table 35 – Sampling units per strata

		Strata			
Activity	Type	1	5	10	9
Deforestation	Primary forest	1	14	0	0
	Disturbed forest	5	42	0	1
	Secondary forest	0	0	0	0
	Agroforestry	0	0	0	0
	Plantations	0	0	0	0
Enhancement	Secondary forest	2	2	0	0
	Agroforestry	0	0	0	0
	Plantations	0	0	0	0

Degradation	PF to Disturbed forest	54	29	3	0
	PF to Agroforestry	0	0	0	0
	PF to Plantations	0	0	0	0
	DF to Agroforestry	0	0	0	0
	DF to Plantations	0	0	0	0
Total number of samping units		677	677	699	422

Analysis design

The average proportion of the variable of interest in the reference period will be estimated through the stratified random estimator of the mean ($\hat{\mu}_{STR}$)

$$\hat{\mu}_{STR} = \sum_{h}^{H} W_h \hat{\mu}_h$$

Where:

W_h Weight of stratum h;

$\hat{\mu}_h$ Sample estimates within stratum h which is equal to $\hat{\mu}_h = \frac{1}{n_h}\sum_{k=1}^{n_h} y_{hk}$ where

y_{hk} is the ith sample observation in the hth stratum

In order to convert the proportions to areas, the average proportion is multiplied by the total area of the region of interest of 6,892,397 ha. This area is the sum of all elements of the population (pixels), so it differs slightly from the polygon based area, i.e. 6,904,417 ha.

Table 36 – Estimate of proportions per class

Activity	Type	Stratified estimate (proportion)	Area estimate (ha)
Deforestation	Primary forest	0.0056	38,372
	Disturbed forest	0.0187	128,765
	Secondary forest	0.0000	0
	Agroforestry	0.0000	0
	Plantations	0.0000	0
Enhancement	Secondary forest	0.0018	12,700
	Agroforestry	0.0000	0
	Plantations	0.0000	0
Degradation	PF to Disturbed forest	0.0410	282,675
	PF to Agroforestry	0.0000	0
	PF to Plantations	0.0000	0
	DF to Agroforestry	0.0000	0
	DF to Plantations	0.0000	0

In order to express the proportion of deforestation or afforestation/reforestation in annual basis, the sample estimate is divided by the duration of the reference period (i.e. 10 years).

Table 37 – Estimate of activity data per class

Activity	Type	Area (ha/year)
Deforestation	Primary forest	3,837
	Disturbed forest	12,876
	Secondary forest	0
	Agroforestry	0
	Plantations	0
Degradation	PF to Disturbed forest	28,268
	PF to Agroforestry	0
	PF to Plantations	0
	DF to Agroforestry	0
	DF to Plantations	0
Enhancement	Secondary forest	1,270
	Agroforestry	0
	Plantations	0

More information is provided in the spreadsheet "MADA_AD_Estimation_V5".

QA/QC

- QC procedures in this case consist in the establishment of a Standard Operating Procedure (SOP) for the interpretation of the samples and the application of training procedures in order to ensure the correct implementation of SOPs. The SOPs designed prior to the data collection may be found in the website of BNCR http://bnc-redd.mg/index.php?option=com_content&view=article&Itemid=103&id=91&lang=fr..

- The forms of Collect Earth were also designed to implement validation rules that would avoid any consistency errors. Since validation rules could not avoid all possible inconsistency errors, the results of sampling units collected one day where reviewed by a different interpreter to check consistency.

- Expert interpreters were used, sufficiently trained, with a specific SOP for interpretation.

- Moreover, the interpreters indicate whether the quality of interpretation is high or low, so this serves to filter out those points that are of low quality in the interpretation. All sampling units labelled as low-confidence are re-assessed by and expert interpreter.

- In terms of QA, 10% were reviewed by an expert interpreter and any inconsistencies were discussed with the group of interpreters.

Spatial level:	Regional
Key uncertainties:	Main uncertainty is sampling uncertainty. See Chapter 12.
Estimation of accuracy, precision, and/or confidence level, as applicable and an explanation of assumptions/ methodology in the estimation:	

The 90% relative margin of error would be estimated with:

$$Error_{90\%} = t_{student} \cdot \sqrt{\widehat{Var}(\hat{\mu}_{STR})}$$

Where:

$t_{student}$ The t of student with *n-h-1* degrees of freedom where *n* is the number of samples and *h* is the number of strata.

$\widehat{Var}(\hat{\mu}_{STR})$ variance of the stratified estimate.

The variance of the stratified estimate is estimated as follows:

$$\widehat{Var}(\hat{\mu}_{STR}) = \sum_{h}^{H} W_h^2 x \hat{\sigma}_h^2$$

Where:

W_h Weight of stratum *h*;

$\hat{\sigma}_h^2$ Sample variance estimates within stratum *h* which is equal to $\hat{\sigma}_h^2 = \frac{1}{n_h-1}\sum_{k=1}^{n_h} \hat{\mu}_h * (1 - \hat{\mu}_h)$ where $\hat{\mu}_h$ is the sample estimates within stratum h.

Table 38 – Uncertainty of estimates of activity data per class

Activity	Type	Standard error (proportion)	90% confidence – Relative margin of error
Deforestation	Primary forest	0.00144	43%
	Disturbed forest	0.00271	24%
	Secondary forest	-	
	Agroforestry	-	
	Plantations	-	
Enhancement	Secondary forest	0.00094	84%
	Agroforestry	-	
	Plantations	-	
Degradation	PF to Disturbed forest	0.00440	18%
	PF to Agroforestry		
	PF to Plantations	-	
	DF to Agroforestry	-	
	DF to Plantations	-	

More information is provided in the spreadsheet "MADA_AD_Estimation_V5" in BNCR's site http://bnc-redd.mg/index.php?option=com_content&view=article&Itemid=103&id=91&lang=fr .

Emission factors

As explained above, GFOI Methods and Guidance Document (MGD) guidance[84] is used in order to estimate GHG emissions from deforestation and enhancement of carbon stocks (afforestation and reforestation). Considering these methods, the required AD is provided in the following table:

Table 39. Parameters of activity data estimated for the reference level

	Activity Data	Source
$AGB_{Before,j}$	Aboveground biomass of forest type j before conversion, in tonne of dry matter per ha;	Deforestation
$AGB_{After,i}$	Aboveground biomass of non-forest type i after conversion, in tonnes dry matter per ha;	
$AGB_{Before,i}$	Aboveground biomass of forest type j before conversion, in tonne of dry matter per ha;	Degradation
$AGB_{After,j}$	Aboveground biomass of forest type i after conversion, in tonnes dry matter per ha;	
$AGB_{Before,i}$	Aboveground biomass of non-forest type j before conversion, in tonne of dry matter per ha;	Enhancement of carbon stocks
$AGB_{After,j}$	Aboveground biomass of forest type i after conversion, in tonnes dry matter per ha;	
C_o	dead wood/litter stock, under the old land-use category, tonnes C ha-1.	Deforestation
$SOC_{Before,j}$	Soil Organic Carbon at 30 cm depth of forest type j before conversion, in tonne of carbon per ha.	
$SOC_{After,i}$	Soil Organic Carbon at 30 cm depth of non-forest type j after conversion, in tonne of carbon per ha.	

The explanation on how these were estimated is provided in the following tables.

Table 40: Aboveground biomass in forest type j

Description of the parameter including the forest class if applicable:	$AGB_{Before,j}$ - Aboveground biomass of forest type j before conversion, in tonne of dry matter per ha; $AGB_{After,j}$ - Aboveground biomass of forest type i after conversion, in tonnes dry matter per ha; $AGB_{Before,j}$ - Aboveground biomass of forest type j before conversion, in tonne of dry matter per ha;

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[84] Chapter 5 of the GFOI MGD Version 2.0

	$AGB_{After,j}$ - Aboveground biomass of forest type i after conversion, in tonnes dry matter per ha;
Data unit (e.g. t CO_2/ha):	tdm/ha

Forest type	Estimate (tdm/ha)
Primary Forest (PF)	265.44
Modified Natural Forest – Disturbed Forest (DF)	232.15
Modified Natural Forest – Secondary forest (SF)	85.66
Modified Natural Forest – Agroforestry (DF)	87.87
Plantations – Plantations	16.40

Value for the parameter: corresponds to the table above.

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:

The source is primarily three different inventories or sources:

- PERR-FH inventory, 2014: As part of the PERR-FH project, intact forest were measured in 2014 using a total of 189 plots located within the Ecoregion of the Eastern Humid Forests.
- DVRF inventory, 2016: Since the PERR-FH did not cover secondary formations, an inventory was conducted in 2016 by DVRF targeting the following secondary forests: Agroforestry; Ravenala mixte; Ravenala; Single layer; and Savoka vieux. Definitions of each of these forests may be found in Annex III.I . A total of 262 plots were measured. From all these formations, the single layer represents a more mature formation, which usually is the result of degradation of primary forest or old secondary forest. In this case, plots were located close to the forest boundary around 100-150 metres in distance. The other formations are secondary formations generally created after slash of primary forest. These formations have a similar stock of aboveground biomass, so Ravenala, Ravenala mixte and Savoka vieux has been decided to be merged into the secondary forest class.

Table 41 – Estimates of AGB according to inventory DVRF, 2016

Stratum	AGB (tdm/ha)	Relative margin of error at 90% of confidence level
Agroforestry	87.87	15%
Ravenala mixte	96.08	17%
Ravenala	63.43	14%
Single layer	170.97	10%
Savoka vieux	94.62	18%
Toutes sauf SL	87.87	15%

- Plantations: Since no inventory covered plantations, estimates for plantations are based on the estimates given by RAZAKAMANARIVO et al. (2013). These estimates represent average biomass for stands in different ages.
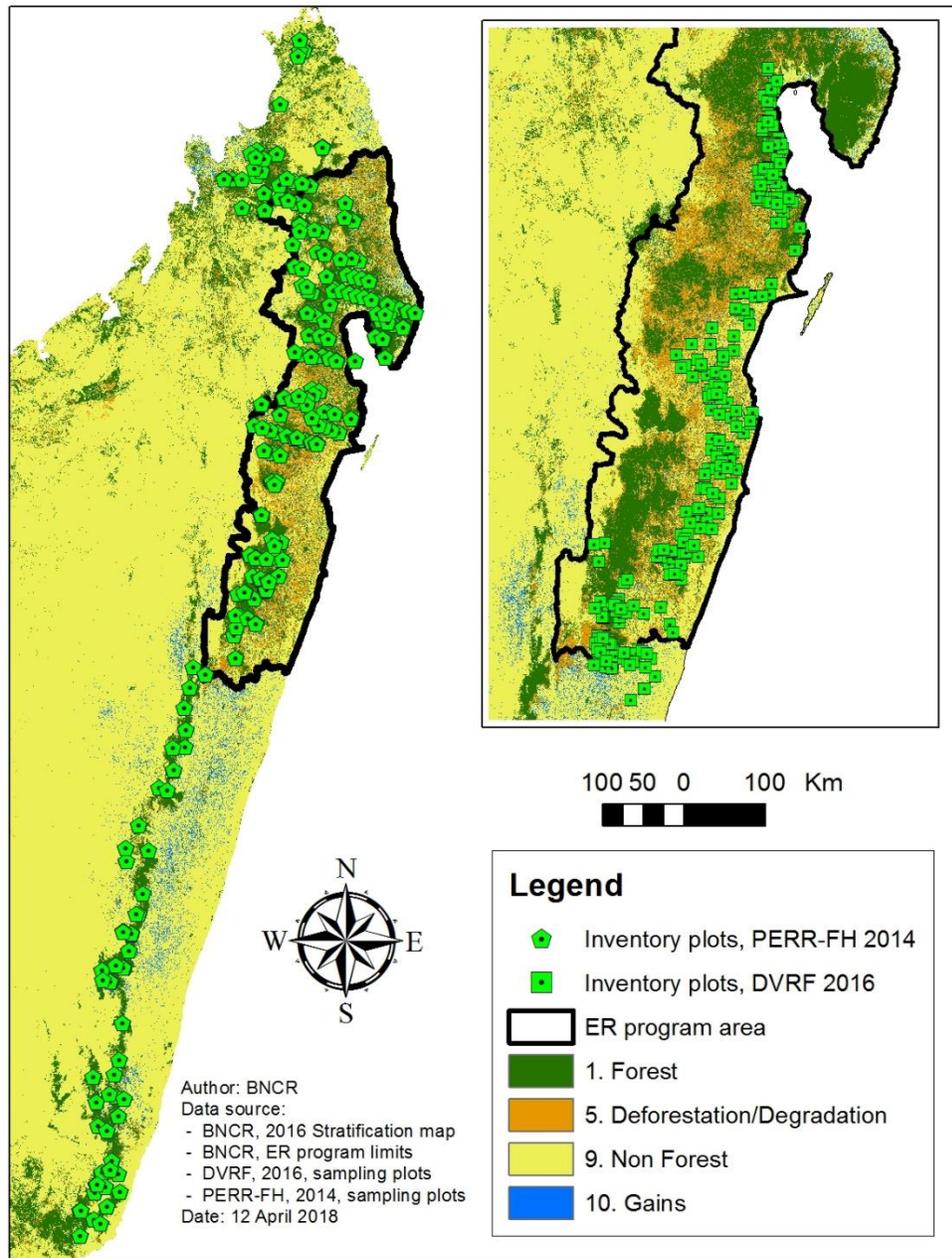
Figure 22 – Distrubution of forest inventory plots

The following sections include a description on how these data were processed and the above values were derived.

A/ Processing Workflow

Inventory data was processed as follows.

Figure 23: Inventory data processing workflow
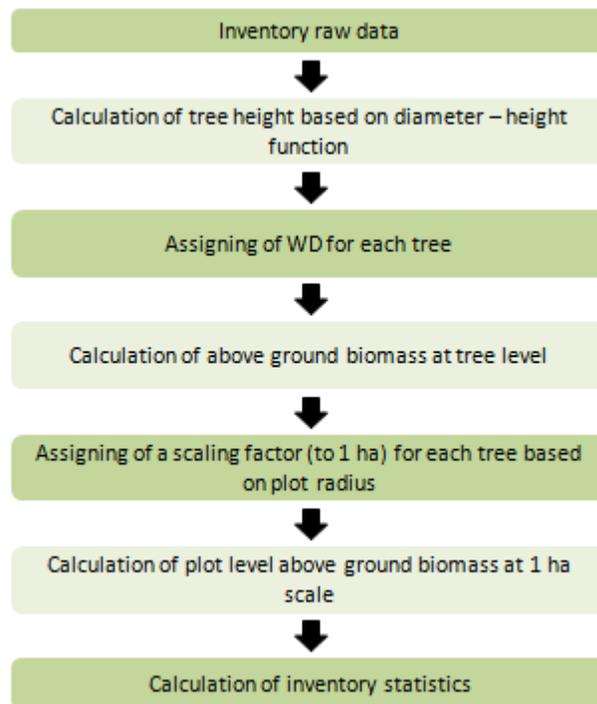
Inventory data used to calculate ground biomass was selected as follows:

- (Woody) trees of dbh ≥ 5 cm;
- All of the Palm (*Ravenala madagascariensis* and *Dypsis sp*.).

B/ Height calculation

Allometric equations used to calculate tree biomass usually have for variable the height (total height in the case of trees, total height or trunk height in the case of the palms. The height not having been systematically measured for all trees, equations were built in order to complete the missing data.

The tree height data of trees collected in the field data was used to develop a height diameter relation based on a function proposed by Chave et al. (2014). According to the field stratum, several height-diameter relations have been established. The table below shows the relations that were developed, the corresponding stratum, the number of trees used to build this relation, as well as the relative error.

For the particular case of the Palm, specific relationships were also established in order to complete the data in the rare case where the height was not measured:

- Either to measure the total height (in the case of the *Ravenala madagascariensis*), from the height of the trunk or from diameter at height of collar (DHC) depending on available data

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- Or to measure the height of the trunk (in the case of the *Dypsis sp.*), from the total height.

Table 42: Relations used for calculating heights

STRATA	N°	EQUATION	NUMBER OF TREES
Primary Forests –PERR-FH 2014 Inventory	1	$\ln(H) = -0.07511*\ln(D)^2 + 0.988*\ln(D) + 0.267$	1,270
« Savoka vieux » or « Agroforestry » strata of the 2016 inventory	2	$\ln(H) = -0.0709*\ln(D)^2 + 0.9257*\ln(D) + 0.371$	1,365
« Mix Ravenala » strata of the 2016 inventory	3	$\ln(H) = -0.106*\ln(D)^2 + 1.1305*\ln(D) + 0.0097$	499
Palm: Dypsis sp.	4	$H_{stip} = 0.3772*H + 1.7639$	25
Palm: Ravenala madagascariensis	5	$\ln(H) = -0.0699*\ln(DHC)^2 + 0.9956*\ln(DHC) - 0.8902$	1,010
	6	$H = 0.9391*H_{stip} + 5.7537$	493

Where:

H: total height, in m

D: diameter at breast height, in cm

DHC: diameter at collar height (Palm trees) in cm

H_{stip}: height of the trunk (Palm trees), in m

Later in the calculations, this calculated height by tree has been used only for trees which were not measured in height on the ground: in other cases, it is the measured height that was used.

The choice of the relation to be used to calculate the height is illustrated by the decision tree shown in Figure 2 below.

Figure 24: Decision tree to calculate height
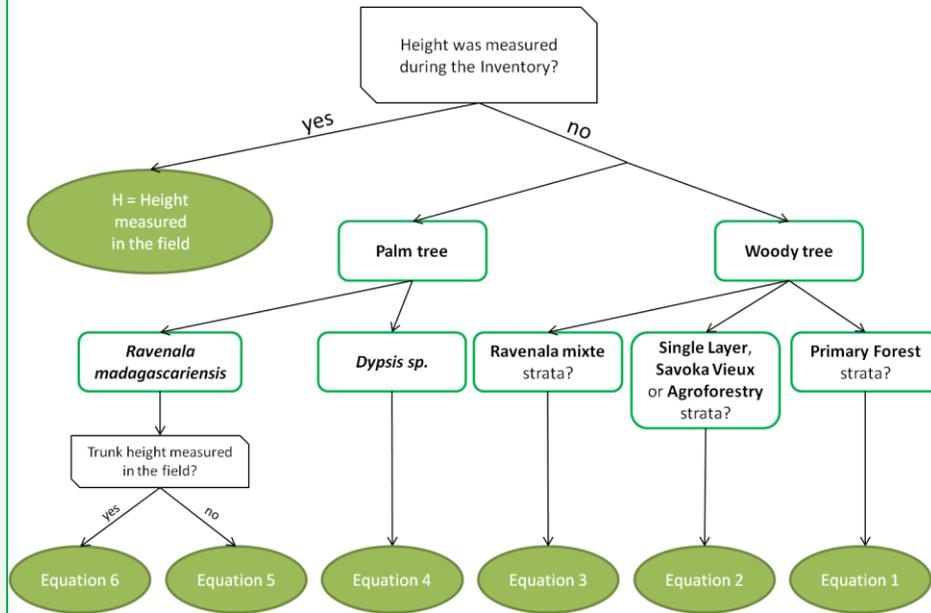
C/ Wood density assignation

Specific basal densities of inventoried trees have been already compiled by the PERR-FH project for the dense forest strata (2014 inventory). For the few additional species not listed in this database, wood density (WD) values were attributed according to the decision tree shown in the following figure:
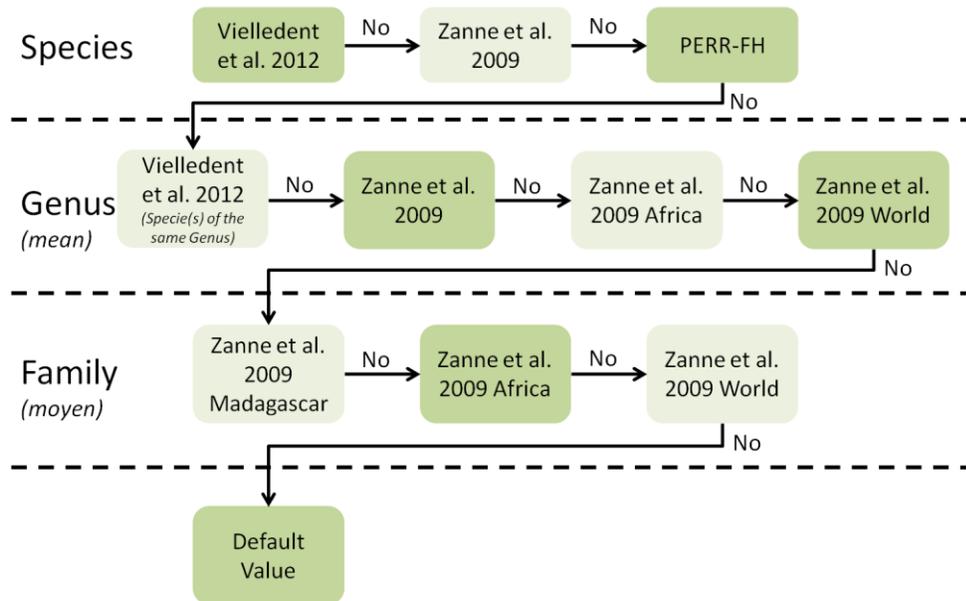
Figure 25: Decision tree for assigning WD

Wood densities were assigned based on the following 3 main databases:

1. A wood density database compiled by Vielliedent et al. (2012) for research related to allometric equations
2. The global wood density database compiled by Zanne et al. 2009
3. The PERR-FH wood density database compiled by the PERR-FH project for the purpose of the PERR-FH inventory

In the order of the above appearance, these 3 databases were searched for a WD value at the species level. If no WD value was found or only the genus of the tree was known, then WD values were assigned based on the genus in the following order of priority:

1. WD value from a species of the same genus from the database of Vieilledent et al. (2012)
2. Mean WD across the genus for species found in Madagascar from the database of Zanne et al. 2009
3. Mean WD across the genus for species found in Africa from the database of Zanne et al. 2009
4. Mean WD across the genus from the entire database of Zanne et al. 2009

In cases where only a single species of the same genus was found, the WD of this species was assigned.

If no WD value was available at the genus level or only the family of the tree was known, then WD values were assigned based on the family in the following priority order:

1. Mean WD across the family for species found in Madagascar from the database of Zanne et al. 2009
2. Mean WD across the family for species found in Africa from the database of Zanne et al. 2009
3. Mean WD across the family from the entire database of Zanne et al. 2009

Finally, if no wood density could be assigned through the above process either because no WD data was available or the tree could not be identified then a conservative WD default value of 0.5 was assigned (this value was chosen because it corresponds to the default value used in the PERR-FH project)/

D/ Calculation of AGB at tree level
The tree level biomass was calculated based on the following allometric equation.

Table 43: Allometric equations used to calculate ground biomass

STRATA OR SPECIES	EQUATION	SOURCE

Trees (woody)	Primary forests (PERR-FH 2014 inventory), modified forests ('Old Savoka' or 'Agroforestry' strata of the 2016 Inventory)	$\ln(AGB_{est}) = -1.948+1.969*LN(D)+0.66*LN(H_{tot})+0.828*LN(\rho))$	Vieilledent et al. (2012)
	(woody) trees of modified forests (« Ravenala mixte » strata of the inventory)	$\ln(AGB_{est}) = -1.56 + 1.912*\ln(D) + 0.471*\ln(H_{tot}) + 0.732*\ln(\rho)$	Ramananantoandro et al., 2017
Palms	*Ravenala madagascariensis*	$\ln(AGB_{est}) = -5.08 + 5.654*\ln(H_{tot}) - 0.772*\ln(H_{tot})^2$	Ramananantoandro et al., 2017
	Dypsis sp.	By default, the allometric equation that has been used is that of the *Chrysophylla sp* species as this was the equation which gave better results: $AGB_{est} = 0.182 + 0.498*H_{stip} + 0.049*H_{stip}^2$	IPCC 2003 LULUCF GPG, Annex 4A.2 (Delaney et al. 1999 ; Brown et al. 2001)

With:

$AGB_{est:}$	Estimated *Above-Ground Biomass* in tdm
ρ:	Wood density
D:	Diameter at Breast Height (DBH), in m
$H_{tot:}$	Total height of the tree or palm (for he palm, including fronds)
H_{stip}:	Height of the trunk (stem height of the Palm, without considering the fronds)

E/ Calculation of AGB at plot level

Following the calculation of tree-level biomass, a scaling factor was assigned to each tree to scale the biomass estimate to the 1 ha scale. As each sample plot

featured 4 subplots, different scaling factors were assigned based on the DBH of the tree.

Table 44: Scaling factor for fixed area subplots - 2014 PERR-FH forest inventory and 2016 DVRF inventory

DBH OF TREE [CM]	RADIUS OF SAMPLE PLOT [M]	AREA OF SAMPLE PLOT [SQM]	SCALING FACTOR TO 1 HA
≥15<30	10	314.16	31.83
≥5<15	4	50.27	198.94
<5cm	1	3.14	3,183.10

For trees with a DBH ≥30 cm which were measured with the Relascope (basal area factor 2), the scaling factor was calculated as follows:

$$SF = RCV * \frac{10,000}{\pi * c^2 * D^2} \tag{4}$$

With:

SF   is the scaling factor, dimensionless

RCV: is the relasope counting value, dimensionless (0.5 or 1)

c   is the c-value for basal area factor 2, dimensionless (here 35.352)

D: Diameter at Breast Height (DBH), in m

The scaling factor was then used to calculate biomass at the 1 ha scale for each tree. Then, above ground biomass was summarized by plot.

F/ Inference

The average estimate of Aboveground Biomass is estimated through the random estimator of the mean ($\hat{\mu}$):

$$\hat{\mu} = \frac{1}{n} \sum_{k=1}^{n} y_k$$

Where:

- y_k is the k sample estimate given by the biomass estimated per plot as described above. This is the biomass per sampling unit estimated above.
- n is the number of samples

Table 45 – Estimates of aboveground biomass per forest type

Forest type	AGB (tdm/ha)	Number of samples
Primary forest	265.44	178
Disturbed forest	232.15	467
Secondary forest	85.66	155

Agroforestry		87.87	28
Plantations		16.40	178

More information is provided in the spreadsheet ¨MADA_Biomasse aerienne et Morte¨ which may be found in the site http://bnc-redd.mg/index.php?option=com_content&view=article&Itemid=103&id=91&lang=fr.

Spatial level:	Local / Regional (Accounting Area)
Discussion of key uncertainties for this parameter:	Sampling error • DBH and height measurement errors • Error of the diameter-height function • Error of the wood density estimate • Error of the allometric equation (selection of equation and parameters) • Sampling error
Estimation of accuracy, precision, and/or confidence level, as applicable and an explanation of assumptions/ methodology in the estimation:	The sampling error is estimated through the following formula. $$Standard\ error(\hat{\mu}) = \frac{1}{\sqrt{n} \times (n-1)} \times \sum_{k=1}^{n}(y_k - \hat{\mu})^2$$ Where: • y_k is the k sample estimate given by the biomass estimated per plot as described above. This is the biomass per sampling unit estimated above; • $\hat{\mu}$ the random estimator of the mean; • n is the number of samples The result is multiplied by the t-student value for the 90% confidence level in order to estimate the confidence interval. The margin of error is the half width of the confidence interval divided by the average estimate. This has been applied for the two types of forest. The result is the following: **Table 46 – Estimates of uncertainty of biomass per forest type** | *Class*	BA (tdm/ha)	Stdev	Number of samples	SE	Relative margin of error at 90%
---	---	---	---	---	---
Primary forest	265.44	99.79	178	7.48	5
Disturbed forest	232.15	97.93	467	4.53	0.0
Secondary forest	85.66	65.34	155	5.25	10
Agroforestry	87.87	40.45	28	7.64	15
Plantations	16.40				12

| | More information is provided in the spreadsheet ¨ MADA_Biomasse aerienne et Morte ¨ which may be found in BNCR's site http://bnc-redd.mg/index.php?option=com_content&view=article&Itemid=103&id=91&lang=fr. |

Table 47: Aboveground biomass in non-forest

Description of the parameter including the forest class if applicable:	$AGB_{After,i}$ - Aboveground biomass of non-forest type j before conversion, in tonne of dry matter per ha; $AGB_{Before,i}$ - Aboveground biomass of non-forest type i after conversion, in tonnes dry matter per ha;
Data unit (e.g. t CO$_2$/ha):	t d.m./ha
Value for the parameter:	11.96
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:	This are sourced from a destructive sampling of Savouka Jeune secondary formations conducted as part of the Laboratoire de Recherches Appliqués in 2016-2017. These formations are the precursors of Savouka vieux, revenala mix and agroforestry formations. ***A/ Sampling design*** The samples were located in four different areas, located in the Centre and the South of the ER program area. These locations are part of the regions of Analanjirofo, Atsinanana and Alaotra Mangoro. Its general characteristics are the following : • Site 1 (Axe Soanierana Ivongo): centre of the ER program and below 200 m of altitude; • Site 2 (Axe Vavatenina): centre of the ER program and at least 400 m of altitude; ; • Site 3 (Axe Brickaville): south of the ER program and below 400 m of altitude; • Site 4 (Axe Andasibe): south of the ER program and above 400 m of altitude.
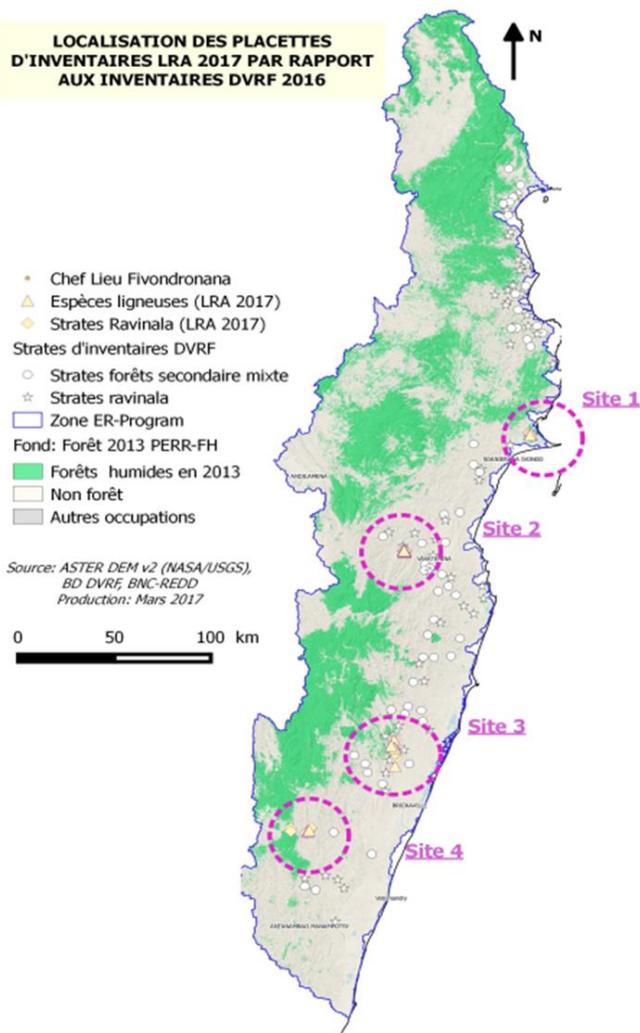
Figure 26 – Location of plots for estimation of biomass in non-forest

In each of the sites a number of 1 m² were established and they were established at different locations within watersheds in order to understand the impact of this in the aboveground biomass. Moreover, the plots within each of the slopes were located on Savouka jeune with different ages ranging from 4 to 10 years in order to understand the variability of Savouka Jeune with age. A total of 292 plots were established.

Table 48 – Number of sampling units per site for the estimation of biomass in Savouka Jeune

Position topographique	Site 1	Site 2	Site 3	Site 4	TOTAL
C1 : bas versant	19	27	21	22	292
C2 : mi-versant	23	26	24	24	
C3 : haut versant	19	34	27	26	
TOTAL par site	61	87	72	72	292

B/ Measurement

Within these plots, a destructive measurement of herbaceous vegetation and woody vegetation was made. The samples were then taken to laboratory and the samples were dried at a temperature of 70°C for the leaves and the herbaceous vegetation and 103°C for the shrubs until constant weight between 24 hour intervals. In general the drying process has taken 3 days in the case of leaves and grasses, and the woody biomass has taken 5 days.

Figure 27 – Picture of bags with destructive samples

The anhydrous mass of the shrubs and grasses has been measured with a balance with 0.01 g accuracy.

C/ Statistical analysis

Different statistical analysis with packages was done on the results.

The average estimate of Aboveground Biomass is estimated through the random estimator of the mean ($\hat{\mu}$):

$$\hat{\mu} = \frac{1}{n} \sum_{k=1}^{n} y_k$$

Where:
- y_k is the k sample estimate given by the biomass estimated per plot as described above. This is the biomass per sampling unit estimated above.
- n is the number of samples

For the ensemble of the four sites, the biomass factor for Savoka jeunes is of 11.96 ±6.5 t/ha.

Spatial level:	Local / Regional (ERP area)
Discussion of key uncertainties	The main uncertainty is the sampling uncertainty and the representativeness of the data. See Chapter 12.

for this parameter:	
Estimation of accuracy, precision, and/or confidence level, as applicable and an explanation of assumptions/ methodology in the estimation:	The sampling error is estimated through the following formula. $$Standard\ \widehat{error}(\hat{\mu}) = \frac{1}{\sqrt{n} \times (n-1)} \times \sum_{k=1}^{n}(y_k - \hat{\mu})^2$$ Where: • y_k is the k sample estimate given by the biomass estimated per plot as described above. This is the biomass per sampling unit estimated above; • $\hat{\mu}$ the random estimator of the mean; • n is the number of samples. The result is multiplied by the t-student value for the 90% confidence level in order to estimate the confidence interval. The margin of error is the half width of the confidence interval divided by the average estimate. **Table 49 – Estimates of AGB in non-forest** | *Class*	BA (tdm/ha)	Stdev	Number of samples	SE	Relative margin of error at 90%
---	---	---	---	---	---
Non Forest	11.96		120	3.28	46%	

Table 50: dead wood/litter stock

Description of the parameter including the forest class if applicable:	C_O dead wood/litter stock, under the old land-use category, tonnes C ha-1.
Data unit (e.g. t CO$_2$/ha):	tC/ha
Value for the parameter:		*Forest type*	Value
Primary Forest (PF)	12.93
Modified Natural Forest – Disturbed Forest (DF)	12.13
Modified Natural Forest – Secondary forest (SF)	10.61
Modified Natural Forest – Agroforestry (DF)	10.88
Plantations – Plantations for wood	0.00	

The same calculation procedures as the aboveground biomass were followed, but only with the trees that were labelled in the field as dead trees. This resulted in the following:

Table 51 – Estimates of dead wood per forest type

Forest type	DW (tdm/ha)
Primary forest	12.93
Disturbed forest	12.13
Secondary forest	10.61
Agroforestry	10.88
Plantations	0.00

These values were then multiplied by 0.47 in order to provide the carbon stocks.

More information is provided in the spreadsheet ¨MADA_Biomasse aerienne et Morte¨ that is posted in BNCR's site http://bnc-redd.mg/index.php?option=com_content&view=article&Itemid=103&id=91&lang=fr.

Spatial level

Local / Regional (Accounting Area)

Discussion of key uncertainties for this parameter:

Sampling error

- DBH and height measurement errors
- Error of the diameter-height function
- Error of the wood density estimate
- Error of the allometric equation (selection of equation and parameters)
- Sampling error

Estimation of accuracy, precision, and/or confidence level, as applicable and an explanation of assumptions/ methodology in the estimation:

The sampling error is estimated through the following formula.

$$Standard\ \widehat{error}(\hat{\mu}) = \frac{1}{\sqrt{n} \times (n-1)} \times \sum_{k=1}^{n}(y_k - \hat{\mu})^2$$

Where:
- y_k is the k sample estimate given by the biomass estimated per plot as described above. This is the biomass per sampling unit estimated above;
- $\hat{\mu}$ the random estimator of the mean;
- n is the number of samples.

The result is multiplied by the t-student value for the 90% confidence level in order to estimate the confidence interval. The margin of error is the half width of the confidence interval divided by the average estimate.

This has been applied for the two types of forest. The result is the following:

Class	DW (tdm/ha)	SE	Relative margin of error at 90%
Primary forest	12.93	1.34	17%

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Disturbed forest	12.13	0.88	0.12
Secondary forest	10.61	5.56	87%
Agroforestry	10.88	5.70	89%
Plantations	0.00		

More information is provided in the spreadsheet ¨MADA_Biomasse aerienne et Morte¨ that is posted in BNCR's site http://bnc-redd.mg/index.php?option=com_content&view=article&Itemid=103&id=91&lang=fr.

Table 52: Parameter - Soil organic matter

Description of the parameter including the forest class if applicable:	$SOC_{Before,j}$ - Soil Organic Carbon at 30 cm depth of forest type j before conversion, in tonne of carbon per ha. $SOC_{After,i}$ - Soil Organic Carbon at 30 cm depth of non-forest type j after conversion, in tonne of carbon per ha.
Data unit (e.g. t CO₂/ha):	tC/ha
Value for the parameter:	<table><tr><td>*Class*</td><td>Value</td></tr><tr><td>*Primary Forest (PF)*</td><td>110.97</td></tr><tr><td>*Modified Natural Forest – Disturbed Forest (DF)*</td><td>110.97</td></tr><tr><td>*Modified Natural Forest – Secondary forest (SF)*</td><td>110.97</td></tr><tr><td>*Modified Natural Forest – Agroforestry (DF)*</td><td>110.97</td></tr><tr><td>*Plantations – plantations for wood*</td><td>0</td></tr><tr><td>*Non-Forest*</td><td>104.65</td></tr></table>
Source of data or description of the assumptions, methods and results of any underlying studies that have been used to determine the parameter:	The data of soil estimates are based on a specific inventory conducted in the Eastern Humid Ecoregion as part of the PERR-FH. More information may be found in the Livrable 3 of the PERR-FH which is posted in BNCR's site http://bnc-redd.mg/index.php?option=com_content&view=article&Itemid=103&id=91&lang=fr.. **A/ Sampling plan** The inventory consistent in sampling in four different regions within the ecoregion, where 5 different chrono sequences were established.
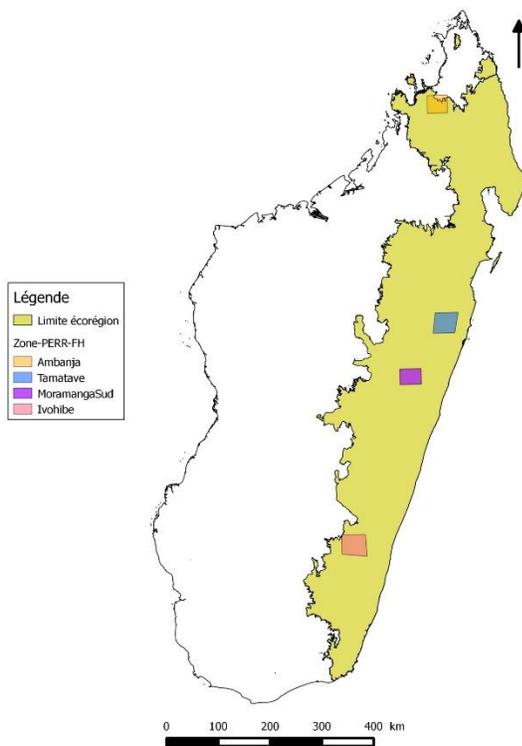
Figure 28 – Location of soil sampling units

The chronosequences we established so as to understand the changes in carbon stocks from Forests to the Tavy system, and to understand these changes across time as shown in the following figure.

Placette

Rayon = 10m

: Echantillons prélevés à la tarière : 0-10 cm, 10-20 cm, 20-30 cm et 30-40 cm, rassemblés ensuite en **1 échantillon composite par placette**.

: Echantillons prélevés sur un profil de 1 m, tous les 10 cm : 0-10, 10-20, 20-30, 30-40, …ou au-de là 50-60 , 70-80 et 90-100 cm

Transect

Points de prélèvements

400 m

400 m
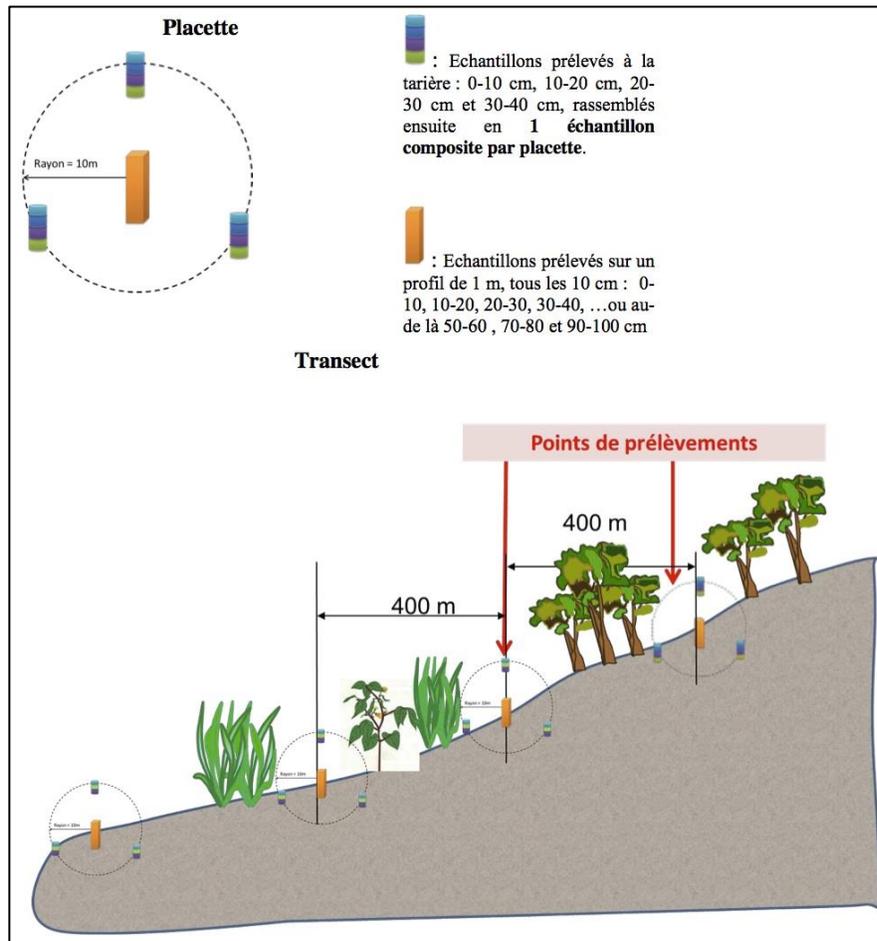
Figure 29 – View of the chrono sequences sampling for soil organic carbon

A total of 200 samples were collected, 75 in forest and 125 in non-forests, 50 in each of the four regions identified.

Table 53 – Sample size for the estimation of SOC

Class	Forest	Non-Forest	Total
Ambanja	26	24	50
Tamatave Est	22	28	50
Moramanga Sud	11	39	50
Ivohibe	16	34	50
Total	75	125	200

B/ Measurement

Data was collected following best practice standards in soil measurement. This was done for the profile down to 30 cm of depth and 1 meter of depth. Once collected the samples, apparent density and carbon content are estimated.

The most commonly used method for calculating soil organic carbon stocks at equivalent volume is to measure C stocks for each layer and taking into account apparent density and coarse content (EG: stoniness) of the soil. . The calculation of carbon stock in mega

grams of C per hectare (Mg C / ha, or tonne of C per hectare t C / ha) is done using the equation presented below:

$$SOC_i = DA \times 0,1 \times (1 - (EG/100)) \times C_{org} \times e$$

Where:

SOCi :   Carbon stocks in depth i (i = 0-10 cm, 10-20 cm, 20-30 cm), en tC/ha;

DA :   Aparent density, en g/cm3 ;

EG :   Percentage of gross elements > 2 mm, in %;

Corg :   Organic carbon content, en g C/kg ;

e :   Depth of the horizon, in cm (ici e = 10 cm).

The SCO for depths of 0 to 30 cm (SCO_30) were obtained by summing the stocks calculated for each thickness (0-10cm, 10-20cm, 20-30cm) (Equation 3). The corrections necessary to take into account the presence of coarse elements have been applied; thus, the mineral fraction greater than 2 mm (EG), being supposed to be devoid of C was thus removed from the stock. In this sense, for the first 30 cm of soil, the volume equivalent stock is calculated with the following equation:

$$SCO\_30 = SCO_{0-10} + SCO_{10-20} + SCO_{20-30}$$

Les stocks de C à volume équivalent ont été principalement utilisés pour la cartographie et la modélisation du carbone du sol.

C/ Inference

The soil organic carbon stocks are estimated and provided in the following table

Table 54 – Estimates of SOC for forest and non-forest according to PERR-FH

Class	SOC (tdm/ha)	N	Standard deviation
Forest	110,97	125	39,17
Non-Forest	104,65	75	37,53

These estimates were then assigned to all classes including primary forest and modified natural forest.

Spatial level:	Local / Regional (Accounting Area)
Discussion of key uncertainties	Sampling error • Sampling error

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for this parameter:	
Estimation of accuracy, precision, and/or confidence level, as applicable and an explanation of assumptions/ methodology in the estimation:	The sampling error is estimated through the following formula. $$Standard\ \widehat{error}(\hat{\mu}) = \frac{1}{\sqrt{n} \times (n-1)} \times \sum_{k=1}^{n}(y_k - \hat{\mu})^2$$ Where: • y_k is the k sample estimate given by the biomass estimated per plot as described above. This is the biomass per sampling unit estimated above; • $\hat{\mu}$ the random estimator of the mean; • n is the number of samples. The result is multiplied by the t-student value for the 90% confidence level in order to estimate the confidence interval. The margin of error is the half width of the confidence interval divided by the average estimate. This has been applied for forest and non-forest. The result is the following: **Table 55 – Estimates of SOC for forest and non-forest according to PERR-FH** | *Class*	90% level – confidence interval
Forest	5%
Non-Forest	7% | More information is provided in the spreadsheet ¨MADA_Biomasse aerienne et Morte¨ that is posted in BNCR's site http://bnc-redd.mg/index.php?option=com_content&view=article&Itemid=103&id=91&lang=fr.

c. *Calculation of the average annual historical emissions over the Reference Period*

i. Reducing Emissions from Deforestation / Land Use Change of Forest Land to other Land

a. GHG emissions in biomass

As explained in Annex III.I the annual change in carbon stocks would be estimated following **Equation 4**:

$$\Delta C_B = \sum_{j,i} \left(AGB_{Before,j}x(1 + R_j) - AGB_{After,i}x(1 + R_i)\right) x\ CF\ x\frac{44}{12} \times A(j,i)$$

Using the default values explained in Annex III.I and the estimated values in 8.3.b

Table 56 – Calculation of GHG emissions from biomass due to deforestation

	Activity Data (ha/year)	AGB before (tdm/ha)	AGB after (tdm/ha)	Root-to-shoot ratio forest	Root-to-shoot ratio non-forest	CF, tonne C (tonne d.m.)-1.	Conversion	tCO2/year
Primary forest	3,837	265.4	12.0	0.2	0.2	0.5	3.7	2,081,645
Disturbed forest	12,876	232.1	12.0	0.2	0.2	0.5	3.7	6,069,334
Secondary forest	0	85.7	12.0	0.2	0.2	0.5	3.7	0
Agroforestry	0	87.9	12.0	0.2	0.2	0.5	3.7	0
Plantations	0	29.6	12.0	3.2	0.2	0.5	3.7	0
			TOTAL					8,150,979

b. GHG emissions in Dead wood and Litter

As explained in Annex III.I the annual change in carbon stocks would be estimated following **Equation 5**:

$$\Delta C_{DOM} = \frac{(C_n - C_o) x\ A(j,i)\ x \frac{44}{12}}{T_{on}}$$

Using the default values explained in Annex III.I and the estimated values in 8.3.b:

Table 57 - Calculation of GHG emissions from dead wood and litter due to deforestation

	Activity Data (ha/year)	Stock litere de C dans la forêt (tC/ha)	C stocks dead wood before (tC/ha)	Stock litiere de C dans non forêt (tC/ha)	C stocks dead wood after (tC/ha)	Conversion	Years	tCO2/year
Primary forest	3,837	2.10	6.07	0.00	0.00	3.67	1	115,019
Disturbed forest	12,876	2.10	5.70	0.00	0.00	3.67	1	368,241
Secondary forest	0	2.10	4.99	0.00	0.00	3.67	1	0
Agroforestry	0	2.10	5.12	0.00	0.00	3.67	1	0
Plantations	0	2.10	0.00	0.00	0.00	3.67	1	0
			TOTAL					483,259

c. GHG emissions in SOC

As explained in Annex III.I the annual change in carbon stocks would be estimated following **Equation 6**:

Using the default values explained in Annex III.I and the estimated values in 8.3.b:

Table 58 - Calculation of GHG emissions from soil organic carbon due to deforestation

	Activity Data (ha/year)	SOC before (tC/ha)	SOCafter (tC/ha)	D	Conversion	tCO2/year
Primary forest	3,837	111	105	1	3.67	88,920
Disturbed forest	12,876	111	105	1	3.67	298,391
Secondary forest	0	111	105	1	3.67	0
Agroforestry	0	111	105	1	3.67	0
Plantations	0			1		0
TOTAL						387,311

d. Non-CO2 emissions

As explained in Annex III.I the annual non-CO2 emissions from fires would be estimated following **Equation 8**:

$$L_{fire} = A(j,i)xAGB_{Before,j}xC_fx(G_{ef_{ch4}}xGWP_{CH4} + G_{ef_{N2O}}xGWP_{N2O})x10^{-3}$$

Using the default values explained in Annex III.I and the estimated values in 8.3.b:

Table 59 - Calculation of non-CO2 emissions due to deforestation

	Activity Data (ha/year)	AGB before (tdm/ha)	Cf - combustion factor, dimensionless	Gef-CH4- emission factor, g kg-1 dry matter burnt.	Gef-N2O- emission factor, g kg-1 dry matter burnt.	Global warming potential CH4	Global warming potential N2O	tCO2/year in Reference Period
Primary forest	3,837	265.44	0.50	6.80	0.20	25.00	298.00	116,928
Disturbed forest	12,876	232.15	0.50	6.80	0.20	25.00	298.00	343,165
Secondary forest	0	85.66	0.55	6.80	0.20	25.00	298.00	0
Agroforestry	0	87.87	0.55	6.80	0.20	25.00	298.00	0
Plantations	0	29.55	0.55	6.80	0.20	25.00	298.00	0

| | TOTAL | | | | | | | 460,093 |

ii. Reducing emissions from forest degradation / Forest Land remaining Forest Land

As explained in Annex III.I the annual change in carbon stocks would be estimated following **Equation 9**:

$$\Delta C_B = \sum_{j,i} \left(AGB_{Before,j} x(1 + R_j) - AGB_{After,i} x(1 + R_i) \right) x\ CF\ x \frac{44}{12} \times A(j,i)$$

Using the default values explained in Annex III.I and the estimated values in 8.3.b.

Table 60 – Calculation of GHG emissions from forest degradation

	Activity Data (ha/year)	AGB before (tdm/ha)	AGB after (tdm/ha)	Root-to-shoot ratio forest	Root-to-shoot ratio non-forest	CF, tonne C (tonne d.m.)-1.	Conversion	tCO2/year
Primary forest to disturbed forest	28,268	265.44	232.15	0.24	0.24	0.47	3.67	2,011,023
Primary forest to agroforestry	0	265.44	87.87	0.24	0.20	0.47	0.00	0
Primary forest to plantation	0	265.44	0.00	3.24	0.20	0.47	0.00	0
Disturbed forest to agroforestry	0	232.15	87.87	0.24	0.20	0.47	0.00	0
Disturbed forest to plantation	0	232.15	0.00	3.24	0.20	0.47	0.00	0
			TOTAL					2,011,023

iii. Enhancement of carbon stocks in new forests / Land Use Change from non-Forest Land to Forest

As explained in Annex III.I the annual change in carbon stocks would be estimated following **Equation 10**:

$$\Delta C_B = \sum_{j,i} \frac{\left(AGB_{Before,i} - AGB_{After,j} \right)}{\text{Years growth}} x(1 + R)x\ CF\ x \frac{44}{12} \times A(i,j)$$

Using the default values explained in Annex III.I and the estimated values in 8.3.b.

Secondary forest

Table 61 – Calculation of removals from secondary forest

Year	Activity Data (ha/year)	AGB before (tdm/ha)	AGB after (tdm/ha)	Root-to-shoot ratio forest	CF, tonne C (tonne d.m.)-1.	Years	Conversion	tCO2/year
1	1,270.04	11.96	85.66	0.20	0.47	10.00	3.67	-19,356.93
2	2,540.09	11.96	85.66	0.20	0.47	10.00	3.67	-38,713.86
3	3,810.13	11.96	85.66	0.20	0.47	10.00	3.67	-58,070.79

4	5,080.17	11.96	85.66	0.20	0.47	10.00	3.67	-77,427.73
5	6,350.22	11.96	85.66	0.20	0.47	10.00	3.67	-96,784.66
6	7,620.26	11.96	85.66	0.20	0.47	10.00	3.67	-116,141.59
7	8,890.31	11.96	85.66	0.20	0.47	10.00	3.67	-135,498.52
8	10,160.35	11.96	85.66	0.20	0.47	10.00	3.67	-154,855.45
9	11,430.39	11.96	85.66	0.20	0.47	10.00	3.67	-174,212.38
10	12,700.44	11.96	85.66	0.20	0.47	10.00	3.67	-193,569.31

Agroforestry

Table 62 – Calculation of GHG removals from new agroforestry systems

Year	Activity Data (ha/year)	AGB before (tdm/ha)	AGB after (tdm/ha)	Root-to-shoot ratio forest	CF, tonne C (tonne d.m.)-1.	Years	Conversion	tCO2/year
1	0.00	11.96	87.87	0.20	0.47	10.00	3.67	0.00
2	0.00	11.96	87.87	0.20	0.47	10.00	3.67	0.00
3	0.00	11.96	87.87	0.20	0.47	10.00	3.67	0.00
4	0.00	11.96	87.87	0.20	0.47	10.00	3.67	0.00
5	0.00	11.96	87.87	0.20	0.47	10.00	3.67	0.00
6	0.00	11.96	87.87	0.20	0.47	10.00	3.67	0.00
7	0.00	11.96	87.87	0.20	0.47	10.00	3.67	0.00
8	0.00	11.96	87.87	0.20	0.47	10.00	3.67	0.00
9	0.00	11.96	87.87	0.20	0.47	10.00	3.67	0.00
10	0.00	11.96	87.87	0.20	0.47	10.00	3.67	0.00

Plantations

Table 63 - Calculation of GHG removals from establishment of new plantations

Year	Activity Data (ha/year)	AGB before (tdm/ha)	AGB after (tdm/ha)	Root-to-shoot	CF, tonne C (tonne d.m.)-1.	Years	Conversion	tCO2/year

				ratio forest				
1	0.00	11.96	29.55	3.24	0.47	5.00	3.67	0.00
2	0.00	11.96	29.55	3.24	0.47	5.00	3.67	0.00
3	0.00	11.96	29.55	3.24	0.47	5.00	3.67	0.00
4	0.00	11.96	29.55	3.24	0.47	5.00	3.67	0.00
5	0.00	11.96	29.55	3.24	0.47	5.00	3.67	0.00
6	0.00	11.96	29.55	3.24	0.47	5.00	3.67	0.00
7	0.00	11.96	29.55	3.24	0.47	5.00	3.67	0.00
8	0.00	11.96	29.55	3.24	0.47	5.00	3.67	0.00
9	0.00	11.96	29.55	3.24	0.47	5.00	3.67	0.00
10	0.00	11.96	29.55	3.24	0.47	5.00	3.67	0.00

iv.   Average annual historical emissions

A summary of annual historical emissions is reported below.

➢ Average historical emissions from deforestation amount to 9.48 Million tCO2e/yr.
➢ Average historical emissions from degradation amount to 2 Million tCO2e/yr.
➢ Enhancement of carbon stocks is -0.106 million tCO2e /yr.

Table 64 – Estimation of historical emissions and removals

Period	historical emissions from deforestation (tCO2/yr)	historical emissions from degradation (tCO2/yr)	historical removals from enhancement of carbon stocks (tCO2/yr)	Total annual historical GHG emissions (tCO2/yr)	Average annual historical GHG emissions (tCO2/yr)
2006	9,481,642	2,011,023	-19,357	11,473,309	11,386,202
2007	9,481,642	2,011,023	-38,714	11,453,952	11,386,202
2008	9,481,642	2,011,023	-58,071	11,434,595	11,386,202
2009	9,481,642	2,011,023	-77,428	11,415,238	11,386,202
2010	9,481,642	2,011,023	-96,785	11,395,881	11,386,202

2011	9,481,642	2,011,023	-116,142	11,376,524	11,386,202
2012	9,481,642	2,011,023	-135,499	11,357,167	11,386,202
2013	9,481,642	2,011,023	-154,855	11,337,810	11,386,202
2014	9,481,642	2,011,023	-174,212	11,318,453	11,386,202
2015	9,481,642	2,011,023	-193,569	11,299,096	11,386,202

8.4. UPWARD OR DOWNWARD ADJUSTMENTS TO THE AVERAGE ANNUAL HISTORICAL EMISSIONS OVER THE REFERENCE PERIOD (IF APPLICABLE)

Not applicable.

8.5. ESTIMATED REFERENCE LEVEL

Table 65 below depicts the ER program's final Reference Emission Level. In this case, the RL is slightly different to the average historical net emissions as the removals enhancement of carbon stocks are not based on historical averages but on historical activity data (rates of afforestation/reforestation) occurring in the future.

Table 65. *ER Program Reference Level*

ERPA term year t	emissions from deforestation (tCO2/yr)	emissions from degradation (tCO2/yr)	removals from enhancement of carbon stocks (tCO2/yr)	Total Reference Level (tCO2/yr)
2S 2019	9,481,642	2,011,023	-19,357	11,473,309
2020	9,481,642	2,011,023	-38,714	11,453,952
2021	9,481,642	2,011,023	-58,071	11,434,595
2022	9,481,642	2,011,023	-77,428	11,415,238
2023	9,481,642	2,011,023	-96,785	11,395,881
2024	9,481,642	2,011,023	-116,142	11,376,524

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

a. *Consistency with national GHG inventory*

Madagascar submitted its initial communication in 2004 and the second communication in 2010, but has not submitted a Biennial Update Report so far. The national communication of 2010 refers to the year 2000. The approach used in the 2010 inventory for estimating the emissions and sinks of the forestry sector, are

similar to those used in 2017 for estimating the emissions of the ER-P area and the emissions on national scale, however there are differences on the following parameters:

- The national inventory uses the base year 2000, whereas the ER-P REL considers a reference period of 2005 to 2015. It is clear that one single year (2000), is too short to serve as reference period and lies too far in the past, and hence could not be considered for the development of the REL.
- The national GHG inventory considers the land use change from forest to non-forest land, but ignores finer classifications such as e.g. primary forest or modified natural forests and related land use change. However, the ER-P chose to consider such classes in order to be able to apply more specific emission factors, increasing the overall accuracy.
- GHG Inventory considers the GHGs CO_2 CH_4 and N_2O, including fires in forests and other wooded land, whereas the ER-P REL considers non-CO2 emissions from fires as part of deforestation. This is related to the issue that the LULUCF inventory was built around a dataset covering the burning of biomass and hence such data is available for the year 2000.

Madagascar is in the process of establishing a national forest monitoring system which will be spearheaded by the 'laboratoire geomatique' hosted under BNC REDD+. The laboratory will develop i) activity data and ii) derive emission factors, once new underlying data will become available, i.e. new, additional volume data, identification of additional tree species names (which is currently perceived as a weakness of the national forest inventory) and/or the identification of additional tree species specific density factors.

The GHG inventory and the national communications are prepared by BNC CC. As the national forest monitoring system, led by the laboratory, will produce activity data as well as new emission factors, the laboratory will provide such data to BNC CC, which will ensure consistency of data used for the GHG inventory.

b. *Consistency with national REL*

On behalf of Madagascar, BNC REDD developed its Forest Reference Emission Level / Forest Reference Level (FREL/FRL) and submitted it to UNFCCC in 2016. The submission is primarily based on existing data, not generated as part of the REDD readiness process, and the main objective for this was to learn from the process and extract lessons learned that could feed into the design of the emerging NFMs. The FREL/FRL is currently under evaluation by the UNFCCC Secretariat. Recommendations from UNFCCC that result from the validation process may lead to amendments in the national FREL.

Both analyses correspond largely. The products match in terms of carbon pools and GHGs considered. Moreover, both constrain their analysis to the detection of the land use change from forest to non-forest as well as regrowth. However, there are some differences between the national FREL and the ER-P REL with respect to technical design features, which are summarized as follows:

- The national FREL/FRL covers a reference period from 2000 to 2013. However, the ER-P covers a reference period from 2005 to 2015 as required by the Methodological Framework, Criterion 11.
- The national FREL covers four ecosystems including the ecosystem of humid forests as covered by the ER program area. In order to estimate the total emissions of the forestry sector, the national REL employs ecosystem-specific inventory data. The ER program however does not cover the total ecosystem of humid forests. Consequently, for the determination of the emission factors, we used only such plot data

which is located within the boundaries of the ER Program. Moreover, the ER Program uses a different stratification (including primary forests and modified natural forests) and includes new inventory data from plots located in the ER Program area, aiming to measure the biomass stock of degraded forests. As a consequence, there are slight differences between the emission factors for humid forests used on national scale and the emission factors used in the ER Program, despite addressing the same ecosystem.

On more general terms, as specified in the National Forest Reference Emission Level, it is envisaged that the ER Program REL, being more specific and accurate, informs the national REL.

The process of developing the initial FREL, its validation as well as the development of the ERP REL insights on learning processes. It is envisaged that, once the laboratory is up and running, that Madagascar develops a revised national FREL (including the ER Program area) which would build on past learning processes, and which would have a reference period which is consistent with the current reference period of the ER REL.
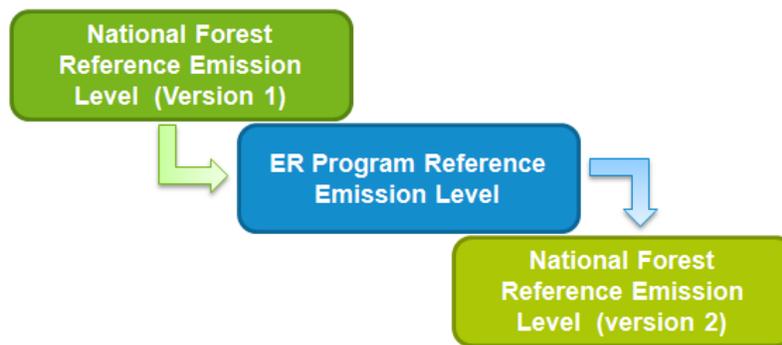
9. MEASUREMENT, MONITORING AND REPORTING APPROACH FOR ESTIMATING EMISSIONS OCCURRING UNDER THE ER PROGRAM WITHIN THE ACCOUNTING AREA

a. *Overall structure of FMS*

The Forest Monitoring System (FMS) of the ER-Program will be fully integrated in the emerging National Forest Monitoring System (NFMS). This NFMS was established in accordance to the decision 4/C.15 of Copenhagen and it has two main functions: a monitoring function and a Measurement, Verification and Verification (MRV) function.

The **monitoring function** will serve for the monitoring of legal compliance, safeguards and other aspects of the ER-Program. The **MRV function** of the NFMS, is strictly related to estimation, reporting and verification of GHG emissions and removals.
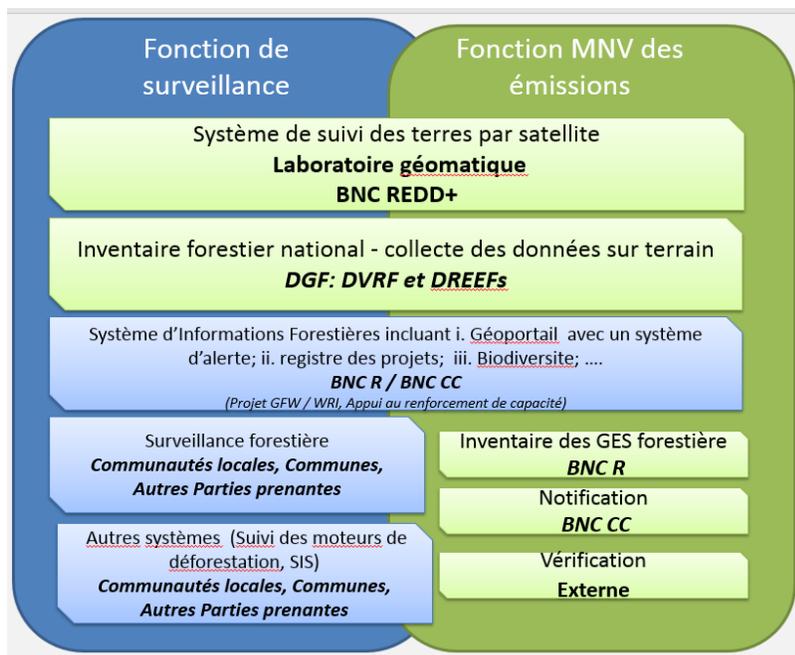
Figure 30. Structure of the NFMS

b. *Principles of the FMS design*

The emissions by sources and removals by sinks measured, monitored and reported by the FMS will be consistent with those reported by the RL as required by **Criterion 14 of the methodological framework.** This will be done through four main principles:

- **Consistent scope**: The same scope in terms of geographical area, REDD+ activities, carbon pools and GHG gases will be kept with regard to the RL (Indicator 14.1 of the CF MF);
- **Activity Data (AD)**: The data on the magnitude of human activity resulting in emissions or removals taking place during a given period of time, will be measured and monitored following the same methods used for the defining this in the RL (Indicator 14.2 of the CF MF);
- **Emission Factors (EF) and default values:** The same EFs and default values used for the RL will be used in the estimation of GHG emissions by sources and removals by sinks (Indicator 14.3 of the CF MF);
- **GHG accounting:** The same equations, calculation procedures and QA/QC as used for the RL will be used (Indicator 14.1 of the CF MF).

This would mean that the only parameters being modified with regard to the RL would be the AD. Considering the methods described in Chapter 8.3, this would mean that only one parameter would be measured:

	Activity Data	Source
$A(j,i)$	Annual conversion from forest type j (primary forest, modified natural forest), to non-Forest Land uses i (Non-Forest)	Deforestation
$A(j,i)$	Annual conversion from forest type j (primary forest, modified natural forest), to non-Forest Land uses i (Non-Forest)	Degradation
$A(i,j)$	Annual conversion from non-Forest Land use i to forest type j (planted forest or modified natural forest)	Enhancement of carbon stocks (afforestation/reforestation)

c. *Measurement, Monitoring and Reporting Process*

The general measurement, monitoring and reporting process consists in all operations of data collection of EO data, QA operations, and final reporting. A general overview of the FMS process is provided in the following simplified process diagram. Each of the operations is described in the following sections.

Data Collection and Processing

Data collection and processing will be done in order to produce Activity Data which will be in the form of: area of conversion of land use subcategories / strata ($A(j,i)$, $A(i,j)$). The main specifications for data collection and processing are provided in the following table.

Table 66. Parameters to monitor

Parameter:	$A(j,i) \; A(i,j)$
Description:	• Annual conversion from forest type j (primary forest, modified natural forest), to non-Forest Land uses i (Non-Forest) in the monitoring period

	• Annual conversion from forest type j (primary forest), to forest type i (modified natural forest and plantations) in the monitoring period • Annual conversion from non-Forest Land use i to forest type j (planted forest or modified natural forest) in the monitoring period
Data unit:	ha/year

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	As indicated previously, design-based inference of reference sampling units and the forest cover change map as stratification map has been used in order to estimate the activity data. All the steps below were made following a set of Standard Operating Procedures which may be found in Annex and BNCR's website http://bnc-redd.mg/index.php?option=com_content&view=article&Itemid=103&id=91&lang=fr .
	
	Sampling design
	Estimator:
	Stratified random estimator of a proportion
	
	Stratification:
	A forest cover change map should be used as stratification criteria using the following strata.
	
	Table 67 – Stratification used for the activity data estimation
	
	Strata
	  1. Forest
	  5. Deforestation
	  9. Non Forest
	  10. Gains
	
	Precision and confidence level:
	Relative margin of error of 20% at 90% of confidence level as requested
	
	Calculation of the sample size:
	For the calculation of the sample size, the equation from Cochran (1977, Eq. (5.25)) was used assuming that the cost of sampling each stratum is the same:
	
	$$n = \frac{(\sum W_h S_h)^2}{[S(\hat{O})]^2 + (1/N) \sum W_h S_h^2} \approx \left(\frac{\sum W_h S_h}{S(\hat{O})}\right)^2$$
	
	Where:
	W_h Weight of stratum *i*;
	S_h Standard deviation of variable of interest in stratum i;
	$S(\hat{O})$ Standard error of the variable of interest;
	N Number of sampling units in the region of interest (i.e., population size);
	
	Drawing of samples
	The region of interest is divided in 90 m x 90 m sampling elements which corresponds to the pixel size of the stratification map. The drawing of samples was done by selecting 90 m

x 90 m squares within each stratum, i.e. a finite population approach[85]. An example of the location and adjustment of a sampling unit is provided below.

Figure 31 - Example of stratification and sampling unit

This was done through an R script that may be found in the SOPs that is provided in BNCR's website http://bnc-redd.mg/index.php?option=com_content&view=article&Itemid=103&id=91&lang=fr .

Response design

Spatial assessment unit:

The spatial assessment unit is a squared area of 90 meter of side which contains 25 points inside and which is centered on the random point selected from the sampling frame. Considering the acceptable geolocation error of Landsat imagery is 30 metres, this spatial assessment unit would be justified.

However, in terms of spatial support the information beyond the limits of the plot were used to assess whether one object within the assessment unit would comply with the minimum mapping unit.

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[85] http://wiki.awf.forst.uni-goettingen.de/wiki/index.php/Approaches_to_populations_of_sample_plots
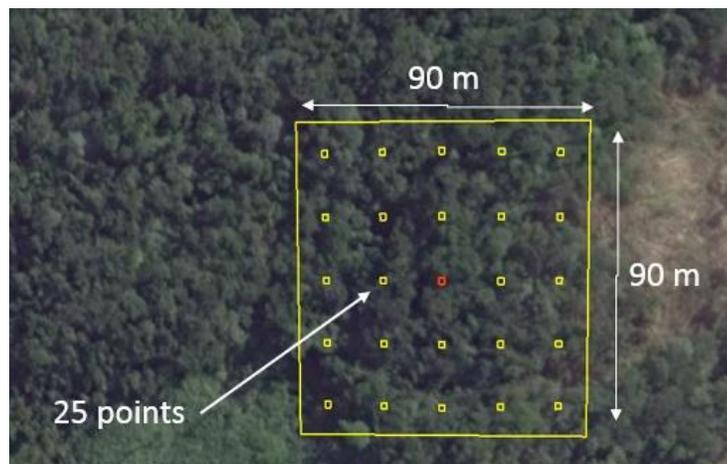
Figure 32 – Assessment or sampling unit

Source of the reference data:

The reference data in this case will be collected through visual interpretation of all satellite imagery available to the country. This includes:

- SPOT 6/7: High resolution imagery (5 m resolution) for 2014/2015
- Google Earth and Bing: All high and very high resolution imagery accessible through Google Earth and Bing. The spatial coverage of very high resolution imagery in the ER program area is relatively high, with many areas with coverage from 2005 to 2015.
- Aster: Resolution of 15 metres from 2000 to 2009
- Landsat 5 TM and 7 ETM+: Available through google earth engine.
- Landsat 8 OLI: Available through google earth engine for 2013-2017.
- Sentinel 2A MSI: Available through google earth engine for 2015-2017.

It is considered that these are reference data as most of the interpretations will be based on direct interpretation of higher resolution imagery for different periods which provides the necessary temporal contextual information.

Reference labelling protocol

- Forest/Non Forest classification: In order to attribute the condition of forest to the sample, the interpreter would evaluate how many points of the grid would fall over forest (a differentiated object that has at least one ha in area and has 30% of tree canopy cover). If at least 13 points (>50% of points) fall in forest, the point would be classified as forest, otherwise as non-forest. This method ensures that there is not a overrepresentation of forest, which happens with hierarchical classification systems. In the example below, although only 10 points fall over canopy, 18 points fall in forest area, so the sampling unit would be classified as forest.

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Figure 33 – Example of interpretation of sampling unit

- Forest types: If the sample is classified as forest, the sample would then by attributed to one of the 5 forest types based on the majority class present:
  - Primary forest
  - Modified Natural forest – Disturbed forest
  - Modified Natural forest – Agroforestry
  - Modified Natural forest – Secondary forest
  - Plantation – Plantation for wood
- Interpretation has been based on a protocol which is provided in Annex.
- QA/QC: A number of QA/QC procedures have been applied:

The results of the interpretation are the following:

Analysis design

The average proportion of the variable of interest in the reference period will be estimated through the stratified random estimator of the mean ($\hat{\mu}_{STR}$)

$$\hat{\mu}_{STR} = \sum_{h}^{H} W_h \hat{\mu}_h$$

Where:

W_h Weight of stratum h;

$\hat{\mu}_h$ Sample estimates within stratum h which is equal to $\hat{\mu}_h = \frac{1}{n_h} \sum_{k=1}^{n_h} y_{hk}$ where y_{hk}

is the ith sample observation in the hth stratum

	In order to convert the proportions to areas, the average proportion is multiplied by the total area of the region of interest of 6,892,397 ha. This area is the sum of all elements of the population (pixels), so it differs slightly from the polygon based area, i.e. 6,904,417 ha. In order to express the proportion of deforestation or afforestation/reforestation in annual basis, the sample estimate is divided by the duration of the reference period (i.e. 10 years).
Frequency of monitoring/rec ording:	Biennial.
Monitoring equipment:	As shown above.
Quality Assurance/Qu ality Control procedures to be applied:	**QA/QC** - QC procedures in this case consist in the establishment of a Standard Operating Procedure (SOP) for the interpretation of the samples and the application of training procedures in order to ensure the correct implementation of SOPs. The SOPs designed prior to the data collection may be found in Annex. - The forms of Collect Earth were also designed to implement validation rules that would avoid any consistency errors. Since validation rules could not avoid all possible inconsistency errors, the results of sampling units collected one day where reviewed by a different interpreter to check consistency. - Expert interpreters were used, sufficiently trained, with a specific SOP for interpretation. - Moreover, the interpreters indicate whether the quality of interpretation is high or low, so this serves to filter out those points that are of low quality in the interpretation. All sampling units labelled as low-confidence are re-assessed by and expert interpreter. - In terms of QA, 10% were reviewed by an expert interpreter and any inconsistencies were discussed with the group of interpreters.
Identification of sources of uncertainty for this parameter	Possible uncertainties in this case would be as follows: - Measurement uncertainty - Sampling uncertainty
Process for managing and reducing uncertainty associated with this parameter	See above.

Any comment:	Community monitoring is not envisaged for this parameter.

Calculation

In order to execute this operation of the process, the same IPCC methods and equations described in Chapter 8.3 will be used to estimate GHG emissions in the monitoring period.

Once changes in carbon stocks under the ER-Program are estimated for each activity i ($\Delta C_{LU,i}$), it would be necessary to determine the GHG emission reductions that would be generated by the program. The following equations would be applied:

$$ER_{LU} = \sum_i \sum_t^T (RL_{i,t} - \Delta C_{LU,i} \times T)$$ Equation 1

Where:

ER_{LU}	=	GHG emission reductions; tCO_2e year^{-1}.
$RL_{i,t}$	=	GHG emissions of the RL in REDD+ general activity i in year t; tCO_2e year^{-1}.
T	=	Years in monitoring period, year

The uncertainty of the GHG emissions reductions would have to be estimated through Montecarlo methods as described in the 2006 IPCC GL – Volume 1 – Chapter 3. The final uncertainty reported under the FCPF CF MF for deforestation and degradation,[8687] will serve to define the conservativeness factor to be applied in order to define the amount set aside in the buffer reserve.

Table 68. Conservativeness factors to be applied to Emission Reductions as defined by the FCPF CF MF

Aggregate Uncertainty of Emissions Reductions	Conservativeness Factor
= 15%	0%
> 15% and = 30%	4%
> 30 and = 60%	8%
> 60 and =100%	12%
> 100%	15%

$$ER_{LU} = \sum_i \sum_t^T (RL_{i,t} - \Delta C_{LU,i} \times T) \times (100 - CF_i)/100$$ Equation 2

Where:

CF_i	=	Conservativeness factor for REDD+ general activity i ; percentage.

Reporting

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[87] Only if spatially explicit activity data (IPCC Approach 3) and high-quality emission factors (IPCC Tier 2) are used, i.e. Approach 3. Criterion 22 of the FCPF CF MF.

Once the emission reductions are calculated, these will be reported providing all information in a transparent way demonstrating that the principles set in Chapter 9.1 have been followed. The following information will be reported:

- Reporting of parameters measured and monitored;
- Total emission reductions;
- Emission reductions disaggregated:

    - REDD+ general activity and sub-activity
    - Per participant in the benefit sharing mechanism.

- Existence of reversals

9.1. ORGANIZATIONAL STRUCTURE FOR MEASUREMENT, MONITORING AND REPORTING

a. *Organizational structure, responsibilities and competencies*

The government of Madagascar is in the process of establishing a National Forest Monitoring System (NFMS) which also fulfils the functions of monitoring and reporting the future emissions and possible emission reductions of the country's ER Program. The monitoring system is based on the following key elements:

- BNC REDD assumes the overall responsibility for the future assessment of land use change and the development of the ERP monitoring report. This not only holds true for FCPF related reporting but also for the reporting of the net GHG emissions from the forestry sector on national scale. The underlying remote sensing analyses will be conducted by a remote sensing laboratory which is currently being created under the mandate of BNC REDD+. This laboratory will determine activity data for the ER Program (following the procedures specified in Chapter 9.1) and equally will determine the activity data to monitor emissions and removals at national scale. BNC REDD equally hosts a REDD+ project register which ensures standardized data flow from REDD+ projects in the ER Program area (i.e. VCS projects CAZ and Makira) and on national scale to BNC REDD+ Data comprises monitoring results, loss events as well as carbon sales to ensure the avoidance of double counting).
- BNC REDD will provide the national data (i.e. activity data, emissions factors and information on mitigation actions in the forestry sector) to BNC CC in order to be used in the national GHG inventory and the submission of National Communications and Biennale Update Reports to UNFCCC.
- DGF (including DVRF which is charged with the implementation of the national forest inventory) will provide new inventory data to BNC REDD+, once available. A current obstacle is that inventories in Madagascar typically comprise a considerable number of species which are either unknown, or identified with their common names only. However, if the scientific names are unknown, this impedes the identification of species specific density parameters for the calculation of carbon stocks. To that end, DVRV and BNC REDD+ are creating a national tree species data base. Additional tree species specific

information, as well as new inventory data may lead to an increase of accuracy of the carbon stock estimates and possibly, the updating of emission factors in the future.

- Local communities and REDD+ projects may provide information on performance, illegal logging activities, loss events, poaching and irregularities on in the REDD benefit sharing process. Community monitoring activities are specifically foreseen in those areas, where there is weak presence of the government. Community monitoring will be based on smart phones which are linked to a national geoportal of the NFMS. First field tests of community monitoring were conducted, and the geoportal is being developed in cooperation with Global Forest Watch.
- BNC REDD+ will compile the results of the Measurement, Monitoring & Reporting activities in a monitoring report which will be submitted to the FCPF Carbon Fund for external verification.

The organizational structure of the Monitoring, Reporting and Verification system (i.e. those functions of the NFMS which are constrained to the accounting of emissions/removals) is illustrated by the figure below.
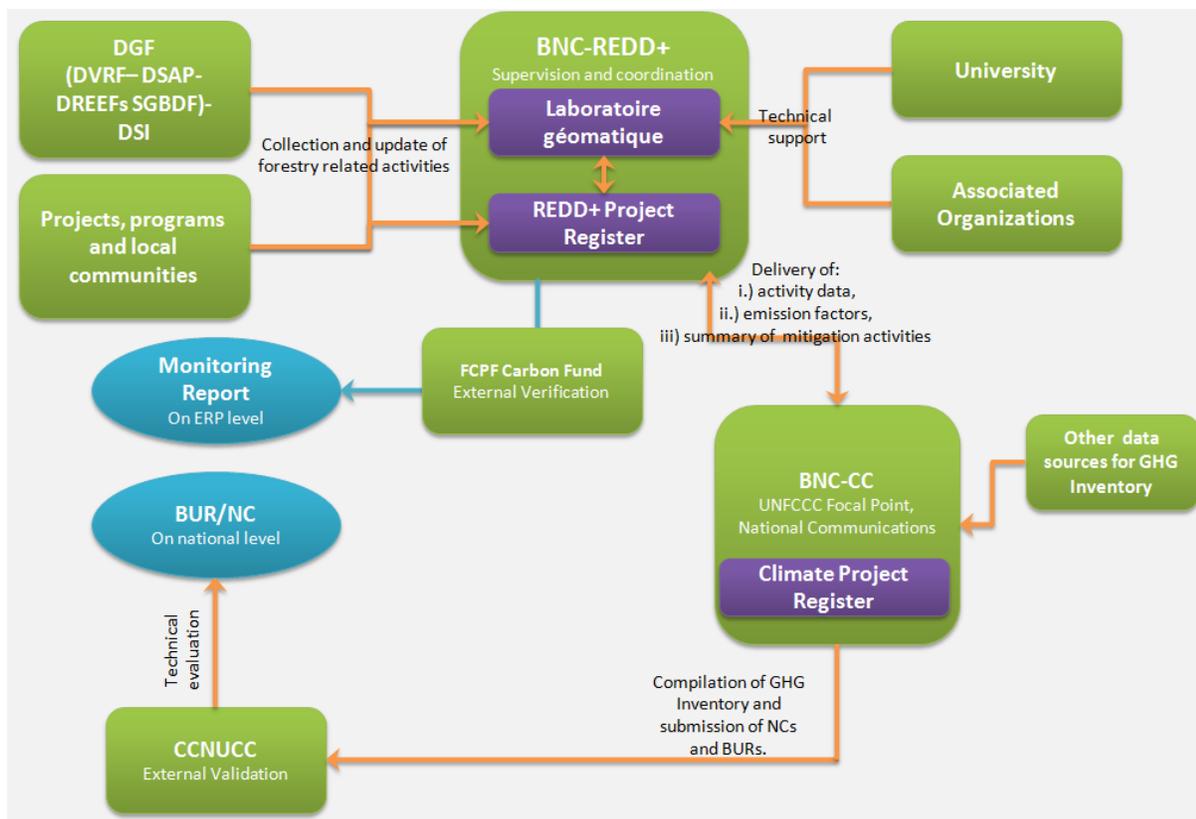
Figure 34: Organizational Structure for the Reporting of Emissions

b. *Methods and standards for generating, storing, aggregating and reporting data*

The monitoring data will be generated following the procedures specified in Section 9.1 and will correspond with ER Program approaches in terms of forest definition, definition of forest types, choice of activity, pre-processing and processing methods, emission factors, uncertainties of change categories and overall uncertainties etc.

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The data will be stored and published in a geoportal which forms an inherent element of the NFMS. The inventory portal will be developed by the World Resource Institute in cooperation with the MEEF, spearheaded by the "laboratoire de geomatique". This approach will ensure that the data is well stored while being publicly accessible.

c. *Integration of the MMR system into existing systems*

It is important to note, that up to date, Madagascar does not yet have a fully operational forest monitoring system, in which the ER Program's Measurement, Monitoring and Reporting efforts could be integrated. However, there are the following osculation points:

- In terms of emission factor related data, the ER Program's monitoring system is based on the existing forest inventory system comprising the national forest inventory, PERR-FH data as well as the new inventory data generated in 2016 aiming to better understand degradation and non-forest biomass.
- Moreover, the MMR will feed into the web-based geoportal, which will also feature data originating from Global Forest Watch (GFW). However, it is important to note that GFW data will not be used for the monitoring of emissions but merely for providing near real time information. This will allow to assess the performance of REDD+ activities in between of monitoring events and equally important will quickly inform on possible large loss events, which then will be validated by the ER Program on the ground.

The Measurement, Monitoring and Reporting system of the ER Program will be integrated into the national reporting system to UNFCCC. BNC CC acts as national focal point for UNFCCC and prepares National Communications, Biennale Update Reports as well as the underlying GHG inventory. To that end, BNC REDD will inform BNC CC on the following issues

- Provision of new, updated activity data;
- Information on amendments of emission factors / new underlying data;
- Summary of REDD+ measures and related forest policies, underlying efforts, results and obstacles.

This information will enable BNC REDD to integrate the data from the forestry sub-sector into the LLULUCF sector ensuring a high data quality for informing UNFCCC.

9.2. RELATION AND CONSISTENCY WITH THE NATIONAL FOREST MONITORING SYSTEM

The National Forest Monitoring System is currently being developed by key agencies of the government of Madagascar, led by MEEF. This allowed conceiving the MMR of the ER Program as inherent element of the National Forest Monitoring System which is described above. Please refer to Section 9.2.

10. DISPLACEMENT

This Section discusses the associated risk of displacement for each driver of deforestation identified in section 4.1. The analysis offers a "high/medium/low" risk significance categorization for each driver, which is linked to the emission level impact estimated to be due to the identified displacement risk. In parallel, the analysis offers also an analysis of the geographical extent of the displacement: not identified because far from ER-P activities implementation, or close from the ER-P activities implementation and thus identified. The fact that Madagascar is an island explains why international displacement is excluded from the analysis, first because the risks are easily estimated to be insignificant, and then because when they do exist their clear identification and description are very difficult to realize.

In the context of Madagascar, the main risks of displacement of emission related to development planned within the project area are low. The program is more likely to attract migrants into the area, which increases the risk of reversals or increased GHG emissions, but reduces the risk of movements of populations towards other provinces. The history of development projects in Madagascar has demonstrated that when projects begin to generate benefits, an immigration phenomenon is often observed in the project area. This phenomenon is related to poverty - which forces households to abandon their lands and seek opportunities where they exist. In this context, Madagascar's proposal is designed to promote opportunities within the area of application and thus does not seem to pose a significant displacement problem out of the ER-P.

10.1. IDENTIFICATION OF RISK OF DISPLACEMENT

As explained in section 4.1, the diversity of drivers is quite important in Madagascar but some drivers appear to be responsible for the majority of deforestation:

▪ Agricultural expansion: annual crops and shifting cultivation, tavy, is undoubtedly the main driver of deforestation in the ER-P area, while permanent crops have a double role because they may be initially responsible for deforestation for the first implementation but they can also ensure carbon stock enhancement when taking place on fallow land or post-tavy secondary forest. Then fires related to livestock breeding and the regeneration of pasture areas are often causing deforestation by burning secondary formations and degraded edges of forests.

▪ Wood Harvesting:

  - Although there is undeniable overexploitation of certain wood species (rosewood, palisander, etc.), as well as large losses during processing (40 to 80 percent of the harvested wood is lost), it is also important to note that the exploitation of timber a posteriori promotes the movement of villagers into the massifs using access roads built during the exploitation, which can trigger deforestation and the subsequent degradation if these populations want to practice agriculture or livestock in these new accessible areas.
  - While fuel wood harvesting does not appear to have a significant impact on carbon stocks, charcoal production for domestic and local use can contribute to deforestation.

▪ Mining, which during the reference period could be negligible in terms of deforestation area compared with other direct drivers, is a growing activity and directly threatens the integrity of intact forests, including within the protected areas.

A reminder of the activities of the program is presented into the following table:

Table 69 – list of activities of the ER-P

Category of activity	With direct impacts	With indirect impacts
Agricultural sector	AD 1 - Optimize production systems and agricultural and livestock-dedicated infrastructures AD 2 - Improve the management of cash crop production under the agroforestry system and improve the food security of local communities' riparian to forests	AI 1 - Support the development and setting up of small and medium-sized enterprises and/or rural cooperatives and promote the creation of REDD+ mechanism-related subsectors at the local level
Forest sector	FD 1 - Improve the management of forest areas under the landscape approach FD 2 - Promote private and community reforestation, rehabilitate degraded forest	FI 1 - Reinforce the forest surveillance and monitoring system and regulatory text enforcement, including fire management FI 2 - Improve the contribution of the forest sector to economic development by

	areas, and reforest in consideration of local needs, without converting natural forests	promoting the use of non-wood products and other subsectors that do not affect the carbon stock
Energy sector	ED 1 - Promote improved fuel wood transformation and use techniques, as well as the dissemination of improved coal stoves in urban centers ED 2 - Develop the use of renewable energy (solar, biogas, etc.) for domestic use	EI 1 - Support the harmonization and development of the legal framework relating to the development of alternatives to fuel wood and sustainable fuel wood supply
Crosscutting and other sectors	ID 1 - Enhance the benefits delivered by the conservation of biodiversity and ecosystem services	II 1 - Reinforce land security, including with reforestation actors II 2 - Improve the coordination and monitoring of mining and agricultural developments and ensure the setting up of compensatory reforestation II 3 - Reinforce decentralized management and coordination of REDD+ mechanism-related interventions at local level II 4 - Align the legal framework with the institutional one conducive to the good governance of the REDD+ mechanism

d. *Displacement of deforestation due to Agricultural Expansion*

Driver & Agent	Significance of the driver (see section 4.1)	Risk of displacement and related activities of the program	Significance of the risk	Mitigation measures
Annual crops and shifting cultivation / Small farmers and local populations for subsistence agriculture - Emigrant population	High: Tavy system is undoubtedly the main driver of deforestation everywhere on the ER-P area, and is used mainly for annual crops	**Activity shifting**: Displacement of shifting cultivation would require the local population to re-locate their agricultural activities outside the program, but this phenomenon is quite unlikely. Some immigrant populations may decide to relocate within the ER-P in order to access natural resources, and practice shifting agriculture. Activities FD1; FD2 and FI1 could force local population to relocate to other areas within the ER-P or outside the ER-P, but more likely to areas in close proximity within the same watershed or in an adjacent watershed. In view of this and considering the ER program low perimeter/area ratio (and that a large fraction of the perimeter leads to non-forested coastal areas or the dry forest ecoregion), any emissions due to displacement of shifting cultivation and annual crops wouldn't be high, though not negligible. **Market Effect**: most of the agriculture within the ER program area is small scale and primarily subsistence driven. Some produce may be sold but this is primarily to serve local markets as the accessibility to large cities such as Antananarivo is limited by lack of accessible transport infrastructure. Hence no market leakage is likely to occur.	Medium	The ER-P is designed in a way that all activities implemented will be discussed and planned at commune and landscape scale with the participation of all stakeholders. Only large-scale avtivities could incur a risk of displacement. The ER-P will set up procedures to ensure that design phase consultations of concerned communes will be undertaken and a displacement analysis and mitigation strategy will be developed. In addition, the ER Program incorporates a set of activities aimed at increasing agricultural productivity (AD1), diversifying incomes from natural resources (AD2) and strengthening agricultural value chains with the objective of increasing revenue of agricultural activities (i.e. without increasing production areas) (AI1). These activities will increase efficiency in the use of existing agricultural land, avoiding the need to migrate due to mitigation activities within the forestry sector (FD1, FD2, FI1).

Agent	Significance of the driver (see section 4.1)	Risk of displacement and related activities of the program	Significance of the risk	Mitigation measures
Permanent crops / Small farmers- Emigrant population	Medium because initially permanent crops are responsible for deforestation when traditionally implemented but they can also ensure carbon stock enhancement when implemented on fallow land or post-tavy secondary forest	**Activity shifting:** most permanent crops in the ER-P can be produced through agroforestry systems and thus it is very unlikely that some activities of the program could encourage or force local farmers to relocate their production, even more when activity AD2 aims at improving agroforestry systems and ensuring their sustainability. However, activity FD1 and FI1, by improving forest management and reinforcing controls, might to some extent, force local populations without legal land specifically dedicated to permanent crops, to implement their production sites on existing forest lands, thus increasing deforestation - or affecting natural forests by implementing agroforestry systems within intact forest.	Medium	The displacement risk related to emigration will be monitored during each project design phase (and thus included in the Regional REDD+ Activity Plan) and a specific strategy will be designed to anticipate potential negative impacts.
		Market Effect: The program will improve permanent crop production first by improving traditional practices to ensure sustainability, and also by increasing agroforestry areas on fallow lands (and ensuring carbon stock enhancement) when they have a high risk of being burnt through tavy. No market leakage risks can be thus identified in the program because the ER-P aims at improving productivity by encouraging sustainability.		

Driver & Agent	Significance of the driver (see section 4.1)	Risk of displacement and related activities of the program		Significance of the risk
Fire due to pastoralism and small farmers with beef cattle	Medium	**Activity shifting**: If improved forest management or new reforestation (activities FD1 and FD2) could constrain the access to land, thus causing activity shifting, it is considered as highly unlikely that local farmers would relocate outside the ER program area because (i) mobility of farmers with beef cattle is very limited, and (ii) activity AD1 aims to improve cattle breeding practices. No risk identified.		No risks

| | | **Market Effect:** ER-P activities dedicated to cattle breeding and fire management practices will not affect the overall level of productivity, and thus risk of market leakage is negligible. | | |

e. *Displacement of deforestation due to wood harvesting*

Driver / Agent	Significance of the driver (see section 4.1)	Risk of displacement and related activities of the program	Significance of the risk	Mitigation measures
Construction, softwood and service timber harvesting / Artisanal loggers without authorization from forest administration	Low, because illegal and artisanal logging is only focused on a limited number of species	**Activity shifting:** Artisanal logging is not linked to land property; loggers may move to other regions when affected by the program activities aimed at reducing artisanal and illegal logging. Thus, a risk of displacement of artisanal and illegal logging in some areas within the ER-P exists where you can find equivalent high-value wood species (rosewood, palisander). However, due to geographical and topographic constraints but also to a further distance from the coast (where all illegal timber is exported), it seems minimally feasible for artisanal loggers to move in the humid forest located on the west side of the ER-P (Bealanana) for wood exploitation. **Market Effect**: The ER-P should reduce its timber supply through a limitation of illegal and artisanal logging. Thus, the supply gap may be closed by other agents in other areas of the humid forest ecoregion.	Medium	The ER Program will not try to reduce artisanal logging but will only ensure that logging is realized legally. Specifically, the ER Program pursues the following strategy: - Activity FD1 will improve forest management by developing local landscape plans, in which some areas will be dedicated to logging and ensure sustainable artisanal logging operations. - Activity FD2 will mitigate the risk of displacement in the mid-term by the creation of dedicated afforestation activities according to local needs, including for timber supply. - Activity FI2 will support the development of partnerships between local communities and artisanal loggers in order to determine the demand in timber wood and then support the creation of sustainable artisanal logging operations for its supply.

Driver & agent	Significance of the driver (see section 4.1)	Risk of displacement and related activities of the program	Significance of the risk	
Wood fuel / charcoal production due to local population needs	Medium Although the consumed charcoal mainly comes from eucalyptus plantations, in some part of the ER-P area, charcoal has a more important local impact, in particular due to the increase in the demand from certain urban areas (ex. Fénérive Est)	**Activity shifting**: Charcoal is mainly produced from eucalyptus plantations but also in lower extent from natural forest, mostly as a byproduct of shifting cultivation. The wood which is cut for future agricultural land is also used for charcoal production. The ER-P programs aims at improving carbonization practices of charcoal made from specific plantations in order to improve energy efficiency; activity FD2 will promote plantations dedicated to charcoal supply. However, there is a risk that activities FI1 could drive illegal producers to relocate in other areas. But considering that the urban areas responsible for a high demand in charcoal are coastal, and considering also the topography of the ER-P area, there is no risk that producers would relocate outside of the ER-P to produce charcoal.	Low- risk	The ER Program will promote alternative, sustainable, energy sources and increased efficiency of fuel wood production through: - ED 1 - Promote improved fuel wood transformation - and use techniques, as well as the dissemination of improved coal stoves in urban centers; and - ED 2 - Develop the use of renewable energy (solar, biogas, etc.) for domestic use. The ER-P will also work on the enabling framework through: - EI 1 - Support the harmonization and development of the legal framework relating to the development of alternatives to fuel wood and sustainable fuel wood supply
		Market Effect: The ER Program does not aim to reduce the existing charcoal supply but to moderate the production to the current and near-future demand (potentially increase the production through specific plantations) and improved carbonization practices and so improve energy efficiency. By doing so the ER-P should be able to ensure the needs from urban areas within the program, thus reducing the risk of market leakage.		

f.   *Displacement of deforestation due to mining*

Agents	Significance of the driver (see section 4.1)	Risk of displacement and related activities of the program	Significance of the risk
Miners	Low	**Activity shifting and market effect**: Mining activities are geographically dependenton available resources, and the ER-P does not aim at stopping mining activities but only improve their practices and implement compensatory reforestation when necessary. There is no risk of shifting.	No risks

10.2. ER PROGRAM DESIGN FEATURES TO PREVENT AND MINIMIZE POTENTIAL

Mitigation measures for displacement risk are described in the table in the previous section.
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11. REVERSALS

11.1. IDENTIFICATION OF RISK OF REVERSALS

The assessment of natural and anthropogenic risks of reversals was conducted following the FCPF Buffer Guidelines and the four main risk factors described:

- Lack of broad and sustained stakeholder support
- Lack of institutional capacities and/or ineffective vertical/cross sectorial coordination
- Lack of long term effectiveness in addressing underlying drivers
- Exposure and vulnerability to natural disturbances

More generally, the focus on watersheds is designed to be inclusive of populations in contiguous communities thus limiting the most immediate risk of incursions from neighboring populations. These natural geographic/geologic target groups (watersheds) provide a degree of natural impediment to large-scale population influxes, and also enable program design that is tailored to each program area, with the identified activities.

Risk Factor	Risk indicators	Default Reversal Risk Set- Aside Percentage	Discount	Resulting reversal risk set-aside percentage
Lack of broad and sustained stakeholder support	As explained in section 5.1, consultations in the jurisdiction have been intensive and realized in each region of the program through the five Regional REDD+ Platforms that participated in the general design of the program, including its strategy, institutional arrangements, eligible and planned activities, FGRM and safeguards mechanism, and most recently, activity selection and prioritization by commune. In addition, specific consultations were carried out at the commune level during the different studies performed (see section 5). When looking at the number of stakeholders by taking into account the different REDD+ platforms, technical groups, and thematic workshops, over 500 persons have been deeply involved into the design of the general strategy of the program to reduce deforestation, and all communes of the program have been consulted at least once. Also, in some area of the ER-P (Makira and CAZ), stakeholders already have a positive experience with REDD+ and their related supporting mechanisms such as benefit sharing, FGRM and safeguards mechanisms, and thus the ER-P was developed based on these positive experiences.	10%	Low risk: 10%	0%

Risk Factor	Risk indicators	Default Reversal Risk Set- Aside Percentage	Discount	Resulting reversal risk set-aside percentage
Lack of institutional capacities and/or ineffective vertical/cross sectorial coordination	**Are there key institutions with experiences in implementing REDD+ project / programs?** The preparation of REDD+ at national level as well as the development of the ER-P has initiated the development of strong capacities to coordinate REDD+ activities. The creation, involvement and work performed by BNC REDD+, PFN REDD+ and the PFR REDD+ illustrate the progress made in this process (most of the elements of the program described in this document have been discussed and designed with stakeholders through the platforms and with a strong support of BNC REDD+). However, these capacities mostly lie on the design phase of the REDD+ mechanism and of the program, but not on the real implementation of them. Currently there's a lack of institutional capacities at central and regional level to ensure that activities and project could be implemented, coordinated, and efficient. <u>Mitigation measures</u>: This is an issue on which BNC REDD+ will focus during the next months, and some capacity building activities have already begun, using the additional funds of FCPF received in 2016 (i.e. structuration of RRC's in regions and capacity building for their coordination role). It is likely that additional capacities will have to be developed or reinforced, especially within other ministries at central level, but also at sub regional level (even if an important part of capacity building will be ensured continuously with the strong support by TSS of communes, SLC, and PI (see section 6.1 and 15). The MEEF and BNC REDD+ are also planning to develop partnerships with other ministries in order to (i) increase their knowledge and capacities related to REDD+ (BNC REDD+ will be in charge of that), and (ii) elaborate an action plan for their involvement and role into the ER-P implementation when necessary, (iii) and identify potential external financial or technical support to ensure this role. For example, BNC REDD+ is currently working with	10%	High risk: 0%	10%

USAID and USFS in order to leverage support from them concerning the needs of capacity building for the implementation of the NFMS and FMS.

Is there a lack of cross sectoral coordination necessary for REDD+ efficiency?

The creation of the PFN and PFR REDD+ illustrates that a strong effort had been provided to ensure cross sectoral coordination during the development of the ER-P. The planned institutional arrangements (described in section 6.1) for the program are also reflecting that a strong cross sectoral coordination is vital for its functioning.

But currently the activities planned and described in section 4.3 are mainly coming from considerations and needs expressed by stakeholders at central, regional and local level, but they do not reflect a real commitment of concerned sectoral ministries to be responsible, even partially, for their implementation (see introduction of section 4.3).

Mitigation measures: While these different ministries are represented in the REDD+ platforms, there is a need to go further in developing real partnerships with MEEF and to agree on specific action plans or procedures to ensure that activities of the program will be implemented in coherence and complementarity with activities of each relevant ministry.

Risk Factor (FCPF)	Risk indicators	Default Reversal Risk Set- Aside Percentage	Discount	Resulting reversal risk set-aside percentage
Lack of long term effectiveness in addressing underlying drivers	**Is the program able to link REDD+ to economic activities and development?** **1/** In the context of Madagascar, the main risks of ineffectiveness within the area of the project are associated with the practice of slash and burn agriculture ("Tavy") and uncontrolled extraction of wood energy. Both practices are largely associated with poverty of rural households in Madagascar, a situation exacerbated during periods where households are facing food emergencies. These risks are of anthropogenic origin. Mitigation measures: The activities of the program are designed particularly to address these practices. To do so, activities AD1, AD2 and AI1 are dedicated to the improvement of agricultural practices and access to market in order to increase productivity and at the same time increase revenues of local populations, allowing them to progressively reduce their dependency on subsistence agriculture. **2/** The commodities driving deforestation are products from permanent crops: vanilla, cloves, and coffee, high value products that are generating higher incomes to households and have a positive impact on the local economy. During the reference period, these commodities had a two-faceted impact on deforestation: on one hand, it can incentivize local populations to cut forest parcels in order to implement production; on the other hand, such production is also implemented on fallow land or secondary forest, allowing their maturation and increasing carbon stocks on land with relatively low carbon content. Mitigation measure: The program will implement measures to reduce the risk that such commodities trigger deforestation and are systematically produced under agroforestry systems, thus participating in carbon stock enhancement when settled on fallow land or secondary forest. Most of the protected areas are already fostering such practices within their surrounding agriculture belt, with positive experiences and feedbacks, and the PADAP will also implement agroforestry in 3 watersheds of the program. Activity AD2 of the ER-P	5%	High Risk: 0%	5%

is dedicated to agroforestry, and more globally, the program will try to increase sustainable production of commodities within the jurisdiction

3/ An additional risk, identified through experience, is that success in the project/program areas, if associated with important positive economic impact, can lead to influx of people that are not part of the target population thus leading to unsustainable practices in the end. This context is particularly witnessed in projects/programs of relatively short lifespan.
<u>Mitigation measures:</u> The ER Program design focuses on the development of activities that can be inclusive of incoming populations through identification and promotion of "no-land" activities, income-generating activities that are not dependent on land ownership, and will limit anarchic land grabs that may be associated with these practices. "No-land" activities are designed to strengthen the value chains that will reduce pressures on forest degradation directly and also indirectly through decreasing the demand for extensive land practices.

Is relevant legal and regulatory environment conducive to REDD+ objectives?

The government of Madagascar has taken several legal and regulatory steps to integrate REDD+ into the legal framework for environment and climate change mitigation in the country. Several legal steps, described in section 4.5, have recently clarified key legal and institutional elements of REDD+ and have created a sufficient basis on which to plan implementation. In addition, Madagascar's previous experience with project-level carbon finance has provided legal precedence and procedures which have informed, and in some cases provided the foundation for, structures currently in design or finalized for the ER-P.

Risk Factor (FCPF)	Risk indicators	Default Reversal Risk Set- Aside Percentage	Discount	Resulting reversal risk set-aside percentage
Exposure and vulnerability to natural disturbances	***Risks due to natural forest fire.*** The project area is a humid rainforest habitat. Natural fires in Madagascar are mostly limited to savannah habitats. There is no reference or available information of natural fire resulting in large-scale deforestation in the humid forest of Madagascar. All fires are, according to literature, due to human activities in this part of the country. Cyclone damage can enable fire propagation but the origins of fires are largely anthropogenic. ***Risks due to pests and disease*** No major pest or disease outbreaks leading to die-off of forest have been recorded in rainforests in Madagascar. Large-scale tree pest and disease outbreaks are extremely rare in tropical natural forests due to the high diversity of tree species and low densities that are typical (Nair, 2007). ***Risks of extreme climate events that could contribute to deforestation.*** The only extreme climate events recorded on the east coast of Madagascar are cyclones. Since the beginning of the twenty-first century, four major cyclones reached the eastern coast of Madagascar and the area of the ER-P causing important damages to local population. However, very little information is available on the actual impact of cyclones on the eastern ecosystems. The majority of cyclones lose their destructive power by the time they get as far inland as the CAZ project area for example (World Bank, 2008). Even if they are powerful, the area of damage to forest is relatively limited. Native forest also recovers well following cyclone damage in the absence of anthropogenic threats, as cyclones are a natural phenomenon of the ecology of these forests (Birkinshaw, 2007).	5%	Medium risk: 2%	3%

Even in an extremely powerful cyclone, less than 10% of carbon stocks of the ER-P are likely to be lost and the loss will be transient with good recovery. For example, cyclone Hudah, one of the most powerful cyclones to damage forests in Madagascar in the last 15 years, was estimated to have damaged 3.2% of the 143,236 hectares of forests of the Masoala peninsula (Birkinshaw, 2007). However, Masoala is a coastal area and therefore cyclone impact at CAZ would be expected to be much less since the cyclone's power reduces over land (Birkinshaw, 2007; World Bank, 2008).

The program's overall risk rating based on the findings of previous sub-sections is showed in the table below.

Table 70 – Resulting non-permanence risk factors

Risks factors	%
Default risk	10
Lack of broad and sustained stakeholder support	0
Lack of institutional capacities and/or ineffective vertical/cross sectorial coordination	10
Lack of long term effectiveness in addressing underlying drivers	5
Exposure and vulnerability to natural disturbances	3
Overall risk rating	28

To help manage these risks, the ER Program will establish two separate buffer reserve accounts:

- a Pooled Reversal Buffer to insure against potential large-scale Reversals which exceed the amount of Buffer ERs set aside in the Reversal Buffer. The default risk (10%) will be set-aside in this buffer; and
- a Reversal Buffer to insure against potential Reversals, the 18% rest will be set-aside in this buffer.

Each buffer will have separate accounts in the ER Transaction Registry (see section 18) for the exclusive purpose of receiving, disbursing, or canceling Buffer ERs that will be allocated as described before. The Reversal Buffer and the Pooled Reversal Buffer accounts will exist separately from any reversal risk management accounts established under the ER Program to manage reversal risks for ERs that are not subject to the ERPA and which, therefore, will not be transferred to the CF.

11.2. ER PROGRAM DESIGN FEATURES TO PREVENT AND MITIGATE REVERSALS

Measures to mitigate reversals risks are already described in the table of section 11.1

11.3. REVERSAL MANAGEMENT MECHANISM

Selection of reversal management mechanism:

Table 71 – Reversal management mechanism option selected

Reversal management mechanism	Yes/no
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

Reversal management mechanism	Yes/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

11.4. MONITORING AND REPORTING OF MAJOR EMISSIONS THAT COULD LEAD TO REVERSALS OF ERS

The ER program's monitoring approach will account for deforestation and degradation. As described in section 9.2.C, the FMS will allow covering any medium and large-scale reversal due to any natural or anthropogenic hazards and extreme events. Especially, the ER program monitoring system is based on the NFMS which will include early warning systems, allowing to pre-identify potential reversals.

12. UNCERTAINTIES OF THE CALCULATION OF EMISSION REDUCTIONS

This section summarizes the approach to identify, assess, minimize and quantify uncertainty following the 2006 IPCC Guidelines for National Greenhouse Gas Inventories (Chapter 3).

The methodology used to estimate average annual GHG emissions in the reference period is based on the provisions of the 2006 IPCC guidelines for national GHG inventories, which is equivalent to the Activity Data x Emission Factor (AD x EF) method indicated in Chapter 3.2.3 of the Global Forest Observation Initiative Methodological Guidance Document version 2 (GFOI MGD 2)[88] as shown in section 8.

Following the identification of uncertainties and an assessment of their relevance and contribution to the overall uncertainty, uncertainties are quantified and then aggregated to a single uncertainty estimate for the RL using numerical simulation (Monte Carlo method).

12.1. IDENTIFICATION AND ASSESSMENT OF SOURCES OF UNCERTAINTY

According to Chapter 3, Volume 1 of the 2006 IPCC GL, there are eight broad classes of uncertainty: lack of completeness, Model uncertainty, Lack of data, Lack of representativeness of the data, statistical random sampling error, measurement error, misreporting or misclassification and missing data.

The identified sources applicable to this case are the following:

Sources of uncertainty and their contribution to overall uncertainty		High / Low
Activity Data		
Measurement error	The measurement error could be a systematic and random error and is caused by the following: 1. Quality and suitability of the satellite data (spatial, spectral, and temporal resolution, and geo-location). This is usually a source of systematic errors. As indicated in section 8.3, all available imagery in the reference period is used in order to have a high confidence in the classification. The geolocation error of all these sources is less than one Pixel. 2. Cartographic and thematic standards (i.e. land category definitions and MMU): As indicated in Section 8.3 there are labelling protocols that allow to reduce the systematic errors to the minimum. 3. Interpretation procedure (i.e. classification algorithm or visual interpretation). This is the largest source of error (systematic error). The existence of SOPs and QC/QA procedures (such as indicating the quality in the classification) allow to reduce this to the minimum.	L

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[88] GFOI (2016). Integrating remote-sensing and ground-based observations for estimation of emissions and removals of greenhouse gases in forests: Methods and Guidance from the Global Forest Observations Initiative – Version 2. Chapter .2.3

Sources of uncertainty and their contribution to overall uncertainty		High / Low
	4. Post-processing: There is no post-processing apart of the filtering (remove low confidence classification) and the calculations. Hence, it is considered that this source is negligible.	
Representativeness	The sampling is spatially balanced (stratification) and random so the sample is representative of the whole population. Hence, it is considered that this source is negligible.	L
Sampling error	This would be the main source of uncertainty. Hence, it is assumed this is the only source of uncertainty.	H
Emission factor		
DBH measurement error	Systematic errors are assumed to be negligible since the inventory was carried out by experienced inventory teams with a set of standard operating procedures (SOPs) in place. Random errors may still occur but at large sample size tend to cancel each other out. Picard et al. (2015) assumed the random error of DBH measurements to contribute 2% to the uncertainty of emission factors. This error is considered in the quantification.	H
H measurement error	Random errors related to height measurements are likely to be higher, in particular in dense tropical forests where it is difficult to see the tree top, in particular from a sufficiently long distance (equal or bigger than the tree height). Chave et al. (2004) measured the height of approx. 1,000 trees and found the measured value to be within +/- 10% of the actual value. This error is considered in the quantification.	H
Plot delineation	Random errors related to setting up the plot boundary and using the relascope may also occur. Specifically, in case of the latter, it can be difficult to determine whether so-called 'threshold' trees are inside or outside the plot radius. Here, both the 2014 and 2016 forest inventories relied on a method that is widely used in commercial timber cruising, which attributes these so-called threshold trees a value of 0.5. Given the large sample size it is likely that inclusion and exclusion errors cancel each other out over the entire inventory dataset. Hence, it is considered that this source is negligible.	L
Wood density measurement error	The basic wood density or Wood Specific Gravity (WGS) cannot be easily measured during forest inventories, and it is usually sourced from peer-reviewed publications and global databases. Chave et al. (2004) assumed that the error of this predictor was +/- 10% of the actual values. WSG values used in the RL have been sourced from different publications. Research in Madagascar by Ramananantoandro et al. (2015) has shown that WSG values from literature overestimate measured WSG by 16% on average. However, effects on biomass estimates were found to be not significant at the 95% confidence level. This error is considered in the quantification.	H

Sources of uncertainty and their contribution to overall uncertainty		High / Low
Root-to-shoot ratio measurement	This error is considered in the quantification as it is high.	H
Biomass allometric equation (Model error)	The allometric model error can be divided in the following sources. a. the error due to the uncertainty of the model's coefficients; b. the error linked to the residual model error; c. the selection of the allometric model. According to Picard et al. (2015) [89] the largest uncertainty is due to the selection of the allometric model which may be 77% of the mean biomass estimate. Van Breugel et al. (2011) [90] estimated that the errors linked to the allometric equation could vary from 5 and 35% depending on the model selected. The third error is assumed to be negligible for the woody biomass species as these equations are calibrated with trees measured within the same ecoregion or even the ER program area. The other two errors are usually negligible but they will be considered in the quantification.	H
Height-DBH equation (Model error)	This is a locally calibrated model. Only the residual model error will be considered as this linked to the measurement uncertainty.	H
Sampling error	This error is one of the main sources of errors. This will be considered in the quantification of uncertainty.	H
Representativeness error	The lack of representativeness usually causes bias, i.e. if the sample is not representative of the population. In the current case, the source of this error is the following: • Root to shoot ratio: This is sourced from the IPCC and might not be representative. This source is not considered as bias, but a random error of the root-shoot ratio is considered. • Representativeness of the samples: In the case of MNF this could be a source of uncertainty as the estimate is based on samples from different forest types. However, the MNF biomass stocks estimate is conservative (samples in degraded forest or single layer were not considered) in terms of reducing emissions and ERs, so it is assumed that this source of error is negligible.	H
Calculations		

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[89] Picard et al. (2015) Error in the estimation of emission factors for forest degradation in central Africa. J For Res DOI 10.1007/s10310-015-0510-5

[90] Van Breugel et al. (2011) Estimating carbon stock in secondary forests: Decisions and uncertainties associated with allometric biomass models. Forest Ecology and Management 262 (2011) 1648–1657

Sources of uncertainty and their contribution to overall uncertainty		High / Low
Model error	Although the simple multiplication of AD and EF does not contain any error, there are some assumptions such as assuming that after deforestation there is an instantaneous transfer of AGB and BGB to the atmosphere or that the biomass in non-forest grows immediately after conversion. The former assumption is based on best practices, while the latter is conservative in terms of GHG emissions and emission reductions. Another potential source is that it is assumed that the carbon stocks of deforested forests is equal to the average of all forests, whether they are primary or not. This last assumption is partially corrected in the RL by separating the stratum of primary forest and the stratum of modified natural forest (with higher deforestation and lower biomass stocks). Another error might be the ages assumed in order to estimate the transition from non-forest to modified natural forest. This error has been taken into consideration.	H

All high errors are assumed to have a large contribution and have been quantified below.

12.2. QUANTIFICATION OF UNCERTAINTY IN REFERENCE LEVEL SETTING

a. *Uncertainty of Activity Data*

Details of the estimation of the uncertainty of activity data is provided in Section 8.3. The uncertainty of activity data is shown in the following table.

Table 72 – Uncertainty of estimates of activity data per class

Activity	Type	90% confidence – Relative margin of error	90% Confidence interval
Deforestation	Primary forest	43%	22043 - 54701
	Disturbed forest	24%	98002 - 159527
	Secondary forest		0 - 0
	Agroforestry		0 - 0
	Plantations		0 - 0
Enhancement	Secondary forest	84%	1999 - 23402
	Agroforestry		0 - 0
	Plantations		0 - 0
Degradation	PF to Disturbed forest	18%	232725 - 332626
	PF to Agroforestry		0 - 0
	PF to Plantations		0 - 0
	DF to Agroforestry		0 - 0
	DF to Plantations		0 - 0

A Monte Carlo simulation cannot be used in order to estimate uncertainty of activity data, even though this is large according to the IPCC.

b. *Uncertainty of Emission Factors*

In order to fulfill the requirement of the MF with regard to estimating the uncertainty of emissions reductions, since the uncertainty of emission factors are generally high, the ER-Program also uses numerical simulation (Monte Carlo) to estimate the uncertainty of the EFs.

The application of the Monte Carlo simulation follows the guidance provided in the 2006 IPCC guidelines. The summary of the different steps is provided:

a. Draw 1000 realizations of the different measured independent variables (i.e. DBH, H, and WSG) assuming a symmetrical normal distribution. It is assumed that the DBH measurement has an error of 2%, the H has an error of 5% and the WSG has an error of 10%.

b. Draw 1000 realization of the vector of the parameters of the Vieilledent allometric model assuming a multi-normal distribution of the parameters. This was not done for the other allometric equations due to the lack of data to estimate the covariance matrices.

c. Draw 1000 realization of the random error of the H-DBH equation assuming a normal distribution with value 0 and standard deviation the standard error of the equation. This was not done for the H-DBH functions of the 2016 inventory.

d. Estimate the resulting estimate and standard error and draw a realization from a normal distribution with that estimate and standard error. Do this with each of the 1000 realizations.

e. Using the 10,000 combined realizations, the 90% percentile (p_{95}) and 10% percentile (p_5) will be estimated using the following equation: $U_{Lower} = \frac{p_5 - \bar{x}}{\bar{x}} 100 \; ; U_{Upper} = \frac{p_{95} - \bar{x}}{\bar{x}} 100$.

The uncertainty estimate of the **aboveground biomass stocks** are provided in the following table:

Table 73 – Uncertainty of aboveground biomass according to MC simulations considering all sources of error (measurement error, allometric equations, height-DBH equations and sampling error)

Forest type	Median (tdm/ha)	LC Sup.	IC inf.	HWCI 90%
Primary forest	266.2	281.6	253.5	5%
Disturbed forest	234.0	248.1	222.9	5%
Secondary forest	87.5	96.9	79.7	10%
Agroforestry	92.0	109.2	77.9	17%
Non forest	10.8	16.1	5.7	48%

These values are very close to the sampling errors presented in Chapter 8.3 so it is considered that this is the main source of error. Not considering this source of error would give much lower estimates of error, indicating that these different sources of errors have a low impact in the overall uncertainty:

Table 74 – Uncertainty of aboveground biomass according to MC simulations without considering the sampling error

Classe	Median (tdm/ha)	LC Sup.	IC inf.	HWCI 90%
Primary forest	264.5	272.7	256.8	3%
Disturbed forest	232.4	240.0	225.9	3%

Secondary forest	87.1	88.2	85.9	1%
Agroforestry	91.1	96.7	87.6	5%

Hence, the other sources of errors such as measurement error and modelling error may be neglected.

c. *Uncertainty of the Reference Level*

Tier 1

Uncertainty of the reference level was estimated using the Tier 1 approach provided in the 2006 IPCC GL. Confidence intervals were assumed symmetrical in all cases and normally distributed. 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

The calculations may be found in the spreadsheet with the calculation of the RL. The uncertainty of forest degradation is high due to the low difference between the carbon density values of primary forest and disturbed forest. Activity data is 18% at 90% confidence which is acceptable.

Table 75 Uncertainty calculation results following IPCC Tier 1 method for propagation of uncertainties

ERPA term year t	emissions from deforestation (tCO2/yr)	emissions from degradation (tCO2/yr)	removals from enhancement of carbon stocks (tCO2/yr)	Total Reference Level (tCO2/yr)
2S 2019	25%	52%	94%	23%
2020	25%	52%	94%	23%
2021	25%	52%	94%	23%
2022	25%	52%	94%	23%
2023	25%	52%	94%	23%
2024	25%	52%	94%	23%

Tier 2

Following the requirements of the MF, a Monte Carlo simulation was done in this case. Below the table with all parameters considered and with the assumed probability distribution functions.

Source ou puit	Parameter	Unit	Estimate	SE	Lower	Upper	Probability distribution function
Deforestation - primary forest	Annual deforestation	ha/year	3,837.18	992.32			Normal, above zero
Deforestation - disturbed forest	Annual deforestation	ha/year	12,876.47	1,869.43			Normal, above zero
Deforestation - secondary forest	Annual deforestation	ha/year	0.00	0.00			Normal, above zero
Deforestation - agroforestry	Annual deforestation	ha/year	0.00	0.00			Normal, above zero
Deforestation - Plantations	Annual deforestation	ha/year	0.00	0.00			Normal, above zero
Forest gain - secondary forest	Annual forest regrowth	ha/year	1,270.04	650.31			Normal, above zero
Forest gain - agroforestry	Annual forest regrowth	ha/year	0.00	0.00			Normal, above zero

Forest gain - Plantations	Annual forest regrowth	ha/year	0.00	0.00			Normal, above zero
Primary forest to disturbed forest	Annual degradation	ha/year	28,267.54	3,035.47			Normal, above zero
Primary forest to agroforestry	Annual degradation	ha/year	0.00	0.00			Normal, above zero
Primary forest to plantation	Annual degradation	ha/year	0.00	0.00			Normal, above zero
Disturbed forest to agroforestry	Annual degradation	ha/year	0.00	0.00			Normal, above zero
Disturbed forest to plantation	Annual degradation	ha/year	0.00	0.00			Normal, above zero
Deforestation - primary forest	AGB primary forest	tdm/ha	265.44	7.48			Normal
Deforestation and degradation - disturbed forest	AGB disturbed forest	tdm/ha	232.15	4.53			Normal
Deforestation and enhancements - secondary forest	AGB secondary forest	tdm/ha	85.66	5.25			Normal
Deforestation, degradation and enhancements - agroforestry	AGB agroforestry	tdm/ha	87.87	7.64			Normal
Deforestation, degradation and enhancements - plantations	AGB plantations	tdm/ha	29.55	6.25			Normal
Non-Forest	AGB non-forest	tdm/ha	11.96	3.28			Normal
Deforestation, degradation and enhancements	RSR >125 tdm/ha	dimensionless	0.24		0.22	0.33	Uniform
Deforestation, degradation and enhancements	RSR <125 tdm/ha	dimensionless	0.20		0.09	0.25	Uniform
Deforestation, degradation and enhancements	RSR Eucalyptus	dimensionless	3.24		2.74	4.26	Uniform
Deforestation	SOCbefore	tC/ha	110.97	6.26			Normal
Deforestation	SOCafter	tC/ha	104.65	6.13			Normal
Deforestation	D	dimensionless	1.00				Normal
Deforestation - primary forest	Dead wood content	tdm/ha	6.07	0.63			Normal

Category	Parameter	Unit	Value	SD	Min	Max	Distribution
Deforestation - disturbed forest	Dead wood content	tdm/ha	5.70	0.42			Normal
Deforestation - secondary forest	Dead wood content	tdm/ha	4.99	2.61			Normal
Deforestation - agroforestry	Dead wood content	tdm/ha	5.12	2.68			Normal
Deforestation - plantations	Dead wood content	tdm/ha	0.00	0.00			Normal
Deforestation - non-forest	Dead wood content	tdm/ha	0.00	0.00			Normal
Deforestation - forest	Litter content	tC/ha	2.10		1.00	3.00	Uniform
Deforestation - non-forest	Litter content	tC/ha	0.00		0.00	0.00	Uniform
Non-CO2 emissions	"Combustion factor - Primary tropical forest		0.50	0.03			Normal
(slash and burn)"	dimensionless	0.50	0.55	0.06			Normal
Non-CO2 emissions	"Secondary tropical forest		6.80	2.00			Normal
(slash and burn)"	dimensionless	0.55	0.20	0.10			Normal, above zero
Non-CO2 emissions	Emission factor CH_4 Tropical forest	g/kg	20.00		12.00	18.00	Uniform
Non-CO2 emissions	Emission factor N_2O Tropical forest	g/kg	20.00		12.00	18.00	Uniform
Forest gain	Age secondary forest	Years	5.00	0.00	3.00	7.00	Uniform
Forest gain	Age agroforestry	Years	10.00	0.00	3.00	7.00	Uniform
Forest gain	Age plantations	Years	0.47		0.44	0.49	Uniform
Forest gain	Age non forest	Years	3.67				
Other data	CF	Fraction carbone, Tropical et soustropical; tous	10.00				
Other data		Facteur de conversion vers CO2	21.00				
Other data	Periode de référence	Ans	298.00				Normal, above zero

Other data	GWP	CH4	3,837.18	992.32	Normal, above zero
Other data	GWP	N20	12,876.47	1,869.43	Normal, above zero
Other data	CF	Fraction carbone, Tropical et soustropical; tous	298.00		Normal, above zero
Other data		Facteur de conversion vers CO2	3,837.18	992.32	Normal, above zero
Other data	Periode de référence	Ans	12,876.47	1,869.43	Normal, above zero
Other data	GWP	CH4	0.00	0.00	Normal, above zero
Other data	GWP	N20	0.00	0.00	Normal, above zero

In this case 10000 realizations of each parameter was made and the model was constructed in order to ensure correlation between parameters (e.g. non-forest value is the same to set the EF for primary forest and MNF forest.

The results are provided in the following table and it results in an uncertainty of 22% at 90% confidence, which is equivalent to an uncertainty discount factor of 4%.

Table 76 – Results of MC simulation for average estimates per year

Parameter	DEF	DEG	GAINS	REL
Mean	9,357,366	2,040,134	102,159	11,317,082
STD	1,392,074	599,447	61,909	1,539,571
Upper bound 90% CI	11,750,974	3,106,490	220,712	13,983,371
Lower bound 90% CI	7,160,583	1,142,103	15,193	8,914,228
HWCI	2,295,196	982,194	102,760	2,534,571
Relative margin	25%	48%	99%	**22%**
Uncertainty discount				**4%**
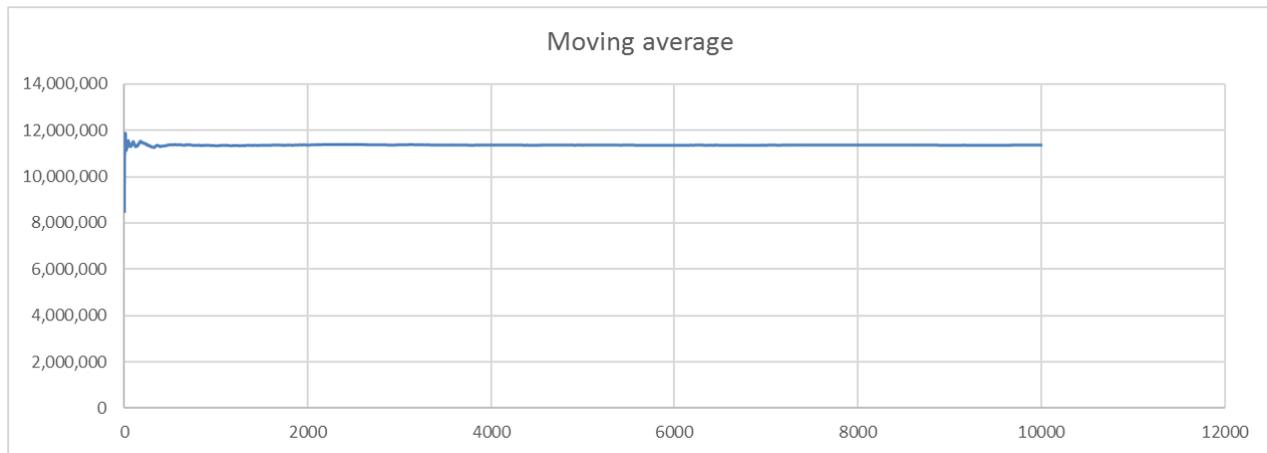
Figure 35. Graph showing the average of iterations. The MC simulations stabilize already at less than 2000 simulations.
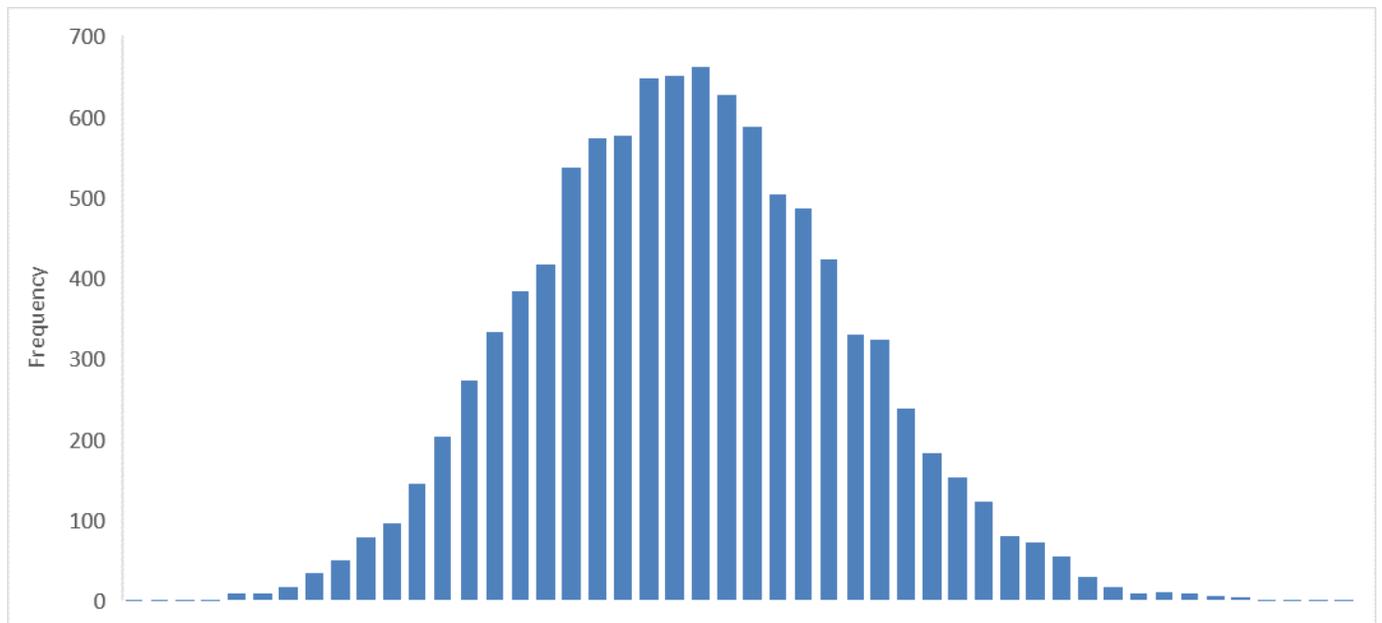
Figure 36. Resulting frequency distribution showing a normal distribution of al 10000 realizations.

Uncertainty is close to the uncertainty using Tier 1 method, but lower in the use of Monte Carlo simulations. The main difference with regard to the Tier 1 approach is that:

- in the case of the MC simulation correlation amongst parameters was incorporated, while in Tier 1 certain uncertainties are counted twice.
- Tier 1 method assumes symmetrical and normal distributions while the Montecarlo has applied different assumptions, such as uniform, normal or in some cases the distributions were truncated to avoid negative values.

Doing some sensitivity analysis with the sources, the following sources were identified as the most important:

- Assuming that the activity data does not have uncertainty, the overall uncertainty would be equal to 13%. Therefore, activity data in this case has the largest contribution to uncertainty.

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- Assuming that aboveground biomass densities do not have uncertainty, the resulting uncertainty would be 21%
- Assuming that the IPCC default values do not have uncertainty, uncertainty would still be of 22%, therefore these would not have any impact.

d. *Uncertainty of Emission Reductions*

A Monte Carlo simulation was applied to Emission Reduction calculations using the average % of performance and the expected ha that will be established above the historical rate. Since there is no activity data for the ER program period, it was assumed the same relative uncertainty that the one of the reference period. The results are provided in the following table

Table 77 – Results of MC simulation for total emission reductions

Parameter	Emissions program per year (tCO2e)	Emission Reductions per year
Mean	6,043,730	5,070,966
STD	922,466	923,035
Upper bound 90% CI	7,613,603	6,546,405
Lower bound 90% CI	4,566,880	3,497,312
HWCI	1,523,362	1,524,547
Relative margin	25%	30%
Uncertainty discount		**8%**

If the estimation of uncertainty is done in a disaggregated manner for deforestation, forest degradation and afforestation/reforestation the results would be the following:

Table 78 – Results of MC simulation of emission reductions per activity

	ER deforestation	ER degradation	ER afforestation/reforestation
Mean	4,131,941	902,171	260,158
STD	1,400,584	384,661	219,865
Upper bound 90% CI	6,516,201	1,607,967	664,167
Lower bound 90% CI	1,902,719	355,242	-56,409
HWCI	2,306,741	626,363	360,288
Relative margin	56%	69%	138%
Uncertainty discount	8%	12%	15%

Uncertainties of the individual activities are higher because the lower the value of the estimate the higher the relative uncertainty is. The uncertainty that will be retained is the first results considering the total Emission Reductions.

13.   CALCULATION OF EMISSION REDUCTIONS

13.1.   EX-ANTE ESTIMATION OF THE EMISSION REDUCTIONS

Emissions Reductions of the ER-PD are calculated based on the target in reduction of deforestation and increase in reforestation defined in already planned and financed REDD+ activities and REDD+ activities to be financed by the ERPA revenues. The first step was to estimate the performance of individual REDD+ activities with financing secured or expected but not yet secured (NAMA proposal). The following map shows the location of the different financed activities.
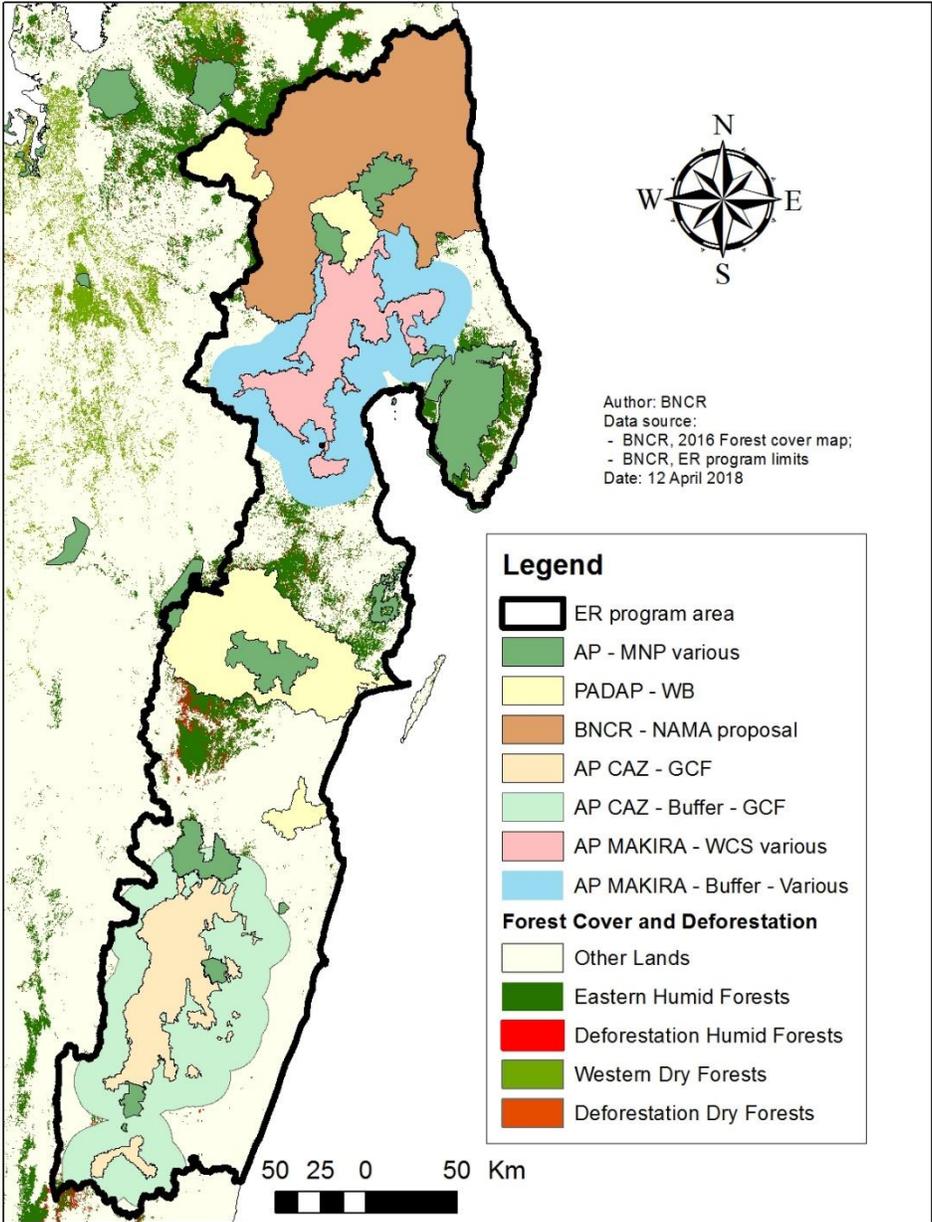
Figure 37 – Stratification for estimation of Emission Reductions

For each of these areas covered by REDD+ activities, the following target performances were defined for each year. This resulted in an average performance for the ER program ranging from 13% to 30%. This is without considering re-investment in new activities once the ERPA payments start to be received by 2021.

Table 79 – Target performance in reduction of emissions from deforestation and forest degradation

Area	2019	2020	2021	2022	2023	2024
PADAP - WB	15%	15%	15%	15%	15%	15%
NAMA proposal	0%	0%	20%	30%	40%	50%
Makira PA - WCS	10%	20%	30%	40%	50%	50%
Makira PA Buffer - WCS	10%	10%	10%	10%	10%	10%
CAZ PA - GCF	50%	60%	70%	80%	80%	80%
CAZ PA Buffer - GCF	10%	10%	10%	10%	10%	10%
Masoala PA - MNP	0%	0%	0%	0%	0%	0%
PA - MNP	10%	10%	10%	10%	10%	10%
PRE-AA	13%	15%	21%	25%	28%	30%

Although targets have already been defined for implementation of REDD+ activities, it is difficult to estimate the resulting performance from these. In this case, a proxy was applied by considering the cost of generation of ERs of existing initiatives, and assuming that new activities will have the same cost, additional Emission Reductions were estimated. The result is that from year 2021, new activities will be generating an additional 3.7 million ERs, resulting in an increase of performance up to 41% in year 2024.

Table 80 – Total emission reductions from deforestation and forest degradation

	2019	2020	2021	2022	2023	2024
Activities to be financed	0	0	0	792,907	1,594,720	1,513,860
Activities financed	1,500,694	1,739,709	2,433,688	2,900,184	3,190,619	3,418,101
Total Emission Reductions	1,500,694	1,739,709	2,433,688	3,693,091	4,785,339	4,931,961
Equivalent performance	13%	15%	21%	32%	42%	43%

For the estimation of enhanced removals, the actual target reforestation was used from the financed REDD+ activities and the REDD+ activities to be financed as set in the regional REDD+ Strategies. The expected hectares of new reforestation, beyond the baseline scenario, is provided in the following table.

Table 81 – Hectares of new reforestation established

	2019	2020	2021	2022	2023	2024
Activities to be financed		0	0	4,500	9,000	9,000
Activities financed	3,238	6,922	9,126	5,451	3,947	2,232
TOTAL	3,238	6,922	9,126	9,951	12,947	11,232

Using the same removal factors as for the reference level, the implementation of these hectares of regeneration result in the following enhanced removals.

Table 82 – Enhanced removals of new reforestation established

	2019	2020	2021	2022	2023	2024
PRE-AA	(49,348)	(154,851)	(293,938)	(445,598)	(642,930)	(814,126)

According to criterion 22 of the FCPF MF, the expected proportion of ERs to be set aside because of uncertainties would be 8% because the level of uncertainties is just at the threshold of 48%. 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 28%.

The expected total level of Emission Reductions over the crediting period (mid 2019-December 2024) is estimated at 13,718,472 tCO$_2$eq. It is assumed that 13 million tCO2eq are available to the Carbon Fund.

The annual generation is provided in Table 83.

Table 83:: *Ex Ante evaluation of the Emission reductions opportunities and potential in the ERPA period (tCO2)*

Year	Reference level			Emissions and removals ER program			Emission reductions or enhanced removals				Uncert. buffer	NPR buffer	ER Available
	Def.	Degr	Enhance.	Def.	Degr	Enhance.	Def.	Degr	Enhance.	Total	8%	28%	to CF
2S 2019	9,481,642	2,011,023	-19,357	8,243,545	1,748,427	-68,705	1,238,098	262,596	-49,348	775,021	62,002	199,645	513,374
2020	9,481,642	2,011,023	-38,714	8,046,353	1,706,603	-193,565	1,435,289	304,420	-154,851	1,894,560	151,565	488,039	1,254,957
2021	9,481,642	2,011,023	-58,071	7,473,809	1,585,169	-352,009	2,007,833	425,854	-293,938	2,727,626	218,210	702,636	1,806,779
2022	9,481,642	2,011,023	-77,428	6,434,780	1,364,794	-523,026	3,046,863	646,229	-445,598	4,138,689	331,095	1,066,126	2,741,468
2023	9,481,642	2,011,023	-96,785	5,533,657	1,173,669	-739,715	3,947,985	837,354	-642,930	5,428,270	434,262	1,398,322	3,595,686
2024	9,481,642	2,011,023	-116,142	5,412,692	1,148,013	-930,268	4,068,951	863,010	-814,126	5,746,088	459,687	1,480,192	3,806,208
TOTAL							15,745,019	3,339,463	-2,400,792	20,710,254	1,656,820	5,334,961	13,718,472

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+

a. *Impacts / risks assessment of REDD+ activities*

The Strategic Environmental and Social Assessment (SESA) for REDD+ in Madagascar was conducted in a participatory manner with representatives of all relevant stakeholders, including civil society, actively engaged. The assessment was conducted as a staggered process throughout 2016 and 2017 in conjunction with the development of the National REDD+ Strategy and the ER-P. Three series of extensive consultations (at local and regional level) were conducted, in order to identify all REDD+ stakeholders, to prioritize REDD+ environmental and social issues, to refine strategic orientations and activities of the National REDD+ Strategy, and finally to evaluate their respective environmental and social impacts and related safeguards measures. Environmental and social risks have been identified and recommendations have been taken into account in the design of the National REDD+ Strategy as well as in regional REDD+ strategies.

The methodology for the SESA included three phases, summarized below.

Phase 1: Preparation of the SESA

1. Stakeholder input highlighted the limited influence of local people in decision-making processes, while at the same time being some of the most impacted by REDD+ activities. In response, a specific consultation plan was designed that resulted in 63 percent of stakeholder input coming from the local level, with a significant proportion of women participants (32 percent);
2. Identification of environmental and social issues related to REDD+;
3. Analysis of the major issues related to REDD+ through a national SESA workshop that was attended by 64 people, 36% of whom were women, representing the public sector, civil society, technical and financial partners, research centers and universities, and economic operators.

Phase 2: Consultation and improvement of REDD+ policy options

▪ Surveys and consultations at the village and commune levels included a total of 847 people ;
▪ Analysis and prioritization of social and environmental issues related to deforestation and forest degradation (DD) factors resulting from surveys and consultations:
  - two environmental issues: uncertainty surrounding current (legal) state of non-protected areas and rights to access forest resources;
  - three economic and social issues: low level of knowledge of local population, concerns about preserving tradition and heritage (related to unsustainable practices) and unbalanced share of costs and benefits of REDD+;
  - two governance issues: lack of efficiency in protected areas management and lack of stakeholder participation in forest management.

- Elaboration of a logic tree relating the factors of DD to appropriate and relevant strategies for addressing the problems;
- Improvement of strategies for REDD+, taking into account the root causes of DD and sustainable development principles.

<u>Phase 3: Assessment of the impacts of REDD+ activities</u>

Impact analysis of REDD+ strategic orientations and activities through regional workshops (526 participants in total) were organized to develop measures aimed to: (i) reinforce REDD+ successes; (ii) translate potentialities into actions; (iii) draw lessons from failures and; (iv) overcome obstacles that will contribute to mitigating risks. Workshops were also held with the Working Group on Safeguards (GTS) during the development of the ER-P. The contributions from the GTS identified, per activity, the potential environmental and social risks that REDD+ activities could generate . When identifying these risks, attention was also given to gender-differentiated impacts.

On the basis of the impact analyses, mitigation actions were developed, discussed, and refined by taking into account corresponding Operational Policies (OP) of the World Bank, national interpretation of Cancun Safeguards and UN-REDD[91], REDD+ Social and Environmental Standards[92], and all national policies linked to safeguards (see ANNEX VI). This has led to the formulation of a national REDD+ safeguards frameworks.

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[91] Working Group on Safeguards (GTS) and the BNC REDD+ have defined a set of Principles, Criteria and Indicators (PCI-REDD+) applicable in the context of Madagascar that sets a high level of social and environmental performance for the REDD+ strategy.

[92] REDD+ SES (2012). *Social and Environmental Standards REDD+* , 10 September 2012, 30 pages.

Table 84 – Assessment of impacts and mitigation measures per REDD+ activities

	Activities of the program	Related environmental and social risks / impacts	Safeguards measures
Agricultural sector	AD 1 - Optimize production systems and agricultural and livestock-dedicated infrastructure	Loss of habitats and reduction of biodiversity due to conversion of forest and other natural ecosystems into land for cultivation and livestock	• Participatory mapping work/ local land-use plan in order to identify agricultural development zones at the scale of landscapes • Support for local organizations so they can control extension of cultivated area and agriculture intensification without harming the environment • Awareness raising among crop farmers to adhere to the ER Program performance objectives
		Overuse or bad management of fertilizer and pesticide products leading to water and soil contamination Human exposure to toxins due to the use of pesticide Creation of dependency on farm inputs Introduction of GMO seeds	• Elaborate a pesticide and pest management framework and specific plans once investments are known • Reinforce management and capacity for farm inputs • Capitalize on local farm inputs for agricultural intensification
		Over-stocking of livestock: risk of contamination of soil and water by animal manure	• Reinforce technical supervision of livestock farmers • Increase use of animal manure as agricultural fertilizer
		Social conflicts due to new land-use plan	• Reinforce land tenure security • Support implementation of land use plans
		Social conflicts due to ownership and management of agricultural infrastructure	• Agricultural support given to rural households through decentralized technical structures • Implement a transparent benefit-sharing mechanism • Promote the role of associations and women's groups in agriculture planning and activities • Reinforce the role of local actors and of women in the decision-making process at local level

Activities of the program	Related environmental and social risks / impacts	Safeguards measures
	Increased agricultural production from households that increases child, women, and indigenous peoples labor (and labor with inadequate worker protection).	• Promote agriculture equipment in order to reduce field work time
	Loss of habitats and reduction of biodiversity due to conversion of forest into agroforestry systems, or due to displacement of annual crops resulting from land appropriation for agroforestry	• Elaborate a specific Process Framework • Protect and sustainably manage watersheds • Implement land-use plans • Reinforce capacity of institutions / management structures out of REDD+ sites of interventions
AD 2 - Improve agroforestry systems to enhance cash crop production and food security of local communities	Introduction of invasive species	• Reinforce control and capacity of farm inputs • Enhance value of local farm inputs
	Overuse and bad management of fertilizer and pesticide products with related risks of water and soil contamination. Human intoxication due to the use of pesticide	
	Agroforestry systems and production do not correspond to local economic and food security interests, making some local people more vulnerable.	• Reinforce technical supervision of farmers • Reinforce REDD+ monitoring systems to ensure that activities are reducing dependency of local people on forest natural resources • Support of processing and conservation of agricultural products at the household level to reduce workload • Support for collective discussion of gender issues in agricultural production.
	Increased agricultural production from households that increases child, women, and indigenous people labor (and labor with inadequate worker protection).	
	Foster medium- and large-scale farmers and exclude small-scale farms and farmers development.	• Reinforce action of farm technicians towards development of small scale farmers • Support cooperatives in favor of small-scale farmers • Improve local farm infrastructure
AI 1 - Support the development and setting up of small and medium-sized	Social conflict due to changes in land use	• Reinforce land tenure security and facilitate agroforestry approaches to land management • Support implementation of land use plans

	Activities of the program	Related environmental and social risks / impacts	Safeguards measures
	enterprises and/or rural cooperatives and promote the creation of REDD+ mechanism-related subsectors at the local level	Increase the influx of external population that could lead to a non-respect of cultural and traditional heritage and increasing vulnerability of native population.	• Reinforce implementation of land-use plan • Reinforce structures in charge of the management of immigration
		Restriction of access to natural resources important for livelihoods Negative economic impacts on other sectors or supply-chain Without appropriate alternatives for current practices, there could be an increase in illegal use of forest resources, in exploitation of natural resources in areas adjacent to protected natural forests, and in conversion of degraded / secondary forests Increase poverty of local population highly dependent on forest resources	• Develop and implement and efficient grievance mechanism adopted by all stakeholders • Develop alternatives of natural resources use by promoting afforestation and agriculture intensification • Support the development of deforestation-free value-chain • Reinforce local control structures
Forest sector	FD 1 - Improve the management of forest areas under the landscape approach	Social conflict due to changes in land-use	• Reinforce land tenure security and facilitate agroforestry land • Support implementation of land use plans
		Loss of habitats and reduction of biodiversity due to propagation of invasive species	• Restrict afforestation of species that have not been proven to be adapted to local environment • Promote afforestation of native and local species
	FD 2 - Promote private and community reforestation, rehabilitate degraded forest areas, and reforest in consideration of local needs, without	Degradation of natural habitats due to parasites and other pathogenic agents due to the simplification of initial ecosystems.	• Avoid monospecific afforestation next to natural forests
		Drop in soil humidity due to plantation of fast growth tree species	• Promote afforestation with species improving quality of soil (Fabaceae)
		Soil erosion due to logging	• Control the application of specifications and management plans of logging

Activities of the program	Related environmental and social risks / impacts	Safeguards measures
converting natural forests	Increase of sedimentation in water course	• Protect and sustainably manage watersheds
	Restriction of access to natural resources important for livelihoods	• Develop and implement and efficient grievance mechanism adopted by all stakeholders • Develop alternatives of natural resources use by promoting afforestation and agriculture intensification
FI 1 - Reinforce the forest surveillance and monitoring system and regulatory text enforcement, including fire management	Social conflicts due to contradiction between customary rights and statutory laws when no alternatives to illegal use of resources are provided to local people	• Develop and implement and efficient grievance mechanism adopted by all stakeholders • Develop alternatives of natural resources use by promoting afforestation and agriculture intensification
	Transformation of non-wood products could lead to an increase in use of wood fuel. Social conflicts over valuable sources of non-wood products. Uncontrolled fire from honey collection	• Control and manage exploitation of NTFP and promote techniques for improvement and intensification of NTFP production • Reinforce capacity of farmers to avoid uncontrolled fire from honey collection
FI 2 -Improve the contribution of the forest sector to economic development by promoting the use of non-wood products and other subsectors that do not affect the carbon stock	Create incentives to continue the use of fuel wood and charcoal leading to increased production (in response to demographic growth) and degradation and deforestation in the long term	• Support and promote sustainable energy sources as alternatives to fuelwood.

	Activities of the program	Related environmental and social risks / impacts	Safeguards measures
	ED 1 - Promote improved fuel wood transformation and use techniques, as well as the dissemination of improved charcoal stoves in urban centers	Micro or medium-scale hydropower production: (i) during the construction phase: risks of pollution and compacting the soils, influx of potential migration population (quite small for micro and medium systems), (ii) during the operational phase: negative impacts on local fauna and flora, perturbation of local use and economy related to water courses.	• Elaborate and respect environmental and social management plan when micro or medium-scale hydropower site are implemented
	ED 2 - Develop the use of renewable energy (solar, biogas, etc.) for domestic use	Reduction of the revenues whose livelihood depend on the wood fuel production and commercialization. Impacts in terms of residues generated (i.e. solar panels, bottles,…)	• Promote other alternatives to carbonization • Development of dispositive of recycling
	EI 1 - Support the harmonization and development of the legal framework relating to the development of alternatives to fuel wood and sustainable fuel wood supply	Anticipated impacts are positive.	No safeguards measures are required but attention will be given so as to ensure that they don't have a negative impact.
Crosscutting and other sectors	ID 1 - Enhance the benefits delivered by the conservation of biodiversity and ecosystem services	Social conflicts due to changes in land-use: local elites or tenure speculators that have important financial resources or specific on local decision makers can influence land-use planning to get further unfair access to land. Restriction of access to natural resources important for livelihoods	• Reinforce implementation of land-use plan • Reinforce participation of vulnerable people, women and young in all REDD+ activity planning and implementation process. • Ensure FPIC principles during REDD+ activities implementation
	II 1 - Reinforce land security, including with reforestation actors	All risks related to reforestation (see above)	• All measures related to reforestation (see above)

Activities of the program	Related environmental and social risks / impacts	Safeguards measures
II 2 - Improve the coordination and monitoring of mining and agricultural developments and ensure the setting up of compensatory reforestation	Institutional and decentralized arrangements could compromise the financial efficiency of the program, and thus, the availability of final revenues and benefits for local population. Potential exclusion of vulnerable people distant from local elites, decision makers or traditional authorities.	• Establish a fair and transparent benefit sharing mechanism • Support targeted actors of REDD+ activities into planning process.
II 3 - Reinforce decentralized management and coordination of REDD+ mechanism-related interventions at local level	Restriction of access to natural resources important for livelihoods	• Reinforce participation of vulnerable people, women and young in all REDD+ activity planning and implementation process. • Ensure FPIC principles during REDD+ activities implementation
II 4 - Align the legal and institutional frameworks to ensure good governance of the REDD+ mechanism	-	-

b. *National framework for safeguards*

Through the development of the SESA recommendations, operational tools for the implementation of REDD+ activities were produced. The safeguards instruments include: **An Environmental and Social Management Framework (ESMF), a Population Resettlement Policy Framework (PRPF) and a Process Framework (PF).** It should be noted that under PADAP, a pest and pesticide management framework was developed and will be implemented within the ER-P, and the ESMF for the ER-P will also include elements relevant to the management of pests and pesticides, consistent with the framework developed for PADAP. The new safeguards instruments fulfill the following roles:

- The ESMF ensures assessment and mitigation of potential negative environmental and social impacts and optimization of positive impacts, including those for carbon and non-carbon benefits;
- The PRPF defines the criteria and procedures to be followed in the event the implementation of a REDD+ activity entails risks of negative social impacts in terms of land rights, property or livelihoods due to the involuntary resettlement of people or restricting access to resources;
- The PF describes the participatory process through which members of communities potentially affected by restriction of access to natural resources take part, inter alia, in the definition of eligibility criteria for affected persons, measures to assist affected populations, and efforts to improve or rebuild their livelihoods, and finally in the grievance redress mechanism (FGRM).

The ESMF has been prepared, validated through a national workshop and by the National REDD+ platform and submitted to the World Bank for review and will be published on the World Bank website and in country on the website of BNC REDD+ in May 2018. The RPF and PF have been drafted and complete versions shared at the national level, and each will undergo a similar process following additional consultations in May 2018. It was decided to conduct a further round of consultations with targeted populations in local communities to ensure that all concerns are adequately addressed. The revised versions will be submitted to the World Bank in early June 2018.

Several national legal texts support safeguards in Madagascar in line with UNFCCC principles (See Annex VI for more detail). These three specific REDD+ framework safeguards instruments will be endorsed by the government once they have been validated through a national process and reviewed by the World Bank. The ESMF. All of the instruments will be annexed to a REDD+ decree that will be submitted in June 2018 as part of the application text for the new Forest Policy.

Information sessions on the content of these framework were organized at the regional level with a broad range of stakeholder groups in order to receive additional feedback and foster a greater understanding and appropriation of their contents. It was through this process that additional consultations were requested for the PF and RPF given the sensitivity of issues with local populations. Specific capacity building workshops with the Civil Society Organizations and women's associations have been organized so that they will be able to raise specific concerns, and/or how the measures apply to them and to enable an effective application of safeguards measures for REDD+ projects.

Additionally, the Working Group on Safeguards (GTS) have defined a set of Principles, Criteria and Indicators (PCI-REDD+) applicable in the context of Madagascar that sets a high level of social and environmental performance for the REDD+ strategy in accordance with the Cancun Safeguards, the UN-REDD Principles and the REDD+ SES principle-criteria. [93] The Safeguards Information System (SIS) that has been set up, in a beta version, to monitor the implementation of Madagascar's REDD+ strategy and the projects of the ER-P are based on these PCI-REDD+ (see Annex IV for more details, and also on the specific [website](#)). The corresponding seven principles, criteria and indicators address the issues of participation, governance and transparency, but also the increase and sharing of social and economic benefits, gender mainstreaming, respect for and promotion of rights and remedies. Madagascar will continue working to (i) strengthen the capacities of ER-P stakeholders, including civil society to monitor safeguards, and (ii) test these indicators in the field.

The intervention strategy for the ER-P was developed concurrently with the definition of the National REDD+ Strategy and as such has fully taken into account the recommendations and analyses that were part of the SESA and the resulting safeguard frameworks. As an application of national REDD+ instruments, the program will provide an opportunity to outline how safeguards are being met in the various phases of implementation, using PCI-REDD+ and in line with UNFCCC principles.

The management of the program's social and environmental safeguards is fully integrated into the process of identification, design and monitoring and evaluation of the ER-P's REDD+ projects and activities. Any REDD+ project financed by the program must therefore comply with the above-mentioned requirements applicable to them at each stage of their implementation.

c. Categorization and monitoring of REDD+ safeguards

Environmental and Social Management Framework (ESMF)

When a project is identified, the following mechanism is used to determine whether a particular REDD+ activity will be subject to an Environmental Impact Assessment (EIA), an Environmental Commitment Program (PREE), or another authorization (to be issued by line ministries or local authorities).

v.   National classification

Three categories are defined in the classification of projects by the Malagasy environmental legislation:

- **Category 1: Projects subject to an Environmental Impact Assessment (EIA)**: Projects subject to an EIA are those that are likely to have harmful effects on the environment due to their technical nature, contiguity, their large dimensions or the sensitivity of the environment where they are established. A list of projects requiring an EIA is provided in Annex I of the MECIE Decree. EIAs must contain a Project Environmental Management Plan (PEMP, also known as EMP or ESMP).
- **Category 2: Projects subject to an Environmental Commitment Program (PREE):** Projects listed in Annex II of the MECIE Decree are subject to the PREE. These are projects whose nature, scope and other related

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[93] REDD+ SES (2012). *Social and Environmental Standards REDD+* , 10 September 2012, 30 pages.

characteristics have the potential to cause some environmental impacts, though such impacts are not large enough to require an independent scientific EIA.

▪ **Category 3: Projects that require no study** because they have no impact on the environment but will have to be categorized by ONE to justify this classification.

vi.   World Bank classification

The World Bank refers to three categories of projects in its classification:

▪ **Category A**: A project with major environmental and social risks that requires the preparation of an in-depth Environmental and Social Impact Assessment (ESIA).
▪ **Category B**: Project with moderate environmental and social risk that requires the preparation of an Environmental and Social Management Plan (ESMP)
▪ **Category C**: Project without significant environmental or social impacts that requires simple environmental mitigation measures.

vii.   Environmental and social screening steps

In general, the environmental and social screening process is comprised of the following steps:

Step 1: Identification of activities to implement and preparation of sub-projects

Based on proposals from validated REDD+ activity plans, the planned projects will be identified by the BNCR and RRCs (see section 6).

Step 2: Selection and environmental and social classification of sub-projects

During the preparation of the technical implementation documents, agents of the BNC REDD+ and the BRC REDD+ will complete the environmental and social screening form and will proceed to pre-select activities, to determine whether an environmental and/or social assessment is required in compliance with the MECIE Decree. In addition to potential environmental and social impacts, the selection outcomes will also indicate: (i) the need for land acquisition; and (ii) restrictions on access to natural resources and the type of public consultations that were conducted during the selection process. Ideally, pre-selection will be done in the field, in consultation with the communities and the relevant decentralized technical services.

Step 3: Validation of selection and categorization of projects

The screening completed during the previous step is sent to the REDD+ Program's Environmental and Social Officer (within the BNC REDD+) to be validated with the activity promoter. Further to verification, the BNC REDD+ sends the form for approval to the National Office for the Environment (ONE), the only entity officially authorized by the decree MECIE to carry out the screening. At ONE, a Screening Committee has been set up to decide on the type of environmental and social assessment to be carried out (categorization). To deal with the technical aspects and feasibility of the project submitted to categorization, the committee may call upon a resource person from the BNC REDD+, as needed.
Once the categorization is done, ONE issues a notification letter.

It should be noted that REDD+ has been categorized as "B" by the World Bank as it only includes activities that may have moderate environmental and social impacts. In addition, REDD+ comprises social aspects that are fairly sensitive, especially if access to resources is limited by closures, prohibition of certain customary rights of use, etc. In this respect, the outcomes of the selection must largely result in a **World Bank Environmental Category B or C**. Sub-projects under Category A will not be funded by the program.

Any activity classified as Category 1 by ONE (Annex 1 of the MECIE decree) requires the preparation of an EIA as well as of an ESMP. An activity classified as Category 2 by ONE will require the preparation of an Environmental Commitment Program (PREE).

Normally, REDD+ program **activities classified in the World Bank's Category B will** require an environmental review which will result either in the application of simple mitigation measures or the preparation of a project-specific ESMP or ESPP. In the case of an activity or sub-project classified in Category B by the Bank but classified in Category 1 by ONE, the preparation of an EIA is required.

World Bank's category C indicates that potential environmental and social impacts are considered to be of little significance and do not require specific environmental assessments, but only the application of simple environmental measures or mitigation measures.

Further to this process where the activity's appropriate environmental category would have been identified, and therefore the scope of the environmental assessment required, the BNC REDD+'s Environmental and Social Officer (ESO) will make a recommendation as to whether (a) an environmental assessment is necessary or (b) simple mitigation measures are required and a separate ESMP or PREE should be carried out, or (c) an Environmental Impact Assessment (EIA) should be carried out with the development of a ESMP.

Step 4: Implementation of an environmental and social assessment

a. When an EIA is required (ONE's Category 1), BNC REDD+ will carry out the following activities:

- Preparation of terms of reference for the EIA;
- Recruitment of qualified consultants to conduct the EIA in accordance with the terms of reference;
- Public consultations in accordance with the terms of reference;
- Submission of the EIE to ONE for review and issuance of the environmental permit;
- Submission of the EIA report to the World Bank for non-objection.

According to the MECIE decree, a general directive specifies the content of an EIA, including the following as a minimum:

- A document certifying the legal status of the place where the project is located;
- A description of the investment project;
- A review of the environmental and social system affected or potentially affected by the project; the analysis should lead to a schematic model highlighting the main aspects (static or dynamic, local or regional) of the environmental and social system, in particular those likely to be affected by the proposed investment;

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- A prospective review of the planned interventions' possible effects on the previously described system;
- A Project Environmental and Social Management Plan (ESMP)
- A non-technical summary written in Malagasy and French to facilitate public's access and understanding of the information contained in the study. The summary, as an attachment to and an integral part of the study, shall indicate in substance in a wording accessible to the general public the initial status of the site and its environment, the modifications made by the project and the measures envisaged to mitigate the adverse consequences of the investment on the environment.

The ESMP may be carried out by qualified consultants recruited by the BNCR or other entity and managed/supported by the ESO.

b. When a PREE is required (ONE Category 2): The BNC REDD+ will perform the following activities:

- Preparation of the terms of reference for ESMP/PREE;
- Recruitment of qualified consultants to carry out the ESMP/PREE,
- Public consultations in accordance with the terms of reference,
- Review of the ESMP or PREE and submission to the Environmental Unit of the relevant Ministry for authorization and issuance of the environmental permit.

c. When an ESMP/PREE is not required (ONE's Category 3): In such cases, only mitigation measures such as an environmental review are required. However, the project ESO shall incorporate good practices and environmental and social clauses to reduce risks and negative impacts that any activity could have on the environment.

Step 5: Review and approval of EIA and ESMP/PREE reports

a. Review : In the case of an EIA and an ESMP, ONE's Environmental Assessment Officer, together with the Technical Evaluation Committee members from the other relevant technical departments will review (i) the findings and recommendations presented in the environmental and social screening forms; (ii) proposed mitigation measures in the environmental and social checklists to ensure that all environmental and social impacts have been identified and that mitigation measures have been proposed; (iii) environmental assessments carried out for the activities.

b. Approval/rejection: Based on the outcomes of the above-mentioned review process and discussions with the relevant partners and the persons likely to be affected, ONE proposes approval or rejection of the screening process that led to the classification as well as of the EIA and the ESMP themselves. Where the opinion issued is not favorable, the reasons for the decision must be clearly stated. As part of the application review, ONE may request further information from the consultant who has carried out the ESMP or from the ESO. ONE shall provide, in writing, to the BNCR/MEEF, an opinion on the sub-project's environmental feasibility.

Step 6: Public consultations and dissemination

The Malagasy environmental legislation advocates for public participation in the preparation of EIAs and their validation through public hearing. As for ESMPs, the MECIE decree calls for the preparation of a public hearing. In addition, in order to comply with World Bank OP/BP 4.01 Environmental Assessment, which outlines consultation and dissemination requirements, and as part of the World Bank's Dissemination Policy (BP 17.50), it is recommended that the REDD+ program should adopt a public participation mechanism as a component of the environmental and social impact assessment at all stages of the development of ESMPs to ensure better decision-making. A consultation process is anticipated during the preparation of any projects.

The outcomes of consultations will be incorporated into the EIA and/or ESMP reports and made available to the public. In order to comply with the World Bank's consultation and dissemination requirements, the project will have to comply with the procedure for publication by the country of safeguard instruments as practiced with Bank-financed projects. EIAs must also be approved by the World Bank and published on the World Bank's website.

Step 7: Incorporation of environmental and social provisions into the Bidding Documents and Works Implementation Documents

For projects subject to an EIA, environmental and social measures proposed in the form of environmental specifications are to be included in the tendering documents and works implementation documents for works to be performed by contractors.

Step 8: Environmental and social surveillance and monitoring

The environmental and social monitoring of REDD+ program activities is carried out within the framework of the project's general monitoring system.

Environmental and social monitoring applies both to the implementation and the operational phases of structures, infrastructure and equipment to be implemented under the project. The monitoring program may allow, as needed, for reorienting works and possibly for improving the progress of construction and implementation of the various elements of the project. Monitoring goes hand in hand with the identification of impacts and suggestion of preventive, mitigating or offset measures.

Monitoring is essential to ensure that:
- (i) Impact forecasts are accurate (monitoring of effects);
- (ii) Prevention, mitigation and offset measures are applied to achieve the desired objectives (monitoring of effects);
- (iii) Regulations and standards are complied with (monitoring of compliance);
- (iv) Criteria for the exploitation of the environment are compiled with (inspection and monitoring).

Monitoring at the national level: At BNCR, the ESO will ensure that environmental and social indicators are monitored and that corrective measures are taken if monitoring findings show, for example, a deterioration in the quality of environment or in the communities' quality of life in the zones concerned by the project. National monitoring may also involve national or international consultants for the mid-term and final assessment of the ESMF.

Monitoring at the regional level: At the regionallevel, monitoring will be carried out by DREEF agents and/or other environmental and social focal points of deconcentrated technical services and/or local administrations. At a minimum there will be general monitoring in the field in order to anticipate and respond to potential impacts or problems.

Monitoring at the local level: At the local level, processes for including local communities are being tested. The model of local community management of forests has provided some examples of how to involve local communities and project-specific opportunities will be included to define how local participation will be incorporated into monitoring and reporting of safeguards implementation.

Population Resettlement Policy Framework for (PRPF) and Process Framework (PF)

Further to the environmental and social screening, if a project triggers OP/BP 4.12 due to involuntary resettlement or restricted access to natural resources, a Resettlement Action Plan (RAP) will be prepared, possibly including a socio-economic study with the objective of collecting baseline information on the project's fields of activity, allowing for an economic and social evaluation of potentially affected populations/communities. The procedures to be followed for cases of involuntary resettlement are defined in the PRPF and the procedures for cases of restricted access to natural resources in the PF.

As part of the study:

- A first summary census will be carried out to identify people affected by the project,
- A detailed census will be carried out to identify potentially affected individuals (individuals, households, vulnerable groups, production systems),
- An identification of beneficiaries, disaggregated by gender, will be carried out (demographic data),
- Affected people and the impact on their properties and production systems will be determined,
- A list of affected people will be drawn up,
- An institutional analysis will be carried out and institutional arrangements for implementing the RAP developed,
- A monitoring and evaluation system will be developed.

Detailed calculations of household economics and identification of all impacts will be necessary for the social assessment and will be decisive in the potential compensation process.

Projects requiring a resettlement action plan should include measures to ensure that displaced persons are:

a) Informed of their resettlement options and rights;
b) Consulted and are given choices as well as alternatives that are technically and economically feasible;

c) Provided promptly with effective compensation at the cost of full replacement of the loss of property and access attributable to the project.

Figure 38: *: Environmental and social impact categorization of REDD+ projects and development of related safeguards plans*
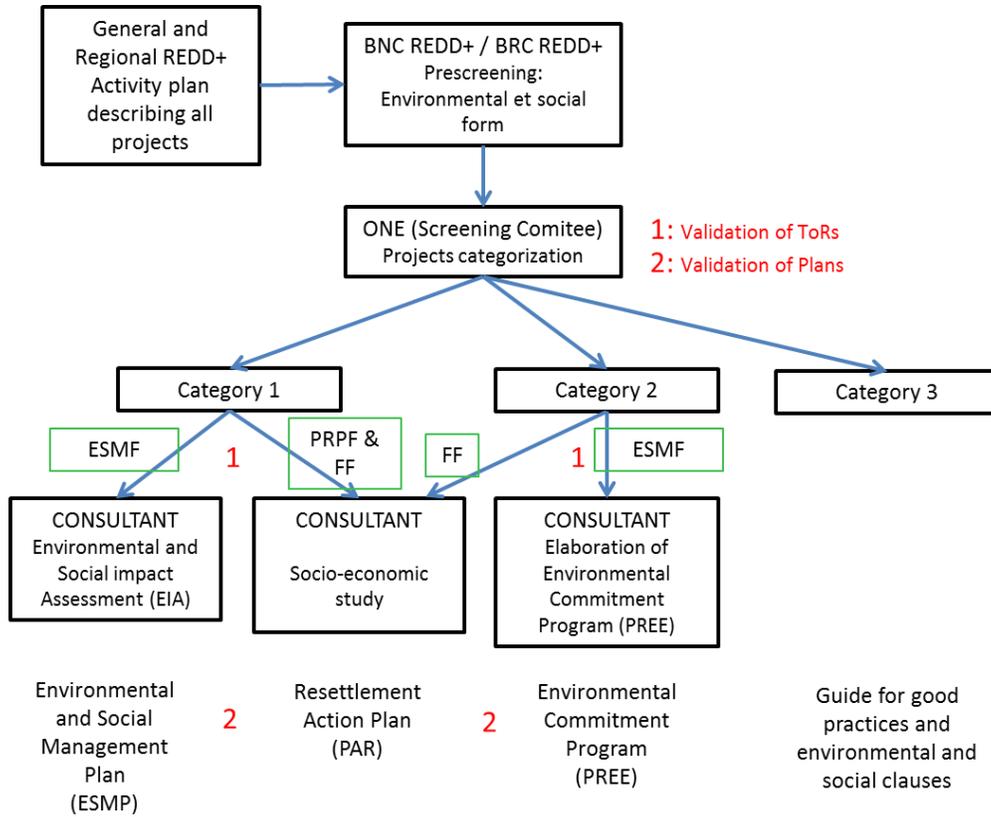
Figure 39: *Monitoring responsibilities of safeguards plans*
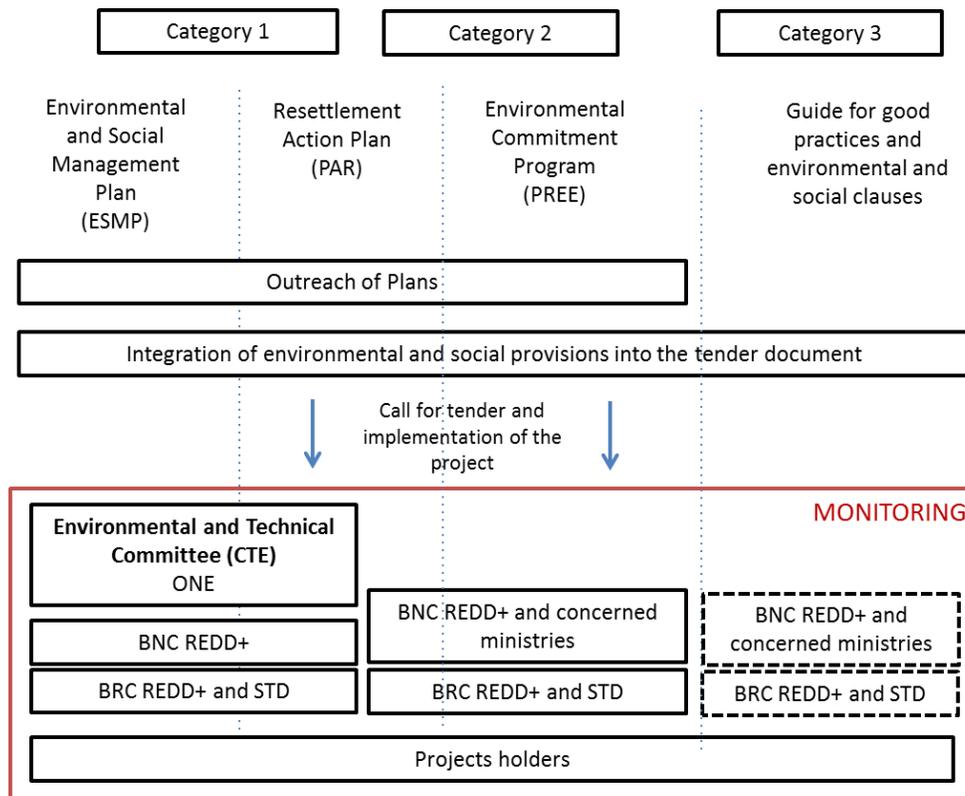
14.2. DESCRIPTION OF ARRANGEMENTS TO PROVIDE INFORMATION ON SAFEGUARDS DURING ER PROGRAM IMPLEMENTATION

Information on the proper application of safeguards and the production of non-carbon benefits[94] during program implementation will be provided through the following channels: (i) regular information posted on the Safeguards Information System (SIS) and the National REDD+ data management system; (ii) a report on the monitoring of the ER-P environmental and social standards published bi-annually in order to assess the program's results and progress against each social and environmental standards principle and criterion; and (iii) an independent observer report on safeguards.

a. *ER-P Safeguards Information System (SIS) and monitoring of the national principles, criteria and indicators*

Regarding points (i) and (ii) mentioned in the previous paragraph, the program manager (in synergy with the other entities in charge of the ER-P, in particular the BNC REDD+) will be in charge of uploading into the Safeguards Information System, and for each REDD+ activity, all required information on environmental and social assessments, the safeguards plans developed and the monitoring and evaluation report. The National

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[94] The national social and environmental standards of Madagascar describe both the minimum safeguard measures and the co-benefits expected from REDD+ activities, so this section is common with section 16.2 on the approach to providing information on non-carbon benefits.

REDD+ data management system will also make some of this information available to the public (or be directly linked to the SIS website with specific link to the corresponding REDD+ projects within the jurisdiction).

According to the type of REDD+ activities (large-scale, intercommunal or communal), specific indicators have been defined to ensure relevancy and appropriate requirements and monitoring on safeguards.

Rating system against national principles, criteria and indicators

The primary objective of the rating system is to quantitatively measure the level of a REDD+ activity's compliance with the REDD+ principles, criteria and indicators for safeguards (PCI-REDD+). The methodology consists in assigning a score to each indicator, depending on the type of response obtained. Using the scores on each indicator, the arithmetic or weighted average can be calculated giving the score on a given criterion, i.e. the project's level of compliance with the criterion. The same applies to the project's compliance with the principles.

This rating system therefore allows for assessing a REDD+ activity's level of compliance with:

- the set of principles
- individual principles
- individual criteria
- individual indicators

For each type of indicator (indicators requiring a letter of approval or a compliance certification, indicators requiring a report to be made available to the public, indicators requiring a qualitative or quantitative assessment of completion – e.g. percentage of complaints resolved out of the number recorded), this rating system provides for a score ranging from 1 to 3 as follows:

Compliance with REDD+ safeguards	Score
Compliant	3
Partially compliant	2
Non-compliant	1

In general, the mission of BNC REDD+ mission consists of ensuring coordination, monitoring and evaluation of activities related REDD+ in Madagascar. Thus, the SIS database management system will be centralized at BNCR to ensure its coordination for the implementation of the information cycle, in particular data and information collection, processing and dissemination.

Data collection

Data will be collected mainly through questionnaires and interviews. To this end, the questionnaire will be sent by the SIS officer at BNCR and RRCs to each agency/institution that is expected to generate the

information as indicated in the indicators data sheet. Each data source agency will then submit the completed forms, validated by their top officer. The officer in charge at BNC REDD+ will ensure the entry of completed records in the SIS database management system (the files received by the BRCs REDD+ on inter-commune and commune activities will be sent unprocessed to the BNC REDD+).

Data analysis

BNCR will process the data obtained, which involves rating each indicator, issuing scores for each principle and indicator, and the final rating for each project.

Validation of SIS information

The PFN REDD+ will validate the SIS information reports before they are forwarded to the CIME for endorsement. CIME can request modifications, as needed to BNC REDD+.

Once the report is validated by CIME, the report will be shared publicly on the SIS web portal, with direct link to the National REDD+ management system. This SIS web portal will also be used to compile the national report on safeguards under the UNFCCC.

b. *Safeguards Independent Observer*

In order to strengthen the monitoring of the program's safeguards, an Independent Observer will verify proper enforcement of the law and compliance with standards. It will prepare an independent report containing relevant recommendations and forward it to the line Ministry for corrective action. The report will be reviewed and validated by CIME and published directly on the MEEF' and BNC REDD+'s website, to ensure consistency with national procedures and/or to identify national engagement or actions to be taken.

Figure 40: Safeguards Information System scheme

Data providers	BNC REDD+	PFN and PFR REDD+	GTS
REDD+ Project holders	Collect and centralize all data into a specific database		
Entities in charge of the ER-P	Analyze and consolidate data		
	Editing	Validation	
	Diffusion		
	Improvement of the SIS		Improvement of the SIS

Safeguards independent Observers → Independent and public report
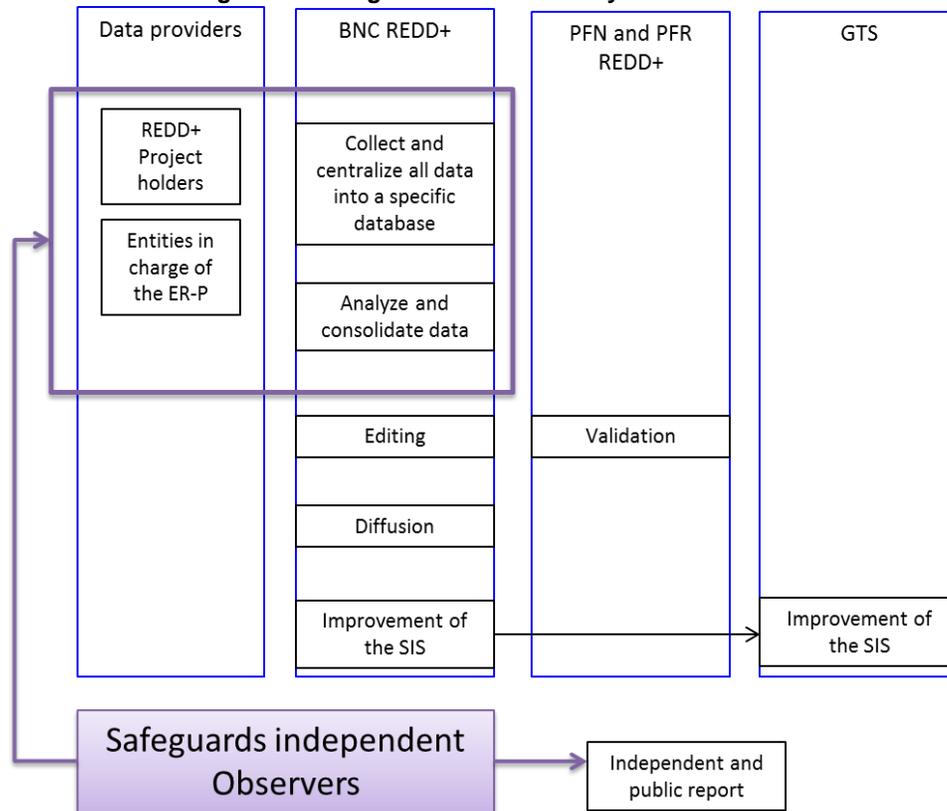
14.3. DESCRIPTION OF THE FEEDBACK AND GRIEVANCE REDRESS MECHANISM (FGRM) IN PLACE AND POSSIBLE ACTIONS TO IMPROVE IT

a. *Work and consultation steps for the development of the ER-P's REDD+ FGRM*

Madagascar carried out analytical studies and stakeholder consultations at all levels in several steps: (i) a review of potential conflicts and complaints under the implementation of REDD+ in Madagascar and in other REDD+ activities through a desktop review (PA, MECIE, forest resource governance, etc.) and interviews with stakeholders at the national level, (ii) held a national workshop to consolidate this review and launch the data collection campaign on the topic, (iii) surveys at the regional, commune and village levels to identify potential conflicts and complaints and evaluate current capacity of resolution; and (iv) a review and synthesis of all the information to categorize and prioritize the types of complaints and conflicts, develop an adequate and operational FGRM with a pragmatic guide for local use. A total of 500 people were surveyed or interviewed in 35 ER-P communes, covering all categories of stakeholders. The sample was comprised of women at 32 percent and men at 68 percent.

b. *Identification and prioritization of potential REDD+ complaints*

Through the different consultations and interviews, eight types of complaints were identified. Prioritization of complaints was based on two criteria: the severity of the problems (relative to REDD+) and the frequency of their occurrence, taking into account the impact of conflicts on (i) the state of natural resources and therefore the potential results of REDD+, (ii) the social environment, and (iii) the economic environment.

Complaints and conflicts can be grouped according to different criteria: geographical level, significance and impacts, frequency, parties involved, object of conflicts etc. Thus, complaints were grouped into eight categories, listed in Table 85 by order of significance.

Table 85 - Categories of complaints

Type of complaints related to the:	Description
Use of resources	Mainly pertain to restriction of access to natural resources, encroachment of land use, misunderstanding on land uses, persistence of unsustainable natural resource management and exploitation practices
Land tenure	Transfers of natural resource management, the creation or expansion of protected areas, poor land-use coordination/planning, including reforestation, and restrictions on land access, are often at the root of land disputes. Needless to say, these come with the social and traditional causes of land conflicts that are linked to the poor operation of the land system in Madagascar: inheritance, sale, problems with the administration, etc
Non-compliance with commitments	Failure to fulfill commitments by the State, regional officials or project managers may cause poor relations with communities and populations and often cause complaints and criticisms, which affects the communities' participation and the success of projects. Frustrations are expressed mainly in relationship with the compensation that are often considered insufficient if not non-existent
Law enforcement	Non-enforcement of laws is felt at all levels and generates conflicts generally between citizens and the State or even among community members
Governance	Problems related to governance are numerous and can result in serious conflicts. Citizens often complain about poor governance. The forestry administration is not well perceived, and this negative perception applies more generally to other sectors of the administration as well; corruption, trafficking in influence, abuse of power, nepotism, embezzlement, lack of transparency, etc. are commonplace and stand as obstacles in the path to development. Unfortunately, the VOI are not free from these scourges either.
Inequity	Exists when there is undue injustice. This occurs in the management of natural resources when there is no equitable sharing of costs and benefits of actions or when there is unequal treatment. Conflicts due to inequity even affect VOI
Social conflicts	Often related to forest management such as economic activities, pollution and nuisances, infrastructure management, etc

Type of complaints related to the:	Description
Cultural and religious	When certain agricultural and socio-economic practices are anchored in traditions and customs that are still very much practiced in areas close to forests, such as *tavy* (slash-and-burn farming) in some parts of the island. On the other hand, conservation or development projects as well as investments may also stumble upon cultural or worship problems. Finally, it should be noted that culture may act as an obstacle that prevents people from filing complaints or voicing their views

c. *Current conflict response and resolution capabilities*

The Malagasy legal framework for the management of complaints is well documented and is comprehensive, although there are still gaps that the ER-P aims to fill. Systems and structures to manage complaints related to resource management exist and are moderately operational (there are a number of specific regulatory texts: decrees, ordinances, decrees), but for the ER-P to better succeed in terms of environmental, social and economic context, they should be adapted to the context of REDD+ and the challenges associated with REDD+. To ensure that all structures will be operational, capacity building will be provided at all levels and specific guides and protocols have been drafted and are being refined. The TSS of each BRC REDD+ will ensure that all stakeholders involved in REDD+ projects are familiar with the mechanism. Specific FGRM guides explaining all processes and formalities will be prepared. It will be distributed to all communes concerned by REDD+ projects in malagasy, the local language.

It should be stressed that consultations and surveys carried out have informed the elaboration of how complaints are handled in the field. Various entities and structures are involved, in particular traditional authorities and structures (*tangalamena*, *olobe*, etc.). Traditional authorities, which are the guardians of social peace in their jurisdiction, play a very important role in solving social conflicts, alongside *fokontany* and heads of fokontany, and communes (mayor, chair of the municipal council or the municipal council, as appropriate). Traditional authorities' jurisdiction in the resolution of conflicts is fairly broad: social conflicts, land conflicts, conflicts related to natural resources. They work in collaboration with VOI (KMD) and heads of *fokontany* for the enforcement of *dina* (collective agreements).

Generally, conflict resolution occurs at four levels,
1. It starts at the level of the *Tangalamena* in the fokontany;
2. Hamlets or villages (usually in the communal house or *tranobe*) through traditional methods;
3. The conflict moves then to the head fokontany in case of non-resolution and is still addressed amicably;
4. It then goes to the level of the commune that plays a role of conciliator via the municipal council.

At the local level, *dina* related to management transfers are enforced by VOIs before any step is taken with the competent authorities in case of infraction linked to natural resources. The customary system of conflict resolution is also involved in the enforcement of *dinas* in general when such system exists. However, the

enforcement of registered or unregistered *dinas* is rather limited in most of the communes surveyed. *Dinas* exist at the local level, especially to address the issue of land insecurity, but local authorities are reluctant to apply them for a variety of reasons: the context of crisis, the poverty of the population, and so on. Moreover, local authorities are not always inclined to adopt and enforce *dinas* (communes and fokontany) given the contrasts with the legislation. Thus, it is important to promote the adoption, registration and enforcement of *dinas* at the local level. Similarly, the advent of the *dinabe*, usually at the regional level, is an element to be taken into account.

d. *Current legal framework for ER-P FGRM*

The approach builds on analysis of existing structures and characteristics and the related legal documents to identify the most appropriate REDD+ FGRM. Review of the other structures whose specific missions in the field of complaint management have been conferred by specific texts, such as the Ombudsman of the Republic, the Interministerial Committee on the Environment (CIME), the Environmental Cells of the Ministries, the Regional Management Committee Environmental Complaints (CRGPE), the Mining Forest Commission, etc are also included.

Related to the legal frameworks, analysis of roles, responsibilities and capacity to manage complaints of each structure was carried out. As to the way complaints are handled, approaches have been deduced from current texts and practices. The strengths and weaknesses were established on the basis of the stakeholder opinions gathered at the regional workshops and the analysis of experts within the NEB (see Annex V).

National level

- Order n° 92-012 of 29/08/92 establishing an Ombudsman of the Republic, defender of the people; ;
- Decree n° 97-823 of 12/06/97 stablishing, organizing and operating the Interministerial Committee on the Environment (CIME);
- Decree No. 99-951 of 15 December 1999 on the establishment, organization and functioning of the Inter-ministerial Coordination Committee of the Program "Local Community Management of Vegetation Fires in Madagascar
- Decree No. 2003-439 of 27/03/2003 establishing an Environmental Unit within each Ministry
- Decree n ° 2014-906 of 24/06/2014 creating the Interministerial Committee in charge of the reorganization of the rosewood and ebony wood industry
- Decree No. 2015-629 of 07/04/2015 establishing a National Commission for Integrated Management of Mangroves;
- Decree n ° 2015-957 of 16/06/2015 relative to the Local Structure of Consultation of the Decentralized Territorial Communities
- Interministerial Order n ° 7340/2004 of 16/04/2004 establishing an Interministerial Committee on Mines and Forests (CIMF), amended by the Interministerial Order n ° 12720/2004 of 08/07/2004;
- Interministerial Order n ° 2007/2013 - VPDAT / MEF of 04/02 2013 establishing, organizing and operating the Interministerial Land and Forests Committee;
- Interministerial Order n ° 52004/2010 of 20/12/2010 establishing, organizing and operating the Madagascar Protected Area System Commission (SAPM);
- Ministerial Decree No. 14569/2016 of 12/07/2016 on the establishment, organization and operation of the REDD + Platform in Madagascar;

Regional level

- Regional Order n ° 009/08-REG.ATS. of 26/02/2008 appointing the members, setting up, organizing, operating and awarding the Regional Environmental Monitoring Committee of the Atsinanana Region (CSER);
- Regional Order n ° 010/08-REG.ATS. of 26/02/2008 appointing the members, setting up, organizing, operating and awarding the Regional Environmental Liaison Committee of the Atsinanana Region (CLER);
- Order No. 005/07 / REGION / ANOSY / ONE of 10/07/2007 appointing the members of the Regional Environmental Monitoring Committee of the Anosy Region (CSER);
- Regional Order n ° 24-RGA / CR / 07/08 of 10/07/2008 establishing a Regional Committee for the Management of Environmental Complaints in the Analamanga Region (CRGPE Analamanga);
- Order n ° 029/2008-Rég.Ats of 03 July 2008 establishing an Environmental Complaints Management Committee (CRGPE Atsinanana)
- Order n ° 164/2015 / REG of 21/08/2015 establishing the Regional Environmental Unit ANOSY;

Local level:

- Law n ° 2001-004 of 25/10/2001 on the general regulation of dina in matters of public security;
- Decree No. 96-898 of 25/09/96 establishing the powers of the Mayor
- Decree No. 2000-027 of 13/01/2000 on the grassroots communities responsible for the local management of Renewable Natural Resources
- Decree No. 2000-028 of 13/01/2000 concerning Environmental Mediators
- Decree n ° 2004-299 of 03/03/2004 fixing the organization, the functioning and the attributions of the Fokontany;

e. *Definitions of the fundamental principles of the ER-P FGRM*

The main challenge in designing and implementing the REDD+ feedback and grievance redress mechanism is therefore to integrate the traditional system into the modern system that, among other requirements, imposes registration, tracking and formalities. The other challenge of the FGRM is related to *dinas*: they are also recognized and useful for the management of certain categories of conflicts at different levels, but the issue of their non-registration and the advent of regional *dinas* raise questions or reluctance towards them.

Data collected from stakeholders were reviewed to develop this REDD+ FGRM in Madagascar. In the course of its development, other parameters and criteria have been integrated in order to ensure the mechanism is optimal, effective, efficient and relevant in relation to local contexts.

The FGRM for REDD+ Madagascar is a complete mechanism that combines compliance with the international standards and prerequisites. More importantly, the FGRM takes into account the local realities of Madagascar and the ER-P, and includes a gender mainstreaming approach that makes it an equitable tool for all stakeholders, including women and vulnerable populations.

Criteria for the development of the FGRM

Surveys and review of existing mechanisms and legal/institutional framework	SESA and E-RP activities	MF of FCPF and UNREDD criterion	Gender mainstreaming	World Bank's safeguard police (cf. section 14.1)

Validity of a complaint

Within the framework of the ER-P and REDD+ projects, to be valid, a complaint must relate to activities undertaken by the ER-P and the REDD+ projects. Therefore, it is essential that all stakeholders in the REDD+ process have a clear vision of these activities. Complaints or feedback on issues related to ER-P activities and REDD+ projects may be referred to other competent bodies, but the REDD+ program or projects may not accept liability for the way other institutions deal with such complaints.

Nature of complaints about the REDD+ program and activities and other related aspects

The ER-P and REDD+ projects' FGRM handles complaints about all issues ranging from the rights of relevant actors and stakeholders to the most serious grievances, such as corruption in managing the benefits of REDD+. For complaints to be properly managed, it is essential to classify them as "sensitive" or "non-sensitive" according to the risks incurred by the complaint. The defining criteria will be specified as part of the process so that there is a consistent application of the categorization across the ER-P Area. When complaints occur, the complainant will be able to classify the complaint as "sensitive" or "non-sensitive". These instructions will be included in the user 's guide mechanism for each step. A complaint of a "non-sensitive " nature relates to a problem whose complaint does not negatively affect the social relationship of the complainant. On the other hand, a complaint is classified as "sensitive" if the potential impacts are detrimental to social relationship or security of the complainant

Assuring complainants that complaints of a sensitive nature are processed confidentially and without risks of retaliation by the bodies involved to the complainant gives them the assurance that they benefit from a certain level of protection. It is therefore important to inform stakeholders of how each type of complaint will be handled in accordance with local, regional or national organizational policies and practices, as appropriate.

Obstacles preventing people from raising concerns or complaints

Parties that are potentially directly or indirectly affected by the FGRM (complainants, bodies involved in the implementation of the FGRM, entities involved in the complaint) may face problems or "obstacles" that impede their will or ability to file a complaint. Information from the stakeholder analysis has been used to identify the most effective means of minimizing or overcoming such obstacles, but also to consult and involve a wide range of stakeholders, particularly those who are often marginalized or most vulnerable in order to ensure that they can voice their concern or file a complaint in a safe and confidential manner.

f. *Description of the steps of the FGRM of ER-P*

The FGRM model of E-RP that encompasses all international, national, regional, and local principles can be generally summarized as in the following block diagram:

Figure 41 - General Scheme of the FGRM
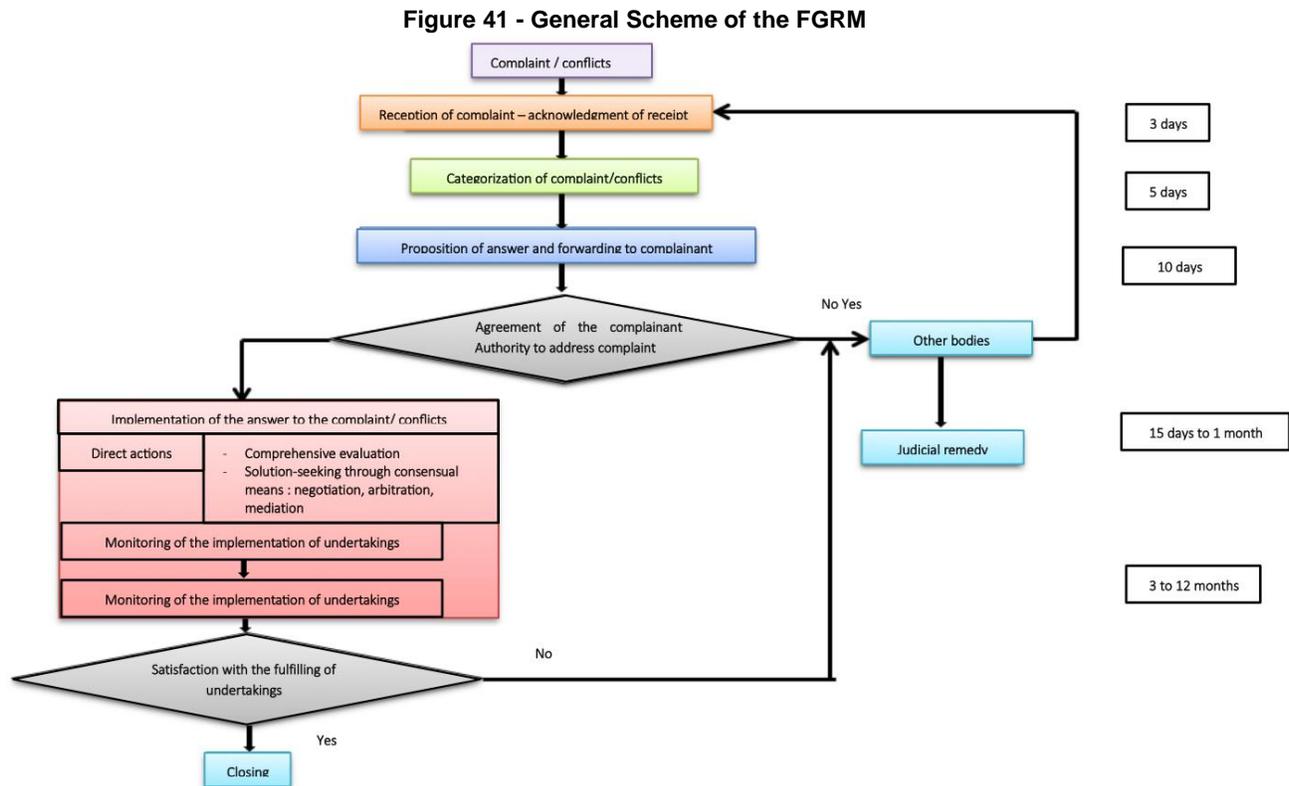
The process that will be used by the FGRM of the E-RP breaks down into the different steps described hereunder in general terms, i.e. with no consideration of type or scale of implementation of the complaint under consideration (*fokontany*/local, communal, district, regional, national). Annex V details the current proposition for implementing the REDD+ FGRM of the E-RP, describing the roles of potential REDD+ actors according to the type and location of the complaints. This near-final version of FGRM will be further improved as the program moves into implementation, especially owing to the work of GTS and BNC REDD+, as well as through ongoing consultations with PFN REDD+ and PFR REDD+ and testing of the approach and processes.

Reception of complaints and feedback

The FGRM will offer several channels and different formats for filing complaints or giving feedback on the implementation of the mechanism, e.g. a complaints box, phone number, letters, a designated representative, community assemblies, etc. Although the different options offered will be decided in consideration of the stakeholders and local context, it is critical to ensure that each one of them is

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understood and accepted by the stakeholders and different entities involved in the implementation of the mechanism. As such, clear guidance will be provided has developed, by the national administrative body of FGRM on how to group complaints, register them in a centralized system, and manage them in a standardized manner. The procedures will undergo a process of evaluation and revision through a consultation and validation process.

Categorization of complaints

Depending on the location of issuance of the complaint, the body in charge of handling it under the implementation of GRM will establish the "type" of complaint and the policy or procedure to be implemented to assess its eligibility. Complaints will be classified according to their level of *sensitivity/priority* for the success of the REDD+ program and activitites, so as to ensure that they will be addressed in compliance with the appropriate policy and procedures. Complaints will be processed per type: sensitive or priority complaints may require a confidential inquiry.

Once the complaint has been categorized, the complainant will be notified at the earliest opportunity, preferably with an acknowledgment of receipt, clearly setting out the way the complaint will be handled and potential outcome of the process. Where a complaint is not sensitive in nature, an answer should be provided within a relatively shorter period of time (e.g.: one week), whereas sensitive/priority complaints may require a relatively longer period of time due to the higher complexity of the investigation processes.

To properly manage the expectations of the people filing complaints, the ER-P will set short response deadlines and clearly signal them to complainants, as well as potentially concerned parties. Answers should, to the extent possible, be given verbally, as well as in written form and registered by the body that assessed the eligibility of the complaint.

Furthermore, the complainant may provide feedback by expressing "feedback" or concerns on the decision made to the body that assessed the eligibility of the complaint. Where applicable, the GRM of the ER-P will consider this feedback for the purpose of transparency of the procedure.

Processing of complaints and inquiries

Complaints will be processed and investigated to establish their validity, the aspects where non-compliance occurred, and the actions that should be taken in response. It falls to the body processing the complaint to decide how to conduct an inquiry on the complaint. The body in charge of processing and investigating a complaint should consider the following key points.

Table 86 – Key points of consideration for the investigation of a complaint was part of the FGRM

Jurisdiction	Transparency	Confidentiality	Impartiality
The inquiring body should have authority to take and/or make appropriate	It is important to ensure the transparency of the relevant procedure. This	Confidentiality is critical, especially when the complaints are of sensitive	It is crucial to ensure the impartiality of the body conducting the inquiry to

Jurisdiction	Transparency	Confidentiality	Impartiality
action and/or decisions and implement them.	includes the composition of the investigation team and the identity of the decision-makers. All important decisions made must be clearly explained.	nature. Any disclosure of information should be kept to what is strictly necessary to protect the parties involved.	guarantee equal treatment of the complaints and answers provided to them. If people involved in the processing of a complaint have a direct interest in the outcome of the investigation, they should recuse themselves to avoid damaging the credibility of REDD+ GRM and causing further concern or prejudice to the affected people.

Sensitive/priority complaints may require the setting up of an investigation body to conduct specialized investigations, so as to prevent damages and maintain the integrity of FGRM. Where the complaint pertains to a criminal or legal issue, FGRM shall refer its management in accordance with appropriate procedures to the relevant judicial authorities.

Since some investigations and answers may have significant consequences for the REDD+ program and projects and/or the partner and/or the complainant, the body conducting the investigation shall assess the risks and implications that they involve. To what extent is the complainant (program/ REDD+ projects/ partner) ready to face the consequences of the investigation? What role will the complainant be playing? Will he/she be willing to publicly voice his/her concern? Under which circumstances would the REDD+ program or project/ partner or complainant choose to put an end to or discontinue an investigation?

Anonymous and malicious complaints or rumors may indicate that people wish to raise other concerns but they hesitate or are unable to voice them openly or doubt the integrity of FGRM. These are warning signs that may be useful to the body in charge of the investigation and that FGRM should be able to identify. If all stakeholders accurately understand the purpose and operation of FGRM, potential practical difficulties in implementing FGRM may be minimized.

Figure 42: Diagram explaining the processing of a complaint

P R O C E S S I N G

TYPES OF COMPLAINTS	COMPLAINTS MANAGEMENT STRUCTURE

Local level → Jurisdiction (Yes →, No ↓)

Use of resources	Fokontany/Traditional Authority/VOI/KMD
Land issues	Fokontany
Failure to fulfill undertakings	Forwarding to other bodies (project/program, UNCR)
Law enforcement	Forwarding to OPI (CEEF - DREEF - Law enforcement agencies - Justice)
Governance	Forwarding to other competent bodies as may be relevant
Iniquity	Forwarding to other bodies (project/program/UNCR)
Social conflicts	Fokontany/Traditional Authority/VOI/KMD
Cultural and religious	Traditional Authority

Commune level → Jurisdiction (Yes →, No ↓)

Use of resources	Commune/Traditional Authority/VOI/KMD
Land issues	Commune
Failure to fulfill undertakings	Forwarding to other bodies (project/program, UNCR)
Law enforcement	Forwarding to OPI (CEEF - DREEF - Law enforcement agencies - Justice)
Governance	Forwarding to other competent bodies as may be relevant
Iniquity	Forwarding to other bodies (project/program/UNCR)
Social conflicts	Commune/Traditional Authority/VOI/KMD
Cultural and religious	Traditional Authority

Regional/ District level → Jurisdiction (Yes →, No ↓)

Use of resources	Region/District/Trad Authority/SRC/ Fed VOI/ Platform (Regional DINA Committee, etc.)
Land issues	Region/District
Failure to fulfill undertakings	Project/program manager, BNCR cdd
Law enforcement	OPI (CEEF - DREEF - Law enforcement agencies - Justice)
Governance	DREEF, Intersectoral Committee, BNCR, CSO Platform
Iniquity	Project/program manager or Associated Committee, BNCR
Social conflicts	Region/District/Trad Authority/SRC

National level

Use of resources	MEEF and relevant sectors (Agri, Mining, etc.)
Land issues	Ministry in charge of Land Issues
Failure to fulfill undertakings	MEEF, Intersectoral Committee, Project/progr. manager, BNCR, CSO Platform
Law enforcement	MEEF, Law enforcement agencies, Justice
Governance	MEEF, Intersectoral Committee, BNCR, CSO Platform
Iniquity	MEEF, Intersectoral Committee, Project/progr. manager, BNCR, CSO Platform

Appeal procedure

Where the complainant is not satisfied with the answer and involved parties fail to find a solution, the complainant may decide to refer the matter to a higher-level authority. The appeal procedure allows for reassessing an already completed investigation and establishing whether the initial decision should be maintained or if a new one should be made on the basis of the findings of the reassessment.

The appeal procedure will be clearly defined, i.e. in which cases it may be used, how it will unfold, and which parties are involved. The purpose of the appeal procedure, where applicable, is to verify the appropriateness of the initial decision or answer. The appeal procedure will be implemented by bodies and entities other than those that performed the first investigation to prove the impartiality and security of the procedure to complainants and foster trust in FGRM. An excessively high number of appeals may indicate a problem

either in the initial FGRM procedure or in the implementation of the REDD+ program or project. A closer look at matters may prove necessary.

Resolution

There is resolution when all parties involved in the complaint reach an agreement and, more importantly, the complainant is satisfied that the complaint has been addressed in fair and appropriate manner and the actions taken bring a solution.

Monitoring and registration/ tracking at each step of FGRM

To ensure the surveillance and management of the complaints received, FGRM will monitor and register the key steps of any complaint process. This way, it will be in position to easily identify the number of complaints received, the body that received them, their place of issuance and person/entity issuing them, the subject matter of the complaints, when and how they were answered, and the actions that were taken to address them. The tracking of the the initial implementation process will support the evaluation process and allow for learning and, where necessary, making adjustments to FGRM and/or REDD+ activities/program.

Monitoring and evaluation of FGRM itself

To determine if the FGRM operates as planned, it is essential to set up a procedure for the surveillance and review of FGRM itself. The surveillance should allow for ensuring the monitoring and analysis of complaints, access points, formats uses, investigation procedures, and answers given. It allows for checking the operation of the different elements of the mechanism, especially if stakeholders understand their rights and are in position to use and understand the system. It also allows for bringing means of improving it. Additionally, the system should periodically undergo a full evaluation aimed at detecting any issues in the processing of complaints or answering of complainants. This evaluation should be entrusted to an independent organization to guarantee objectivity and legitimacy.

The FGRM procedures may then be reviewed, its approaches adjusted, and the system improved to ensure effectiveness. During the FGRM review, it is important to check that the following principles are implemented:

- **Participation** – Check how the different parties participated in the implementation and surveillance of the system. Ensure that FGRM reaches the target groups of the REDD+ program and projects and that it does not discriminate against or excludes the populations that the REDD+ program or project wishes to work with by emphasizing the gender and vulnerable and marginalized group aspect.
- **Adaptation to the context** – Check that FGRM is adapted to the context and culture of the region and locality where the activities are implemented. Ensure that FGRM is adapted to the implementation or execution arrangements of program activities.
- **Information accessibility** – Ensure that the information is disseminated in a way accessible to all relevant stakeholder groups. Check if these stakeholders know what the REDD+ program is about and whom it targets, how the FGRM process works, and how they can access it. Is the information displayed in a way that is appropriate to the targeted group of stakeholders? E.g. If the populations are for the most part

illiterate, the information should be displayed in the form of pictures or diagrams. Is the dialect appropriate and easy to understand?

▪ **Transparency** – Ensure that the purpose of FGRM, its limits, and the operational mode of the system are clearly explained. If, for example, several complaints received do not directly relate to the REDD+ program/project, this may indicate a problem in the reference information provided. It may prove necessary to review the way the information is communicated and correct the approach/methods used to clearly explain to complainants and parties affected by the complaints what they can expect.

▪ **Accessibility and procedure security** – It is critical to give each person and body the feeling that they can safely access the system and are not exposing themselves to any risk by using it nor risk any harm by filing a complaint. This applies to the stakeholders affected by the REDD+ program and projects or other stakeholders.

▪ **Independence, confidentiality and no retaliation** (where applicable) – It is essential to consult with stakeholders affected by the REDD+ program and projects to know their perceptions on the different procedures of the mechanism, as well as on any revision they wish to make to ensure confidentiality and prevent any feeling of threat or reluctance to use the system.

▪ **Responsibility taking** – If a body involved in the implementation of FGRM manages to demonstrate that it takes complaints and feedback seriously, , it has high chances of reinforcing the trust that the parties involved or affected by the complaints and other parties have in it. There are higher chances that people will keep on resorting to FGRM if they notice that the fact that they are talking openly about their concerns can directly impact on the situation.

Action plan for the finalization and implementation of the FGRM of E-RP

A first version of the guide intended for the authorities involved in the implementation of FGRM as part of ER-P activities has been developed. A capacity building plan has been developed is in the process of finalization and will begin implementation along with the full implementation of the ER-P.

15. BENEFIT-SHARING ARRANGEMENTS

15.1. DESCRIPTION OF BENEFIT-SHARING ARRANGEMENTS

a. *Types of benefits*

The ER-P is expected to generate a total of 13 million tCO2e during the ERPA period term from 1 July 2019 to 31 December 2024, proposed to sell to the Carbon Fund. Through the sale of these credits, the ER-P will generate finance flows which will be allocated following the distribution modalities set in section C below. promoter

The ER-P is expected to generate significant non-monetary benefits during the ERPA term but also beyond the ERPA term. These co-benefits are identified in Section 16 of this ERPD and are summarized in the following table.

Table 87 - Outline of priority non carbon-benefits identified in the ER-P

Conservation and improvement of environmental services:
• **Improved conservation and strengthening of protected areas** → habitat conservation and regeneration for biodiversity; **conservation of** soil fertility.   • **Increased environmental services at all levels** → quality and supply of water; **conservation of soil fertility; sustainable agriculture production;** increased economic opportunities (agroforestry with value production, as well as Non-Timber Forests Products and eco-tourism).
Improvement of population well-being:
• **Reduction of poverty and unemployment** → additional and diversified income for households;   • **Increased access to markets, health system and education**→ collective socio-economic investments in the form of benefits and incentives to local communities; Increased transparency in the forest sector

REDD+ activity promoters will have to allocate some of the proceeds they receive for the implementation of activities which produce priority non-carbon benefits. The REDD+ activity selection process will include an evaluation of how non-carbon benefits will be enhanced and monitored.

Figure 43: Generation of monetary and non-monetary benefits
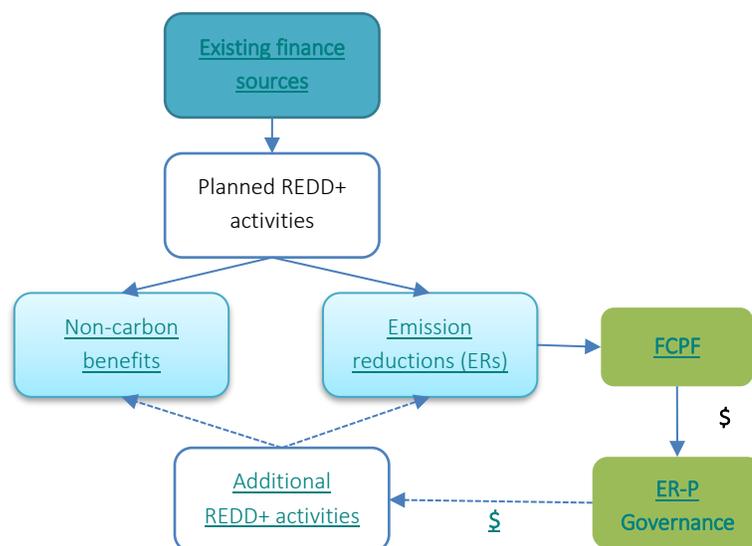
b. *List of beneficiaries and eligibility criteria*

i. Categories of beneficiaries

Categories of beneficiaries of carbon revenues are the promoters of REDD+ activities and local communities:

- **Promoters of REDD+ activities**:. Potential promoters of REDD+ activities can be **forest managers (i.e. community forest manager or protected area manager), rural households, farmers' associations or groups of small producers and processors (i.e. charcoal producers, hunters, animal and agriculture farmers, private sector actors, NGOs, civil society organizations, etc**.
- **Local communities**: Although local communities can be promoters of REDD+ activities, all activities must include a number of community-based incentives (health, education, transportation, etc.) so that local communities will benefit directly, beyond co-benefits generated by the REDD+ activities themselves.

In addition to these two categories of beneficiaries, part of the monetary benefits will be allocated to cover the management costs of the ER-P as explained further below.
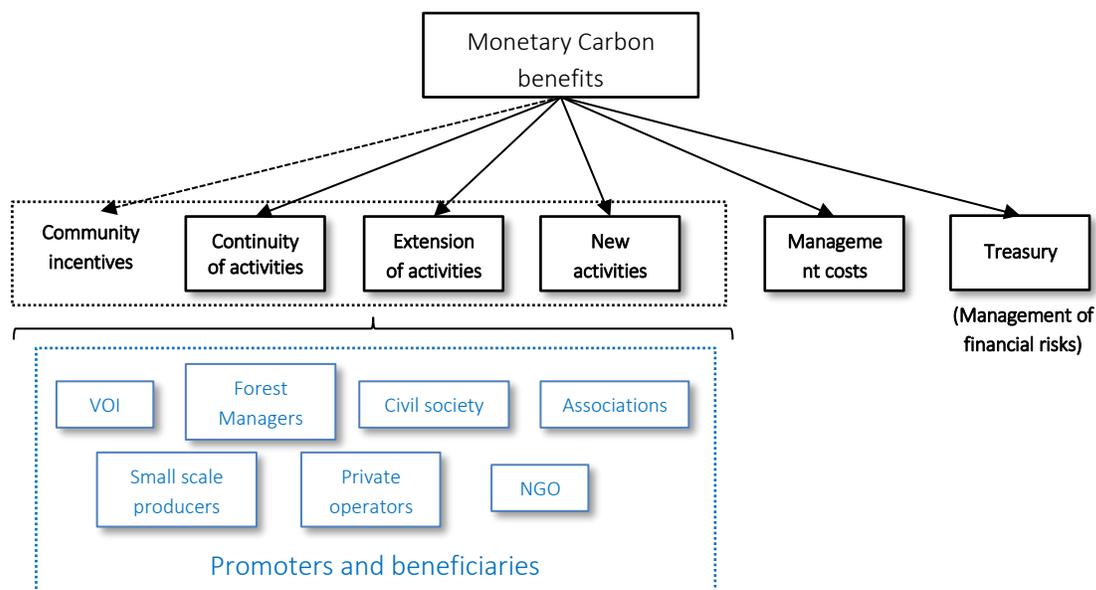
Figure 44 – Allocation of carbon monetary benefits by type of REDD+ activity

Based on the ex-ante estimation of revenues and activities promoterto be implemented, the following table provides an estimation of the expected allocation of the carbon finance across ER-P activities and the expected beneficiaries for each of the activity type.

promoter

Table 88 – Estimated Benefit Allocation

Activity	Sub-Activities identified in Regional REDD+ strategy	Expected allocation (MUSD)	Local population	COBA - VOI	Group producers	Middle-men groups	Region	Commune	STD	Investor or Koloala	Protected Area
Agriculture											
AD 1	Aménagement d'infrastructure hydro-agricole (A)	5.00	X		X	X	X	X		X	
	Développement des cultures vivrières (riz, maïs, haricot, arachide) (B)	0.16	X		X	X		X	X		
	Dispositif local de promotion de l'aménagement des bassins versants lié aux BV (champ école…)	0.15		X	X	X		X			X
AD 2	Développement de l'agroforesterie dans les zones de pont et en dehors des forêts naturelles (E)	4.03	X	X	X			X			
	Valorisation locale et tracabilité des produits	2.80		X	X	X	X	X	X		
	Dispositif d'appui régionale et locale	0.05		X	X	X		X			X
AI 1	Structuration de paysan et contractualisation avec le privé	0.29	X		X	X					
	Création de petites unités de transformation (B)	0.19			X	X	X	X		X	
Forest											
FD 1 -	Aménagement forestier (F)	0.46		X			X	X	X		
	Appui à la gestion forestière (F)	1.83									x
FD 2	Reboisement à vocation d'utilisation (énergie, COS) (D)	22.50	X	X				X	X	X	
	Restauration de masse et cash for tree (D)	7.65		X				X	X		X
FI 1 -	Surveillance périodique , incluant le survol (C)	1.90		X				X	X		X
	Renforcement de Dispositif de conservation des forêts (C)	0.71		X							X
FI 2 -	Valorisation locale des produits PFL et PFNL (J)	0.20			X	X	X	X	X	X	
	Exploitation durable des produits forestiers, et gestion des stocks de bois précieux	2.28		X				X	X	X	X
Energy											

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Activity	Sub-Activities identified in Regional REDD+ strategy	Expected allocation (MUSD)	Local population	COBA - VOI	Group producers	Middle-men groups	Region	Commune	STD	Investor or Koloala	Protected Area
ED 1	Renforcement de structure locale de promotion et de commercialisation	0.28		X	X			X	X		
	Formation et sensibilisation pour l'ensemble des acteurs	0.21	X	X				X			
ED 2 -	Promotion de technologies nouvelles	0.21					X	X	X		
	Projet privé de commercialisation des technologies utilisant les énergies renouvelables	2.45	X				X	X	X	X	
EI 1 -	Développement de meule améliorée, et accompagnement /création des unités locaux	0.56		X	X	X	X	X	X		
Cross-sectorial activities											
ID 1 -	Etablissement et contractualisation de projet PSE locale (hydro elec, biodiv & tourisme, eau potable)	1.00	X	X			X	X	X	X	X
II 1 -	Etablissement de SAC, intégration des PDFR et des stratégies nationales	0.00	X				X	X	X		
	Appui aux guichets fonciers pour la sécurisation des reboisements et des restaurations massives	0.49					X	X	X		
II 2 -	Lutte contre les ruées et Redynamisation de la brigade mixte de contrôle (BMC)	0.64	X	X			X	X	X		X
	Opérationalisation de système d'alerte précoce pour chaque commune autour des forêts	0.60	X					X	X		X
II 3 -	Communication et sensibilisation	0.55	X					X			X
	Renforcement de capacité	0.39	X	X	X	X	X	X	X	X	X

Beneficiaries will be able to receive benefits, upon the completion of a selection process of their REDD+ activity proposal. This process will include a technical evaluation by BNCR of the management and financial capability of the REDD+ activity promoter based on a set of criteria. **These criteria will be defined as part of the advanced draft benefit sharing plan.**

In the distinct case of the two existing Protected Areas that were developed as carbon finance projects, their access to the benefit-sharing mechanism is described below.

Box 2. Consideration of existing REDD+ activities that seek carbon finance

Prior to 2008, when the State embarked on a national REDD+ process, the State moved forward with a number of pilot activities in order to seek carbon finance in voluntary markets that could secure the management of protected areas. Within the ER-P are two protected areas that have utilized REDD+ carbon finance - the CAZ Protected Area and the Makira Protected Area. More information on these projects may be found in Section 18 and Section 3.1.

The government of Madagascar, promoterhaving designated both Protected Areas, is seeking to ensure a smooth transition of these PA's into the new REDD+ framework and the benefit sharing arrangements of the ER-P. Their participation in the benefit sharing is as follows:

- **CAZ Protected Area**: This protected area is managed by the international NGO Conservation International. In the past it has generated Emission Reductions that have been sold in the voluntary market. The Government of Madagascar and CI have presented a proposal to the GCF that includes finance to consolidate REDD+ activities within this protected area[95]. This finance is conditional to the non-use of the titles for Emission Reductions as offsets and on the submission of a road map that defines how the activities financed by the GCF will be aligned with the national REDD+ process. *The road map, signed by CI and the Government of Madagascar, which is provided in*

- *ANNEX VII – Roadmap of Green Climate Fund* Project*, states that any Emission Reduction generated as a result of activities financed by the GCF may be sold by the ER-P to the Carbon Fund while not being used as offsets. To avoid double finance, Conservation International will not be a beneficiary of the Benefit Sharing Plan of the ER-P during the term of the ERPA for GCF-funded activities*.

- **Makira Protected Area**: This protected area is managed by the international NGO Wildlife Conservation Society (WCS). In the past it has generated Emission Reductions that have been sold in the voluntary market, and this finance represents a significant part of the management costs of the Protected Area and in the buffer area of the protected area. Since the direct selling of ERs from Makira to the voluntary market will be discontinued as a part of the integration of the PA into the ER-P, which would impact the budget of the protected area, the Government of Madagascar is in discussions with WCS with the aim of agreeing on an approach to mitigate the risk of lost finance to the PA, while integrating the project activities with the program. The

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[95] Estimates from the MRV unit of BNCR indicate that deforestation during the reference period has been increasing, being still around -0.79%.

Government of Madagascar and WCS are still discussing the details of the transition and it is expected that an agreement on principles will be developed prior to the Carbon Fund meeting. The main elements that have already been agreed are:

1. The protected area will not generate VCUs throughout the ER-P period and will therefore not directly receive carbon finance from the voluntary market during the ERPA term, other than through sales of pre-ER-P ERPA credits if these are able to be sold. It is to be decided if generation of ERs would be allowed if the ER-P performs beyond the committed amounts for the ERPA and there are not other programmatic buyers, i.e. the volume generated at ER-P level exceeds the ERPA volume and additional non-voluntary market buyers are not secured .

2. The protected area will receive a fixed payment, counted as a part of the operating costs of the ER-P, for covering basic management costs of the protected area that were covered by carbon finance and will be managed by WCS as the delegated manager of the PA.

3. The protected area will receive a fixed payment for covering basic activities with communities surrounding the protected area and will be managed by WCS as the delegated manager of the PA. Deforestation and degradation rates must not be higher than those observed in the reference period 2006-2015, which is the period during which the REDD+ activities were implemented as part of the project. Additional payments may be received if the PA and communities performs over the historical average deforestation and degradation rates. These are estimated by the national forest monitoring system with consistent methodologies as those used for the ER-P.

4. In order to ensure equity in the sharing of benefits, the amount of revenues received by the protected area will be capped to a certain % of the ERPA revenues.

c. Distribution modalities and allocation of ERPA proceeds

A summary of the process of allocation of the ERPA proceeds is provided in the following figure. Once the carbon revenues are received from the Carbon Fund, 10% of these revenues will be allocated to cover the ER-P management costs of the ER-Program, 10% will be allocated to a reserve that will be used to cover future investments in the case of lack of performance, and the remaining 80% will be allocated for investments and incentives in new activities, continuation or the extension of existing activities. These activities are envisioned at either the National/large-scale or regional/communal scale.
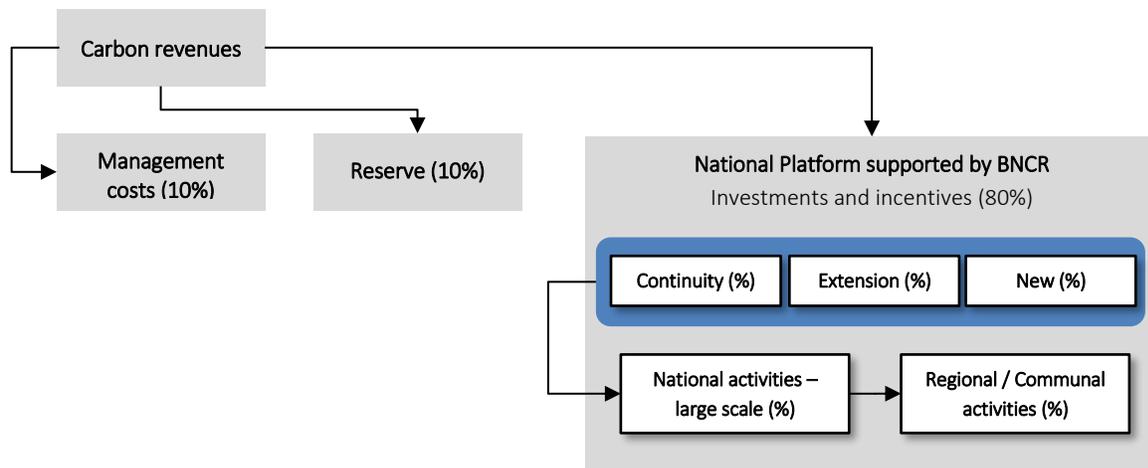
Figure 45 – Allocation of benefits and benefit sharing process

i. Management costs

For the ER-P and the benefits sharing mechanism to be operational, all the costs related to their implementation, functioning and coordination should be covered during the ERPA term and some time thereafter. **An equivalent to 10% of the ERPA proceeds will be used to cover the ER-P management costs**. An estimate of the ER-P management costs is provided in Section 6.2 b.

ii. Reserve

An equivalent to **10% of the ERPA proceeds will be allocated to a reserve to manage the risks of non-performance of the ER-P** and ensure the sustainability of the ER-P. In the case performance is verified in the subsequent events, the reserve allocated previously will be released and will be substituted by the new allocation. By the end of the ERPA term, the remaining reserve will be released to finance additional REDD+ activities.

iii. Investments and incentives

Once the 10% allocated to management costs and 10% allocated to the reserve is deducted, the 80% remaining will be allocated to investments and incentives. **The allocation of the remaining 80% will be based not on actors but on REDD+ activities, their associated performance and non-carbon benefits generated, so there is no a-priori distribution defined in the benefit sharing plan.**

National/ Large-scale activities	Regional / Communal activities
Continuation of existing activities	Continuation of existing activities
Extension of existing activities	Extension of existing activities
New activities	New activities
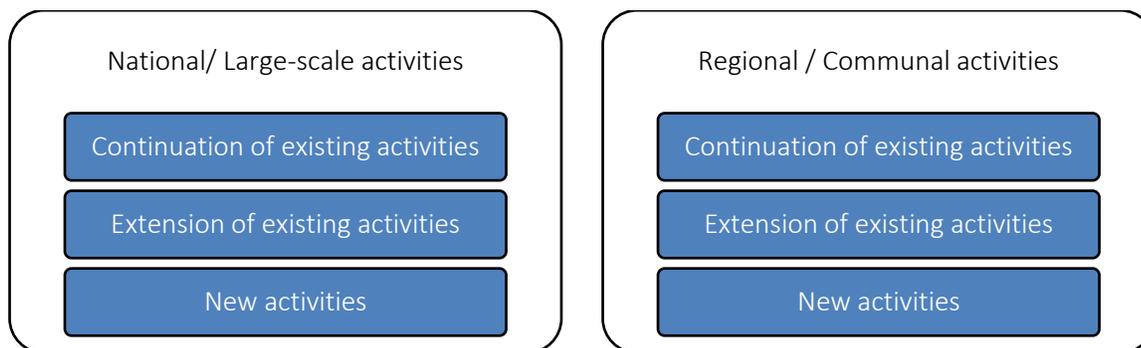
The national platform will decide the allocation of the revenues to the different activities as explained below. This ensures the transparency and the ownership of the process. The selected activities will then be validated by the CIME. Once all REDD+ activities have been validated by CIME, **the General REDD+ activity plan is put online** (in the REDD+ Projects and Programs data information system) to allow all stakeholders to track the physical and financial achievements of the projects.

National / Large scale activities
A national/large-scale activity is a large transformation project with multi-stakeholders, that covers a large area beyond a small group of communes or covering various regions or watersheds. This is an integrated project that includes a combination of different activities (as described in section 4.3.b) that are implemented in a complementary manner.

From the remaining 80% of the ERPA proceeds, the national platform will prioritize first the national-large scale activities to be financed. **Priority is given to national/large-scale activities over regional/communal to maximize efficiency in the generation of emission reductions.**

One year prior to the reception of carbon finance, BNCR will make a call of expression of interests for the proposal of national/large-scale activities. The terms of reference will set the eligibility criteria for REDD+ promoters and will define the priority activities and locations as given by the Regional REDD+ strategies of the 5 regions. Once the proposals are received and evaluated technically, the national platform will decide which to prioritize based on a set of criteria which consider the efficiency, the involvement of stakeholders and the number of program activities considered. Additional criteria are set for the continuation or extension of existing activities so as to ensure the additionality in the use of carbon finance, but **priority will be given to the continuation of activities to ensure the permanence of emission reductions.**

It is expected that there will be one exception to these allocation, which is the two existing PA's with VCS REDD+ activities that have been partially financed with carbon finance in the past (See Box 2. Consideration of existing REDD+ activities that seek carbon finance). It is expected that these will be prioritized as the lack of access to carbon finance might have impacts on the sustainability of these protected areas.

Table 89 – Preliminary criteria for the selection of large scale activities

Type of projects	Criteria
National/Large-scale activity	– Efficiency: the indicator used will be the amount needed to reduce a ton of GHGs ($ / tCO2 reduced). The promotor should therefore include a precise and rigorous estimate of the ex-ante estimates of emission reductions. The reference level will be based on the same methodology used at the level of the ER-P, and the target areas and efficiencies will be justified.

	– At least three of the five actors identified as having significant ability to address deforestation ,i.e. DREEF, VOI, municipalities, native citizens and economic actors, are involved. – At least three direct impact activities as listed in Section 4.3 b are targeted by the REDD+ program activity. – At least two indirect impact activities as listed in Section 4.3 b are targeted by the REDD+ program activity. – At least three watersheds are targeted by the REDD+ program activity.
Additional requirements for continuation or expansion of activities already performing	– High performing activities, having already generated emission reductions. – Activities with additional financing needs to maintain or continue to generate these emission reductions – Prioritization of Program activities based on the risk of reversal and the existence of opportunities for significant improvement. – Prioritization according to non-carbon benefits.

Once approved a design document will be prepared and the activity will be selected, after which a signed agreement will be signed between the beneficiary and BNCR. The selection of national/large-scale projects will be validated by the CIME.

Regional / Communal activities

Once the national/large-scale projects have been decided, the national platform will decide the regional and communal activities to be financed in each of the regions. This selection is preceded by a bottom-up process of preparation of proposals in each of the five regions.

Since regions and communes don't have the capacity to develop these proposals, the regional cells of REDD coordination will provide technical support to develop these proposals at the SLC level by identifying the zones, activities and the promoter. These proposals will be based on the activities and location of activities defined in the regional REDD+ strategies (c.f. Annex I).

These proposals will be then presented at the regional platform, which will decide which activities to finance. Selected activity proposals will then be presented to the national platform for final decision.
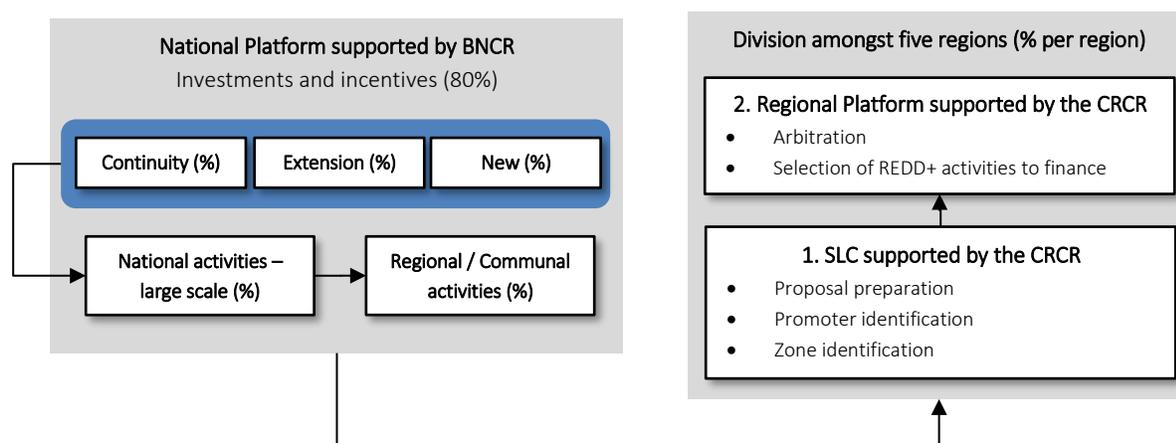
Figure 46 – Allocation of benefits and benefit sharing process

a. *Institutional arrangements and flow of funds*

i. Institutional arrangements

The institutional arrangements will rely mostly on existing institutions or structures such as the DECIM, the regional directorates of valorization of natural resources (where the regional coordination cells are based), or the national platform. Further information on the institutional arrangements, including responsibilities and flows of information are explained above and in section 6.1 of the ERPD.

ii. Flow of funds

Payments from the Carbon Fund will be made directly to a specified account within the fiduciary management structure. The GoM is currently exploring options for overall fund management. One option that is being assessed is to create a REDD+ fund that will house these funds and release them following the fiduciary governance guidance. Another option is to use one of the existing funds in the country, and create a separate window for REDD+ which would reduce the transaction costs as an existing structure would be used, but is also challenged by significant overhead costs. This decision will be included in the advanced benefit sharing plan.

b. *Safeguards*

One requirement for all REDD+ activity promoters and REDD+ activities will be the compliance with the safeguards requirements described in section 14. Each REDD+ activity will have a section in the REDD+ programs and projects data management system that will provide all safeguards relevant information and will provide a score in the performance indicators for each of these REDD+ activities.

c. *Monitoring of the benefit sharing plan*

BNCR will be the entity in charge of the overall monitoring of the implementation of the benefit sharing plan and the reporting to the Carbon Fund. Data will be collected by BNCR from the reports provided by the national/large-scale projects while monitoring of implementation of regional/communal activities will be conducted by the regional coordination offices. Archiving of all the relevant information will be included in the REDD+ projects and programs data management system that will be accessible to the BNCR and the regional cells.

Information on the monitoring of the benefit sharing plan is provided in Section 6.1.c.

15.2. SUMMARY OF THE PROCESS OF DESIGNING THE BENEFIT-SHARING ARRANGEMENTS

The design of the benefit sharing arrangements was carried out during the preparation phase of the implementation frameworks of the national REDD + strategy. The benefit-sharing mechanism was developed in a participatory and transparent manner with all relevant stakeholders represented at the national and regional levels:

- A specific study was first conducted to identify options for the ER-P monetary and non-monetary revenue sharing mechanism (MPR). **The results of this study were subsequently discussed in five meetings of the regional and national REDD+ platforms**[96] where ministerial sectors, local communities, civil society organizations, technical and financial partners, NGOs, and researchers are represented. These were all public consultations including representatives of the five different regions included in the ER-P. These consultations resulted in the development of regional REDD+ strategies, the reports of which are provided in Annex I of this ERPD.
- The institutional mechanism for benefit sharing was again discussed during the validation workshop of the national REDD+ strategy organized 27-28 February 2018 and obtained validation participants. The meeting minutes may be found in BNC REDD+ website: http://bnc-redd.mg/

The process of activity selection was discussed and shared during the meetings of the regional platforms in which priority activities were defined and a general geographic location determined for each activity. More information on the meetings that were held may be found in section 14.3.

The benefit-sharing mechanism was designed to allow the ER-P to evolve and increase its performance as REDD+ activities are implemented. The timeline for implementation is as follows:

Table 90 – Timeline for the finalization of the benefit sharing plan

Action	Dates
Preparation of draft zero	September 2018
Discussion of National and Regional REDD+ Platforms	December 2018
Draft benefit sharing plan available	March 2019

15.3. DESCRIPTION OF THE LEGAL CONTEXT OF THE BENEFIT-SHARING ARRANGEMENTS

The ER-P benefit sharing mechanism follows the principles and guidelines set out in the approved national REDD+ strategy[97]. It has been developed and validated with the participation of stakeholders at both national and regional levels grouped in the National and Regional REDD+ platforms.

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[96] Meeting minutes of the consultations can be given upon request

[97] Approved 16 May by Ministerial decree

The design of the benefit-sharing arrangement does not conflict with national laws. A Decree legislating all frameworks for the implementation of the national REDD + strategy is currently being drafted and will be approved by the end June 2018. This decree will also clarify aspects related to the title to the emission reductions and their transfer. This decree is the backbone of the implementation of the ER-P and guarantees the effective implementation of the ER-P while respecting the laws in force.

The benefit-sharing arrangement respects the rights of local actors. This being the case, it offers these actors, especially local communities that depend on the use of natural forest resources, the opportunity to carry out the activities that really respond to the drivers of deforestation and degradation. This materializes through their participation in SLCs, whose main roles are to select and prioritize relevant activities to finance. A description of these structures, their legal creation and operation is provided in Sections 4 and Section 14.

16. NON-CARBON BENEFITS

16.1. OVERVIEW OF POTENTIAL NON-CARBON BENEFITS AND IDENTIFICATION OF PRIORITY NON-CARBON BENEFITS

This Section analyzes the associated non-carbon-benefits generated for each activity proposed in section 4.3. This analysis was performed for the ER-PIN submission and has been refined for the ER-PD. Further consultations with stakeholders were undertaken through Regional REDD+ platforms and consultations, and activities have been further refined.   Non-carbon benefits will vary depending on the specific activity undertaken. As specific activities will be identified and prioritized by the communities who will participate in and be impacted by them, the prioritization of individual non-carbon benefits will take place at a more local level than at the jurisdiction as a whole. Thus, while the benefits described below indicate the range of non-carbon benefits that the program as a whole seeks to generate, prioritization of these benefits will only be realized as local and regional-scale activities are identified and planned. While the Regional REDD+ platforms have made clear progress in the identification of priority activities, and these activities clearly reflect a focus on support for rural income generation and food security, a formal prioritization of these non-carbon benefits has not been completed as distinct from the prioritized activities that will generate them.

Non-carbon benefits from activities within the agriculture sector

It is through improvements to agriculture that the co-benefits will be the most significant. The development of new agricultural practices (intensification and diversification of production, activity AD1), accompanied by the practice of agroforestry (activity AD2) will increase the productivity of plots, preserve and increase the productivity of soil and reduce the cost of infrastructure maintenance. This overall improvement will allow households to achieve greater food stability and dispose of surplus that they will be able to sell to supplement their income, a situation that will also be fostered through the activity AI1 (market access improvement through value chain creation and integration). This co-benefit will allow households to move out of a subsistence mode and benefit from greater food security together with a small additional income. Agriculture-related activities may also have a positive impact on health by diversifying the food supply and offering more fresh food options.

Non-carbon benefits from activities within the forestry sector

Restoration, afforestation and reforestation will have a positive impact on the local climate regulation through carbon storage, and will reduce the risk of local drought which has negative impacts on rice crops (activity FD2). Moreover, water regulation, which is at the heart of this sector, will also be better managed thanks to the new arrangements and planning put in place (activity FD1); the structure of soils and all fauna and flora will be also better conserved due to new, more environmentally friendly practices.

As for the agriculture sector, and thanks to activity FI2 and FD1, the forestry sector activities of the program will contribute to local development, not only through a better controlled and sustainable timber production but also with NTFP and biodiversity and specific value chain creation, reducing the dependency of local population on their "survival" mode of living.

Non-carbon benefits from activities within the energy sector

The development of new forms of energy and improved yields related to the use of wood energy should reduce emissions of CO_2 from deforestation, improve the health of impacted communities, but also change their behavior with regard to the use of energy resources. Finally, it is important to note that the sectors linked to the exploitation of forest resources will contribute to land tenure security and a better supply to the market.

A key co-benefit of this program is the securing of forest energy resources, allowing the progressive phasing out of the degradation and deforestation process typically associated with the practice of collecting fuel wood. Once implemented, the emissions reduction program will allow households to access sustainable sources of wood thanks to a new management plan, thereby sustaining the resource at the same time as commercializing it.

Non-carbon benefits from intersectoral activities or within other sectors

A significant number of benefits of the "intersectoral activities" of the program are socio-economic and environmental. The plans of the sustainable management of soils will have an anti-erosion effect protecting more effectively the soil and the biodiversity (activity ID1). The new governance policy and the strengthening of sectorial policies will foster the creation of new 'non-land' jobs, new markets by supporting the economy as well as securing the land tenure to reduce poor utilization of forest resources (activity II2, II3 and II4 in parallel).

Finally, the program will generate benefits for biodiversity. Protected areas in Madagascar have forest preservation and the consequent avoided deforestation as one of the key goals. They therefore have biodiversity conservation at the heart of their purpose. The present ER program is also placing a focus on the restoration of degraded forestlands, lands from which the forest and its biodiversity have been greatly reduced or lost. But the rationale, from the standpoint of the biodiversity co-benefits, is that the restoration of these degraded lands will permit both the protection of existing forest and the expansion of forest, and the consequent re-connection of more recently isolated forest fragments. While the quality of such forest (in terms of species richness) may initially be low, it will constitute a process of gradual restoration of forests, which will have biodiversity benefits that are critical in such a country with exceptionally high levels of endemism, both of plant and animal species.

To prioritize non-carbon benefits, a transversal vision is necessary because most of non-carbon benefits are not specific to only one sector. Two main objectives drive prioritization of activities within the program.

   i.   Conservation and improvement of environmental services:

- Improved conservation and strengthening of protected areas: the program should improve habitat conservation for biodiversity as well as support reforestation and natural regeneration of degraded and secondary forest that will also protect biodiversity and play a role in maintaining soil and fertility.
- Increased knowledge and prioritization of environmental services at all level: the program will demonstrate that forests are closely linked to livelihoods and well-being: better quality and supply of water as well as increased maintenance of soil fertility and sustainability of agriculture, and other increased economic opportunities (agroforestry with value production, but also Non-Timber Forests Products and eco-tourism).

    ii.   Improvement of population well-being:

- Reduction of poverty and unemployment: the program should generate additional and diversified incomes for households. The program will promote agroforestry in order to increase profitability of local engagement in degraded or secondary forest management (with high risk of deforestation without such initiatives) independently from carbon revenues (food crops based on improved varieties in combination with wood energy, timber or NTFP).
- Increased access to markets, health system and education: the program should provide collective socio-economic investments in the form of benefits and incentives to local communities as a result of their efforts and performance in deforestation reduction (e.g. roads, bridges, and transformation facilities to facilitate economic development, stable prices and access to markets, but also local hospital facilities or schools).

Validation of the priority non-carbon benefits for individual activities will be part of the activity approval process, and the monitoring plan for non-carbon benefits will be based on the activities approved. Non-carbon benefits, as with other program benefits, must be in line with the general strategy of the ER-program and its main objectives: maintaining biodiversity and contributing to reduction of poverty.

16.2.   APPROACH TO PROVIDE INFORMATION ON PRIORITY NON-CARBON BENEFITS

This subsection has been discussed in Subsection 14.2 when describing the SIS, because non-carbon benefits are part of the PCI-REDD+ used in Madagascar (see annex V). However, some indicators need to be added in the PCI-REDD+ list, and other more detailed, in order to be in line with the vision of the ER-P on non-carbon benefits as described above.

For each of the two priority non-carbon benefit, one criterion has been identified in order to easily monitor and evaluate that the program reaches its objectives:
- Presence or increase in lemur populations within forests adjacent to REDD+ activities. Lemur species are a good indicator of environmental integrity of ecosystems and some species can only be seen in forest that can still ensure their ecological functions. Also, the presence of lemurs is

important for tourism and is correlated to the objective of the program to create alternative sources of revenues for local population, including through ecotourism promotion.

- Number of social infrastructure projects established and enabling a substantial improvement of local livelihoods. Through the different activities of the program as well as the reward system of each REDD+ activity, investment for social infrastructure will be linked to environmental stewardship in order to incentivize local people to act for the reduction of deforestation and also commit to the overall objectives of the program.

Both indicators are being integrated into the SIS. The specific procedures and methodology to evaluate these criteria will be developed with stakeholders (after agreeing on the nature of these indicators) in the coming weeks.

17. EMISSION REDUCTIONS CERTIFICATES

17.1. ER PROGRAM AUTHORIZATION

Table XX. ER-Program Authorization

Name of Entity	Ministry of Environment, Ecology and Forests
Signing Representative	Madame NDAHIMANANJARA Bénédicte Johanita
Function	Ministre de l'Environnement, de l'Ecologie et des Forêts
Address	Nanisana
Telephone	...+261 0517210
Email	...rbjohanita@gmail.com
Reference to the decrees, laws or other types of decisions identified by this national authority within the ER-Program.	- La Constitution de Madagascar (Article 95-I, 12°) - Loi N° 2015-003 portant Charte de l'environnement (Préambule, article 4) - Décret n° 2016-298 sur les responsabilités du ministère de l'Environnement, de l'Écologie et des Forêts et l'organisation générale du Ministère; - Décret n° 2013-785 définissant les modalités de la délégation des forêts domaniales pour les entités publiques ou privées ; - Code civil de Madagascar Régime de la parafiscalité (Chapitre VI)

The Government of the Republic of Madagascar will negotiate and sign the ERPA, represented by the Ministry of Finance and Budget (MFB) and the Ministry of Environment, Ecology and Forestry (MEEF).

The responsibility of the MFB flows from Decree n ° 2007-187 of 27 February 2007 modified by Decree n ° 2008-106 of 18 January 2008 and n ° 2008-1152 of 11 December 2008 setting out the powers of the Minister of Finance and Budget and the general organization of its Ministry".

The responsibility of MEEF flows from Decree No 2016-298 on the responsibilities of the Ministry of Environment, Ecology and Forestry and the general organization of the Ministry which mandates MEEF to "reduce the process of degradation of natural resources" and to "provide for the rational and transparent valorization" (Article 1).

17.2. TRANSFER OF EMISSION REDUCTION CERTIFICATES

For Madagascar, emission reduction certificates are linked to "carbon rights", which are qualified as "right to benefits" within the PES mechanism.

The qualification of "carbon rights" as part of environmental services.

The forest carbon is the property of the State. Article 52 of Decree No. 2013-785 defines the procedures for the delegation of management of State forests to public or private persons, stipulates that "*All wood and non-wood forest products, whether tangible or intangible, especially forest carbon, remain the property of the State, and the management of which is the exclusive responsibility of the Forestry Administration*"[98].

In addition, Law No. 2015-003 on the Malagasy Environment Charter stipulates
- In Article 4, climate regulation services (including reductions in greenhouse gas emissions) are part of the environmental services that are naturally provided by the environment for humanity;
- And in its preamble, that the benefits derived from these environmental services (...) through the use of revenues derived from carbon markets must be shared equitably.

The Environment Charter therefore explicitly places greenhouse gas emission reductions or enhanced removals as part of Payment for Environmental Services mechanisms. In this sense, "carbon rights" are qualified as "rights to benefits" by the remuneration of environmental services rendered through intentional actions.

Contracting of stakeholders to strengthen the exclusivity of the state's "carbon rights"

For the REDD+ activities that will carry the initial investments, as indicated in Section 15.2, a contract will be established with the MEEF, represented by the BNCR marking their exclusive affiliations in terms of emissions reductions committed to the program. For future investments, each approved REDD+ activity will also be the subject of a specific contract, signed between the project promoters and the BNC REDD+.

Transfer power of titles

The Malagasy State has an exclusive right to carbon rights on emission reductions and enhanced removals. The MEEF, representing the Government, is the only authority to transfer legal title on reduced carbon. This transfer is consistent with land rights and resource ownership.

Compliance with Rights and Ownership of Resources for the ER-P

For public forest lands, under management or by delegation of management, there is no risk to consider, since the title of carbon belongs to the State according to article 52 of the decree n ° 2013-785 bearing the modalities of forest delegation. In the decree, planned for June 2018, it will be explicitly clarified this extent.

For private forests or forests delegated to decentralized territorial collectivities (CTDs), estimated at less than 0.1% of the program area, they will only be integrated into the program's mechanisms through a process of approval and contracting as explained in Section 15.2..

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[98] The Forestry Administration, represented by the Directorate General of Forests, is an integral part of the MEEF

For non-forest land, representing about 30% of the program area, the carbon title is created in accordance with the principles of private law as defined by the Civil Code of Madagascar. REDD + emission reductions represent a service that gives carbon and non-carbon benefits to all its contributors.

Box 3. Transfer of title of the two PA's with VCS REDD+ projects

As explained in Section 18.1, there are two Protected Area managers conducting REDD+ activities that are registered and issuing Emission Reductions under the Verified Carbon Standard.

The State as holder of title of Emission Reductions is recognized by both managers of the Protected Areas in their project documents.[99][100], The role of the State is further exemplified by the fact that the **Issuance Representations of both PA's, stating the conditions between the project promoter and the VCS Association** [101] [102] **, are signed by the Ministry of Environment and Forests of Madagascar.**

The two entities in charge of managing both PA's with REDD+ activities have agreements signed with the Government of Madagascar. Such agreements **give the exclusivity to these entities for the commercialization of Emission Reductions** generated in these areas. **The contracts are renewable for five-year periods, and include clauses for their dissolution, in addition to the option to amend, renew or not renew following each five-year period**. However, these two agreements **don't have an impact in terms of title or ability to transfer title, rather in terms of using such an entity as the exclusive commercial entity**. The enforcement of these conditions, which do not have an impact in the ability to transfer title, will not occur in any case as:

- Carbon Emissions Reduction Project in the Corridor Ankeniheny-Zahamena (CAZ) Protected Area: As shown in the Road Map agreed between Conservation International and the Government for the implementation of the conditions set by the Green Climate Fund (Provided in

- ANNEX VII – Roadmap of Green Climate Fund **Project**), the former has agreed not to commercialize VCUs and has agreed that the government will be able to sell these Emission Reductions to the Carbon Fund.

- The Makira Forest Protected Area in Madagascar: Discussions regarding the definition of the benefit sharing plan with WCS are ongoing but it has already been agreed that the project will not generate VCUs during the ERPA term but will receive funding from the results-based finance of the Program. If generation of VCUs occurs, the sum of these and the emission reductions sold to the Carbon Fund (including buffers) cannot exceed the total emission reductions generated by the ER-P.

It is worth noting that these two PAs are departing from a carbon finance model to a model where the operational costs are covered through other finance sources.

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[99] http://www.vcsprojectdatabase.org/#/project_details/1311

[100] http://www.vcsprojectdatabase.org/#/project_details/1215

[101] http://www.vcsprojectdatabase.org/services/publicViewServices/downloadDocumentById/28335

[102] http://www.vcsprojectdatabase.org/services/publicViewServices/downloadDocumentById/14090

18. DATA MANAGEMENT AND REGISTRY SYSTEMS

18.1. PARTICIPATION UNDER OTHER GHG INITIATIVES

There are two other GHG initiatives within the ER program area which seek to reduce GHG emissions from deforestation in two protected areas located within the ER program area. These two PA's were developed by the Ministry of Environment and Forests of Madagascar with the support from NGOs who manage both protected areas in the name of the Government.

Both are registered under the Verified Carbon Standard (VCS) and have issued credits in the past. According to the applicable methodology their baselines expire earlier than the start of the ERPA term. As described in earlier sections, both Pas are undergoing a transformation away from reliance on the voluntary market and towards integration into the Program structures and benefit-sharing mechanism process.

Table 91 – Registered GHG initiatives

Project name	Project promoter	Crediting period	Registry details
Carbon Emissions Reduction Project in the Corridor Ankeniheny-Zahamena (CAZ) Protected Area	Govt. of Madagascar, Ministry of Environment and Forests	2008-2037	VCS, ID 1311[103]
The Makira Forest Protected Area in Madagascar	Govt. of Madagascar, Ministry of Environment and Forests	2005-2034	VCS, ID 1215[104]

18.2. DATA MANAGEMENT AND REGISTRY SYSTEMS TO AVOID MULTIPLE CLAIMS TO ERS

a. *REDD+ Program and Projects Data Management System*

Madagascar will maintain its own national REDD+ Program and Projects Data Management System as required by Indicator 37.1 of the CF MF. This registry will be integrated within the SIS that has already been developed as part of the readiness process.

i. Administrative procedure

According to its decree of creation, BNC REDD+ will be responsible for the management of a national REDD+ Registry. In Section 15 and 6.1 it is discussed the process of homologation of REDD+ activities (these are

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[103] http://www.vcsprojectdatabase.org/#/project_details/1311
[104] http://www.vcsprojectdatabase.org/#/project_details/1215

activities that will participate in the benefit sharing mechanism); the National REDD+ platform with the support of the BNC REDD+ will be in charge of the homologation of REDD+ activities and the final validation will be done by the CIME. Once a REDD+ activity is validated, this will be incorporated by BNCR in the data management system where basic information on the REDD+ activities, their safeguards implementation and the monitoring and evaluation will be provided. These data will serve for reporting purposes to the CF but also will be connected to the registry that BNC CC holds on climate change mitigation activities.
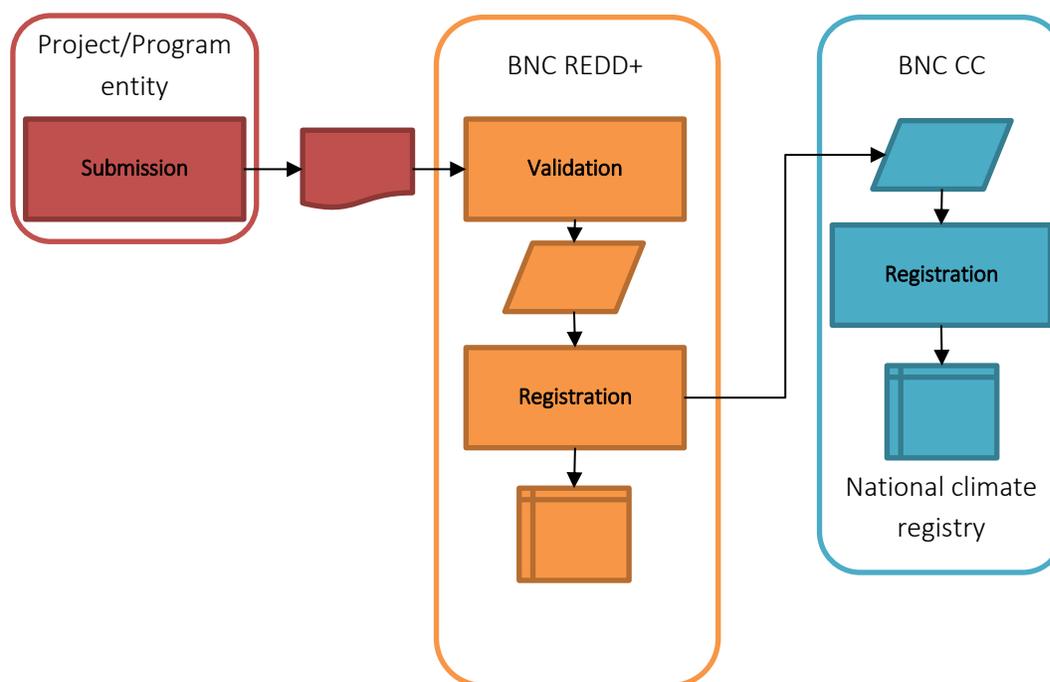
Figure 47. Current view of the information flow of the REDD+ program and project data management system.

ii.   Content of the REDD+ Program and Project Data Management System

Although the details have to be defined, it is expected that this REDD+ activity registry will serve as a data management system and will register all REDD+ activities and jurisdictional programs at national level and provide information (or a link to information) such as:

- Entities who own the ERs titles (if different from the State);
- Additional standards in use (VCS / Gold Standard/ etc);
- ID Number and Project Name;
- Geographic boundaries (with a shapefile available for upload) and surface area;
- Carbon pools considered;
- Sources (deforestation, degradation, carbon stock enhancement, conservation, sustainable management of forest);
- GHG considered;
- Reference level (when available);
- ERs estimation;
- Emission reduction estimation;
- Description of main objectives and activities;

- Starting date;
- Monitoring report on activities, safeguards plans and PCI evaluation.

This registry will be built on the SIS which has a web portal already deployed (http://sis-redd-madagascar.webou.net/scripts/projet.php) and provides information on safeguards for each activity.

Figure 48 – View of the first version of the registry
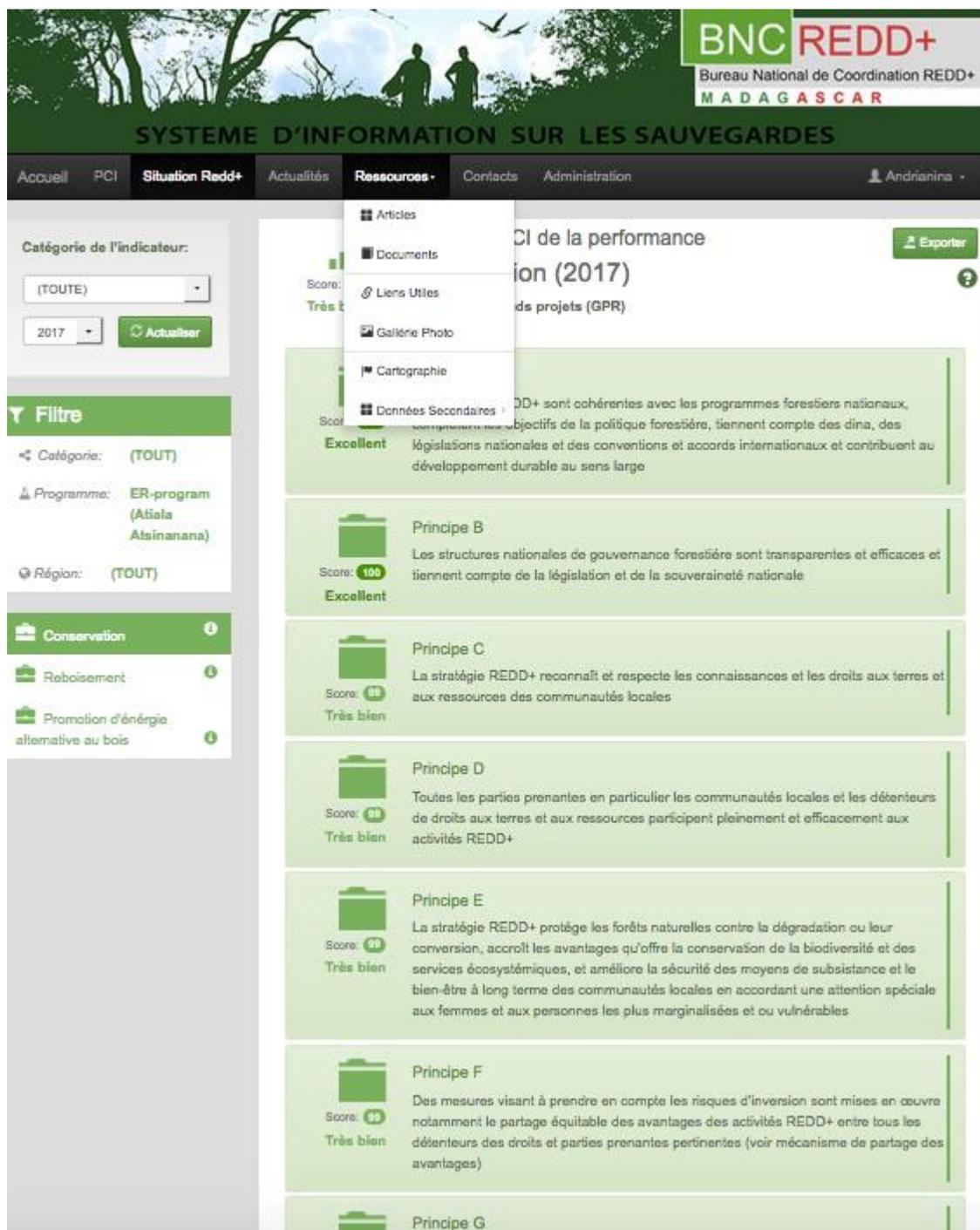
It is expected that the portal will be modified to include the above requirements for data management systems. The timeline for the integration of the other aspects into the SIS platform is provided in the following table:

Table 92 – Roadmap for the establishment of the registry

Timeline	Activities
15 May to 15 June	Technical design of registry
15 June to 15 November	Creation of the web platform and application
15 November to 15 January	Ingestion of data in version 0 of the platform

b. *ER transaction registry*

The Government of Madagascar has decided to use a centralized ER Transaction Registry managed by a third party on its behalf: Madagascar 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.

In the case of Madagascar, during the ERPA period, it is expected that apart from the titles sold to the Carbon Fund by the ER-P, no REDD+ activity will generate any title of Emission Reduction to be sold in other markets. However, for future possible changes, there will be a process to ensure that no double counting occurs and that the amount of titles to be generated doesn't exceed the ERs generated by the ER-P.

In terms of process, BNCR will be in charge of the reporting and estimation of Emission Reductions of the ER-P or any REDD+ activity within the Program area.

BNC CC is commencing the development of the National Carbon Registry, which it is expected to be a tracking database rather than a registry as such, therefore this cannot be used as a registry at this stage.

ANNEX 1 - REGIONAL SPATIALIZATION OF PRIORITY ACTIVITIES (ADDITIONAL TO UP-FRONT INVESTMENT) FOR THE ERPA

Region Alaotra Mangoro
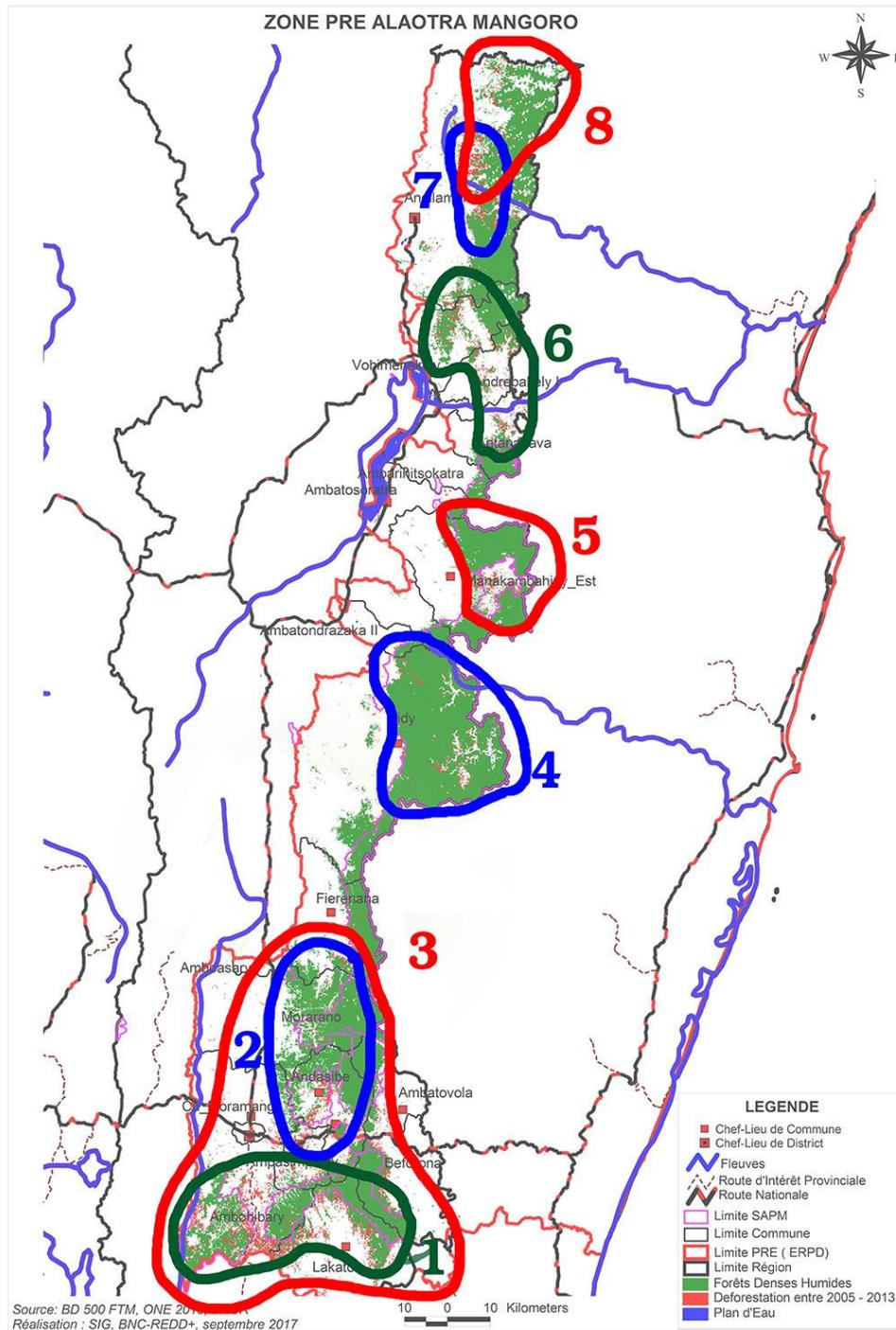
Area on the map	Sector	Causes of D&D	Specific location (communes)	Priority Activities	Beneficiaries
1	Agriculture	Tavy for annual and perennial crops	Lakato, Ambohibary, Andasibe, Ampasimpotsy, Beforona, Ambatovola	Local stakeholders need to identify the adapted mix of AD1, AD2 and II-1	Farmers and cooperatives, Land tenure offices administration
2	Energy	Charcoal: Both illegal and legal exploitations	Morarano, Andasibe, Ampasimpotsy	Local stakeholders need to identify the adapted mix of ED1, ED2 (low and regulatory text application) and II-1	Local rural and close urban population. Coal producers, Land tenure offices administration
3	Forest	Lumber production: Both illegal and legal exploitations	Lacto, Ambohibary, Andasibe, Ampasimpotsy, Ambatovola, Beforona, Morarano, Fierenana, Amboasary	Local stakeholders need to identify the adapted mix of FD1 FD2 and II-1	Local people, private sector (logging), VOI, CTD, STD, Land tenure offices administration
	Foret	Lumber production: Lack of clarity on rights of use	Lakato, Ambohibary, Andasibe, Ampasimpotsy, Ambatovola, Beforona, Morarano, Fierenana, Amboasary	Local stakeholders need to identify the adapted mix of FD1 FD2 and II-1	Local people, private sector (logging), VOI, CTD, STD, Land tenure offices administration
4	Mines	Small scale and artisanal mining	Didy	II-2	Mining administration, CTD, local population
	Energy	Charcoal: Both illegal and legal exploitations	Didy	Mix of ED1 and ED2	Civil Society, PTF, CTD, STD, local population
	Forest	Lumber production: Both illegal and legal exploitations	Didy	Mix of FD1 and FD2	Local population, private sector VOI, logging association, land tenure offices administration
	Agriculture	Destruction of natural regeneration of forest (fallow lands) by livestock	Didy	AD1	Farmers with livestock
5	Agriculture	Tavy for annual crops associated with and livestock	Manakambahiny Est	Mix of AD1 and AD2	Farmers, VOI, land tenure offices administration

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	Forest	Lumber production : Both illegal and legal exploitations	Manakambahiny Est	Mix of FD1, FD2	Local population, private sector, VOI
6	Agriculture	Tavy for annual crops associated with and livestock	Antanandava, Andrebakely, Vohimenakely	Mix of AD1 and AD2	Farmers and cooperatives, VOI
	Mines	Gold (small scale and) artisanal mining	Antanandava, Andrebakely, Vohimenakely	II-2	Mining administration, CTD, local population
7	Forest	Lumber production : Both illegal and legal exploitations	Andilamena	Mix of FD1, FD	Local population, private sector, VOI
	Mines	Illegal ruby mining	Andilamena	II-2	Local administration, CTD, population
8	Other	Wild fires in inhabited areas (transhumance for cattle theft)	Nord d'Andilamena	Mix of FD1, FD2, FD3 and FD4	Local population, private sector, VOI

Region Analanjirofo

Zone on the map	Sector	Causes of D&D	Suggestion of activities	Beneficiaries
1 to 6	Mine	Artisanal mining, poverty, non-application and knowledge of the law	II - 2: ensure the application of the law and expulse operators from Protected areas; Support decentralized management of mines	Protected areas and local famers, mining operators, CTD and STD
2 et 3	Mine	Cristal mining, poverty, non-application and knowledge of the law		
Evrywhere	Agriculture	Tavy for perennial and annual crops, poverty, absence of land tenure management	AD - 1, implementation of agriculture infrastructures to improve valorization of low lands through improved practices	Farmers and cooperatives
7 (Mananara North)	Agriculture	Cash crops (vanilla), fluctuation of the price of vanilla; Lack of land tenure management.	AD2: Renewal and extension of cash crops plantations but by implementing Dinamparitra for sustainability	Producers, economic operators, CTD
7 (South Mananara)	Agriculture	Cloves production, lack of land tenure management, corruption		
8	Forest	Selective and illegal exploitation of precious wood (for both national and international markets), corruption	FI 1 to improve local capacity of Ministry of justice and public security in order to stop illegal logging in Protected areas FD1, improve implementation of Koloala, reinforce intercommunity in the control of forest products, and renew the concept of Polisin'ala to reduce illegal logging	Loggers, CTD and STD
9 (Mananara Soanerana Ivongo)	Agriculture	Cash crops: traditional extraction of essential oils and intensification of the activity (increase of the number of local operators)	AI 1: all activity, but a focus on reforestation with fast growing species in surrounding areas of villages and old tavy is a priority ED1: ensure supply of local transformation and alambic unit with sustainable charcoal	Producers, economic operators, CTD
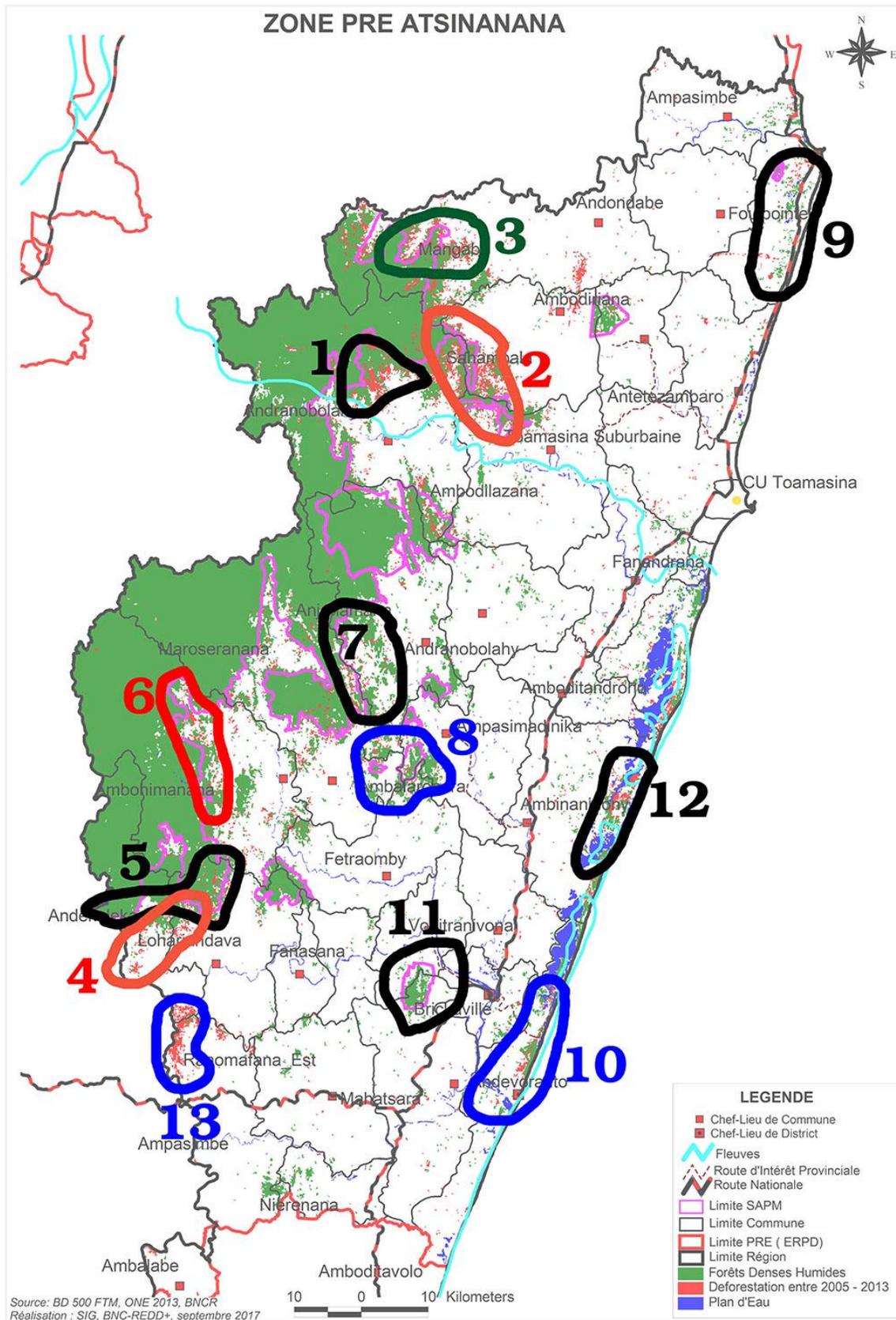
Area on the map	Sector	Causes of D&D	Detailed location	Suggestion of activities	Beneficiaries
1	Agriculture	Tavy	Andranobolahy	AD1 & AD2	Farmers and cooperatives, households
	Forest	Illegal logging due to lack of knowledge of VOI on administrative authorization process		FD2, FD1, (monitoring and control, valorization of NTFP)	VOI and loggers
	Mine	Graphite exploitation		II - 2	Artisanal mine operators, local mine administration and STD
2	Agriculture	Tavy (tradition and reinforce by migration flux)	Sahambala	AD1 & AD2	Farmers and cooperatives with traditional practices, households
	Mine	Gold illegal mining		II - 2	Migrants, Artisanal mine operators, local mine administration and STD
3	Agriculture	Tavy	Mangabe	AD1 & AD2	Farmers and cooperatives with traditional practices, households
	Forest	Illegal logging		FD2, FD1, (monitoring and control, valorization of NTFP)	VOI and loggers
4	Mine	Gold illegal mining	Lohariandava	II - 2	Migrants, Artisanal mine operators, local mine administration and STD
	Mine	Sapphire illegal mining	Manaraka lalambato		
	Forest	Illegal logging		FD2, FD1, Suivi-Contrôle, Valorisation PNFL	VOI and loggers
5	Mine	Gold illegal mining	Andekaleka	II - 2	Migrants, Artisanal mine operators, local mine administration and STD
	Forest	Illegal logging		FD2, FD1, (monitoring and control, valorization of NTFP)	VOI and loggers

6	Mine	Gold illegal mining	Ambohimanana (Est CAZ)	II - 2	Migrants, Artisanal mine operators, local mine administration and STD
	Forest	Illegal logging		FD2, FD1, (monitoring and control, valorization of NTFP)	VOI and loggers
7	Forest	Illegal logging	Anjahamana	FD2, FD1, (monitoring and control, valorization of NTFP)	VOI and loggers
	Agriculture	Tavy		AD1 & AD2	Farmers and cooperatives, households
8	Forest	Illegal logging	Ambalarondra	FD2, FD1, (monitoring and control, valorization of NTFP)	VOI and loggers
	Agriculture	Tavy		AD1 & AD2	
	Mine	Gold illegal mining		II - 2	Migrants, Artisanal mine operators, local mine administration and STD
	Mine	Future area of mine exploitation		II - 2	Migrants, Artisanal mine operators, local mine administration and STD
9	Energy	Charcoal production	Foulpointe	ED1,(Promotion and vulgarization of sustainable charcoal), ED2	Households, carbonizers
	Tourism	Implementation of tourism without legal rights to settle in of very close to forests		Promotion of eco-tourism	Tourism operators, land tenure offices administration
10	Tourism	Implementation of tourism without legal rights to settle in of very close to forests	Andevoranto	Promotion of eco-tourism	
	Forest	Charcoal production (National Road 5)		ED1,(Promotion and vulgarization of sustainable charcoal), ED2,	Households, coal producers
11	Forest	Charcoal production	Brickaville	ED1,ED2, Autres 1	coal producers

12	Mine	Gold illegal mining	Ambinaninony	II - 2	Migrants, Artisanal mine operators, local mine administration and STD
13	Agriculture	Ethanol production	Ranomafana Est		Farmers and cooperatives, economic operators
	Forest	Illegal logging		FD2, FD1, (monitoring and control, valorization of NTFP)	VOI and loggers
le long de la route RN2	Forest	Wood fire production (National Road 2) and graphite exploitation		ED1,(Promotion and vulgarization of sustainable charcoal), ED2, II-2	Migrants, Artisanal mine operators, local mine administration and STD

Region Sofia

Area on the map	Sector	Causes of D & D	Suggestion of activities	Beneficiaries
1	Agriculture	Tavy because of lack of arable lands, traditional agriculture practices with low productivity	AD1: Improvement of farm practices (SRI and SRA), providing equipment and farm inputs. AD2: Improvement and promotion of sustainable agroforestry (vanilla, coffee, cloves)	Local people, association of producers, farmers
3	Forest	Wood exploitation for diverse uses but local population doesn't have access to seedlings	FD1 and AD2: Reinforcement and capacity training to implement tree nursery in villages in order to supply enough seedlings locally, restore degraded land, and do afforestation to answer local needs in wood	PA managers, VOI, nurserymen
2	Livestock	Bushfire for grazing, customary practices	AD1: Land use management with a fire rotation system, forage crop, vulgarization of legal text constraining bushfires, elaboration and application of Dina within each grazing unit	Livestock farmers, local population, terroir right holders
4	Energy	Energy wood (charcoal and wood fire)	ED1: vulgarization on the use of improved woodstoves, afforestation of fast growing species of trees for charcoal production in non-forest areas.	Local population, households, coal producers and local tree nursery

Regiona SAVA

Area on the map	Sector	Causes of D & D	Suggestion of activities	Beneficiaries
1	Agriculture	Tavy for annual crops (rice) and cash crops (vanilla and coffee)	AD1: Promotion of tree as stake for vanilla production, revitalize the research center on vanilla sector in Ambohitsara/ Antalaha. Promote enhanced farm inputs (seeds) and build capacity. Vulgarization over the content of AD2	Farmers, cooperatives, and economic operators
	Forest	Charcoal production, illegal fire	FD1, FD2, ED1 and ED2 Promotion of green energy and sustainable charcoal Afforestation and forest restoration Sustainable valorization of wood product (Koloala) Reinforcement of human resources and equipment of forest administration Implement incentives mecanism to promote afforestation	Households, forest administration
2	Mine	Local (voluntary) confusion between collect and exploitation authorization, for gold, gems illegal exploitations.	Improve coordination between forest and mine local administrations (for control) Field control coordinated by Region, DREEF, police force, mayors.	CTD and STD, forest and mine administrations (local)

ANNEX II – SUMMARY OF THE FINANCIAL PLAN

Investment from result-based finance: In USD

Orientations stratégiques	Total	en %	2019	2020	2021	2022	2023	2024	2025	2026	2027	2027	2028
Agriculture	12,672,500	22%			527,000	1,173,000	767,000	2,012,500	1,972,500	2,165,500	2,027,500	2,027,500	0
Forêt et Reboisement énergétique	37,522,500	64%			1,912,500	3,452,500	3,597,500	4,802,500	4,852,500	4,795,000	4,845,000	4,795,000	4,470,000
Energie	3,710,000	6%			0	530,000	530,000	530,000	530,000	530,000	530,000	530,000	0
Activités habilitantes (transversales)	4,545,000	8%			365,000	485,000	460,000	597,500	792,500	417,500	972,500	165,000	290,000
TOTAL	58,450,000		0	0	2,804,500	5,640,500	5,354,500	7,942,500	8,147,500	7,908,000	8,375,000	7,517,500	4,760,000

Financing plan: In USD

Financing plan		2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	TOTAL
Items	Description	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	
Expected uses of funds												
Implementation costs	Costs of ER-Program activities	7,360,252	15,735,750	23,549,220	18,031,054	14,327,636	13,017,395	13,072,815	7,908,000	8,375,000	7,517,500	128,894,622
	Sectorial activities	7,270,587	15,166,598	22,566,220	16,959,713	13,293,933	11,860,791	11,772,655	7,490,500	7,402,500	7,352,500	121,135,997
	AD 1 - Optimize production systems and agricultural and livestock-dedicated infrastructures	4,578,023	9,603,108	11,094,999	5,621,688	2,792,503	870,321	831,024	1,027,500	1,027,500	1,027,500	38,474,165
	AD 2 - Improve the management of cash crop production under the agroforestry system and improve the food security of local communities' riparian to forests	34,342	38,157	1,177,593	1,371,375	1,382,890	1,697,390	1,693,753	1,000,000	1,000,000	1,000,000	10,395,500
	AI 1 - Support the development and setting up of small and medium-sized	0	0	0	34,500	34,500	138,000	138,000	138,000	0	0	483,000

enterprises and/or rural cooperatives and promote the creation of REDD+ mechanism-related subsectors at the local level

FD 1 - Improve the management of forest areas under the landscape approach	172,556	1,152,769	1,653,279	1,516,340	1,494,708	1,495,833	1,401,388	310,000	310,000	310,000	9,816,873
FD 2 - Promote private and community reforestation, rehabilitate degraded forest areas, and reforest in consideration of local needs, without converting natural forests	1,162,878	2,403,194	5,747,970	5,648,235	5,056,060	5,579,878	5,575,837	3,900,000	3,900,000	3,900,000	42,874,051
FI 1 - Reinforce the forest surveillance and monitoring system and regulatory text enforcement, including fire management	1,014,710	1,322,715	1,967,917	1,694,845	1,443,056	1,224,370	1,227,653	260,000	260,000	260,000	10,675,266
FI 2 - Improve the contribution of the forest sector to economic development by promoting the use of non-wood products and other subsectors that do not affect the carbon stock	289,031	606,677	878,437	521,232	548,765	325,000	375,000	325,000	375,000	325,000	4,569,142
ED 1 - Promote improved fuel wood transformation and use techniques, as well as the dissemination of improved coal stoves in urban centers	19,047	39,979	46,026	91,498	81,451	70,000	70,000	70,000	70,000	70,000	628,000
ED 2 - Develop the use of renewable energy (solar, biogas, etc.) for domestic use	0	0	0	380,000	380,000	380,000	380,000	380,000	380,000	380,000	2,660,000
EI 1 - Support the harmonization and development of the legal framework relating to the development of alternatives to fuel wood and sustainable fuel wood supply	0	0	0	80,000	80,000	80,000	80,000	80,000	80,000	80,000	560,000

	Enabling activities	4,762	468,995	876,506	990,375	962,863	1,097,500	1,238,500	417,500	972,500	165,000	7,194,500
	ID 1 - Enhance the benefits delivered by the conservation of biodiversity and ecosystem services	4,762	281,995	308,506	302,375	424,863	297,000	640,000	0	375,000	0	2,634,500
	II 1 - Reinforce land security, including with reforestation actors	0	0	156,000	156,000	186,000	186,000	186,000	170,000	170,000	0	1,210,000
	II 2 - Improve the coordination and monitoring of mining and agricultural developments and ensure the setting up of compensatory reforestation	0	0	110,000	230,000	50,000	255,000	75,000	75,000	255,000	50,000	1,100,000
	II 3 - Reinforce decentralized management and coordination of REDD+ mechanism-related interventions at local level	0	187,000	302,000	302,000	302,000	359,500	337,500	172,500	172,500	115,000	2,250,000
	Suivi et saveguardes à niveau du projet	49,291	63,979	69,954	44,608	34,332	22,595	25,691	0	0	0	310,449
	Communication à niveau du projet	35,613	36,178	36,539	36,358	36,509	36,509	35,970	0	0	0	253,676
	Coût operationnel à niveau de projet	0	0	0	0	0	0	0	0	0	0	0
ER program management costs	ER program management costs (Supervision and governance: (CIME, PFN) et BNC)	304,120	304,120	304,120	304,120	304,120	304,120	304,120	304,120	304,120	304,120	3,041,200
	Planification et Supervision régionale /communale (PFR, BCR, SLC intercommunal et communal)	442,700	442,700	442,700	442,700	442,700	442,700	442,700	442,700	442,700	442,700	4,427,000
	Monitoring (MRV…)	257,335	257,335	257,335	257,335	257,335	257,335	257,335	257,335	257,335	257,335	2,573,350
	Sauvegarde et gestion des plaintes	136,103	136,103	136,103	136,103	136,103	136,103	136,103	136,103	136,103	136,103	1,361,033
	Communication nationale et mainstreaming politique intersectoriel	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	
	Cout de fonctionnement AP	100,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	1,900,000
Total costs		8,650,510	17,126,008	24,939,478	19,421,312	15,717,894	14,407,653	14,463,074	9,298,258	9,765,258	8,907,758	142,697,205

Expected sources of funds													
Secured Grant funding	FCPF readiness	595,129											595,129
	MBG	118,351	131,502	139,895	135,698	139,196	139,196						803,839
	PADAP	6,484,098	13,610,169	15,668,702	7,318,676	3,898,241	0						46,979,886
	CASEF												0
	MNP - 9 AP	689,770	689,770	689,770	689,770	689,770	689,770						4,138,619
	GCF - AP CAZ	0	1,258,000	1,258,000	1,258,000	1,258,000	1,258,000						6,290,000
	WCS/Various sources - AP Makira	68,033	46,310	44,353	44,410	43,929	43,929						
Non secured grant funding	NAMA - AP COMATSA	0	0	2,944,000	2,944,000	2,944,000	2,944,000						11,776,000
Revenue from sale of ERs	ERPA with Carbon Fund	0	0	5,133,835	7,459,332	10,998,990	15,395,658	26,012,185	0	0	0		65,000,000
Total sources		7,955,381	7,955,381	15,735,750	25,878,555	19,849,886	19,972,126	20,470,552	26,012,185	0	0	0	
Net revenue before taxes (=total sources – total uses)		-695,129	-1,390,258	939,077	428,574	4,254,232	6,062,899	11,549,111	-9,298,258	-9,765,258	-8,907,758	-6,822,770	
Cumulative		-695,129	-2,085,388	-1,146,310	-717,737	3,536,495	9,599,394	21,148,505	11,850,247	2,084,989	-6,822,770	-13,645,539	

ANNEX III – CARBON ACCOUNTING

This annex provides additional information on carbon accounting

Annex III.I - Operationalization of the forest definition

Operationalization of the forest definition

In terms of operationalizing the forest definition there are some aspects to clarify:

- **Canopy cover and minimum area thresholds**:

    - Activity Data: As explained in section 8.3, squared sampling units of 0.81 ha with a grid of 25 points are used for collecting the data. These two features are used to classify lands that have a 30% tree canopy cover and 1 ha of minimal area.
    - Emission Factor: Only plots included in forest areas or that even though they don't reach the thresholds within the plot, they are within a forested area, will be considered as forest.

- **Height**: The height threshold refers to the potentiality to reach this height in-situ. In case of no continuous disturbance[105], forest in the Eastern Humid Forest Ecoregion can reach the height in-situ. There are no formations that naturally cannot reach 5 meters.

- **Temporarily un-stocked forest**: According to the IPCC guidelines Forestland "also includes systems with vegetation that currently fall below, but are expected to exceed, the threshold of the forest land category". This usually refers to areas under forest management that are harvested and post-harvesting regrowth is expected.

    - Forest management: In the ER program area, most of cleared areas as part of forest management occurs in plantations, which are generally Eucalyptus plantations. As explained earlier, commercial plantations are not included in this version of the ERPD.
    - Slash-and-burn agriculture: In the ER program area, most of deforestation occurs as a result of a slash-and-burn system called "Tavy" (See Box below). Although vegetation could meet the forest thresholds during the fallow period (usually only in the first rotation), currently evidence shows that after the first cycle, additional cycles follow ending up in permanent conversion to shrubland or grassland. Moreover, experience shows that it would take 15-20 years in order to enable trees to reach the forest thresholds, so it is not expected that within the reference period cleared areas will be able to reach the minimum threshold. Based on this, the assumption made is once total clearing of vegetation is detected, this would constitute a deforestation.

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[105] These are of anthropogenic origin. Natural disturbances such as cyclones are disturbances that cause transient effects in the vegetation.

Box 4. The "Tavy" system.

The "Tavy" system

According to Andriamanjara et al. (2016): "In eastern Madagascar, traditional farming practices of slash and burn, in which the forest is replaced for agriculture by cutting and burning the trees followed by agricultural cycles interspersed with fallow periods, lead to vegetation changes marked by transition of primary forest to grassland (Styger et al., 2007).

The first fallow cycle after deforestation is associated with a tree fallow system where vegetation types are dominated by Trema orientalis and Harungana madagascariensis. From the second to the fifth fallow cycle after deforestation, endemic shrubs, dominated by Psidia atlissima and exotic and invasive species dominated by Rubus moluccanus or Lantana camara, replace the previous tree fallow species resulting in shrub fallow landscapes. Beyond the sixth fallow cycle herbaceous fallows or grasslands dominate, marked by development of grass species and ferns, Imperata cylindrica, and Aristida sp.[106][107] (Styger et al., 2009; Styger et al., 2007)".

- **Forest types**: In order to assign to different forest types, visual interpretation is used:
    - Activity Data: In terms of activity data, visual interpretation of very high resolution imagery together with medium resolution imagery is used. A specific SOP with the interpretation rules is provided. The decision tree for the classification of the different forest types is provided in the following figure.

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[106] Styger, E., Rakotondramasy, H.M., Pfeffer, M.J., Erick, C.M., Fernandes, E.C.M., Bates, D.M., 2007. Influence of slash-and-burn farming practices on fallow succession and land degradation in the rainforest region of Madagascar. Agric. Ecosyst. Environ. 119 (3–4), 257–269.

[107] Styger, E., Fernandes, E.C.M., Rakotondramasy, H.M., Rajaobelinirina, E., 2009. Degrading uplands in the rainforest region of Madagascar: fallow biomass, nutrient stocks, and soil nutrient availability. Agrofor. Syst. 77 (2), 107–122.

Figure 49 – Decision tree for the classification of forest types *Usually this is dense forest that is located within 100 m of the limit of the forest or within 100 m of disturbances of antropic origin

- Emission Factors: As explained in Section 8.3, emission factors were derived from the 2014 inventory of PERR-FH and the 2016 inventory by DVRF. The former targeted natural vegetation, mainly what is considered primary forest, so it was assumed that all sampling units were located in primary forest. The latter targeted secondary forests (Ravenala, Ravenala Mixte, Agroforestry, Savoka Vieux) and disturbed forests (single layer).

Operationalization of the definition of REDD+ activities

Since only deforestation and enhancement of carbon stocks in new forest are included, the operationalization of the forest definition was done in the following way:

▪ Deforestation:

- Human-induced: Natural losses occurred due to cyclones, usually in top of ridges at high altitudes.
- Minimum area: As explained in section 8.3, 0.81 ha squared sampling units are used to collect sample reference data together with a grid of 25 points. This has been used by interpreters in order to identify objects that would classify as forest.
- Permanent vs temporal loss: It is unlikely that forest cover loss occurring within the 10-year reference period will reach the forest threshold, hence, it will be assumed that the

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conversion has been permanent. If after 10 years' forest reconstitutes, this will be considered as a stock enhancement.

- Plantations: Conversion of plantations to non-forest are included in the accounting framework.

▪ Forest degradation:

- Conversion of primary forest to disturbed forest is mapped with very high resolution imagery. Disturbed forest is that forest that shows sign of disturbance or that it is near to areas deforested or disturbed in the recent pas (100 meters from the plot boundary).
- Conversion of primary forest or disturbed forest to agroforestry and plantations is mapped with very high resolution imagery.
- It is assumed that conversions of primary forest or disturbed forest to plantations is a full loss of carbon.

▪ Enhancement of carbon stocks:

- Minimum area: As explained in section 8.3, 0.81 ha squared sampling units are used to collect sample reference data together with a grid of 25 points. This has been used by interpreters in order to identify objects that would classify as forest.
- Plantations: Conversion of non-forest to plantations are considered in this RL

Box 5. Method to estimate emissions from degradation.

Madagascar has decided to apply a stratify and multiply method for estimating GHG emissions from forest degradation, meaning that the natural dense forest will be stratified in accordance with the disturbance: primary forest and disturbed forest. Forest degradation in this case will be the transition from primary forest to disturbed forest.

In order to proceed with the stratification, an indirect approach (GOFC GOLD REDD Sourcebook, 2016) was applied, whereby a natural dense forest would be classified as disturbed if it is located at less than 100 meters from a disturbance, being this a deforestation or a loss of canopy cover that does not comply with the forest definition. This indirect approach was originally tested in DRC by Shapiro et al. (2016) and it was tested as part of the PERR-FH project with success.

BNCR conducted an assessment of the inventory data from natural dense forest and found that there was a trend in terms of average Aboveground Stocks per distance, yet with large variability. The large variability is mainly identified in the first 100 meters as shown here which indicates that forest degradation occurs mainly at these distances.
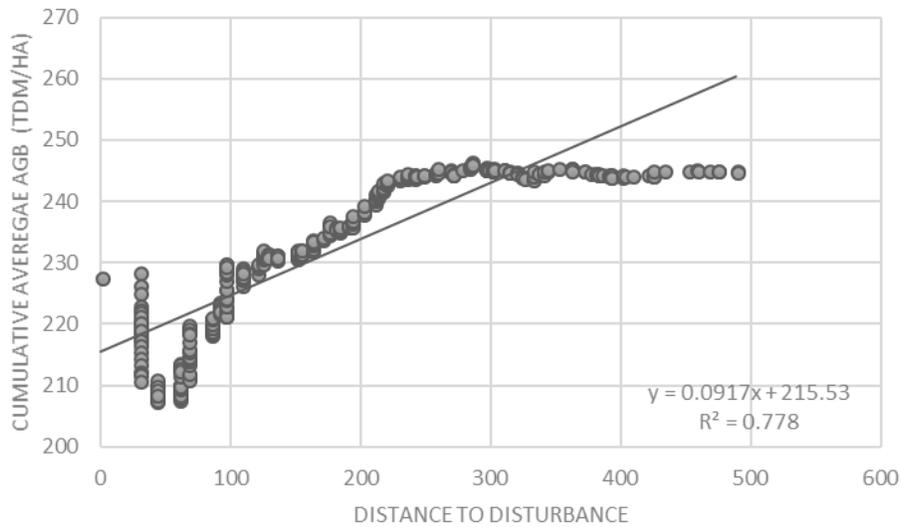
It is believed that this method is conservative as the emission factors have a very low value and the area of forest degradation is reduced to the minimum.
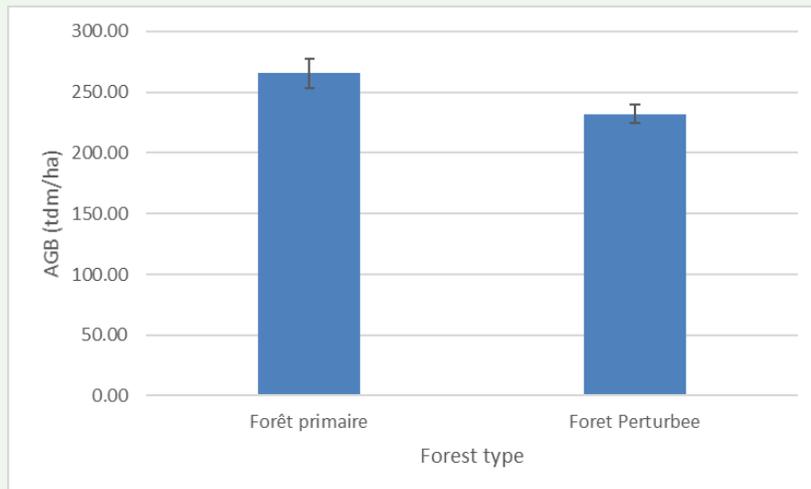
In terms of interpretation of satellite imagery, it is possible for the conditions of Madagascar to be able to identify easily these disturbances and its distance as most of the sampling units are covered with very and high remote sensing imagery. As shown in the below figure, 80% of the points have very high resolution imagery close to 2015.
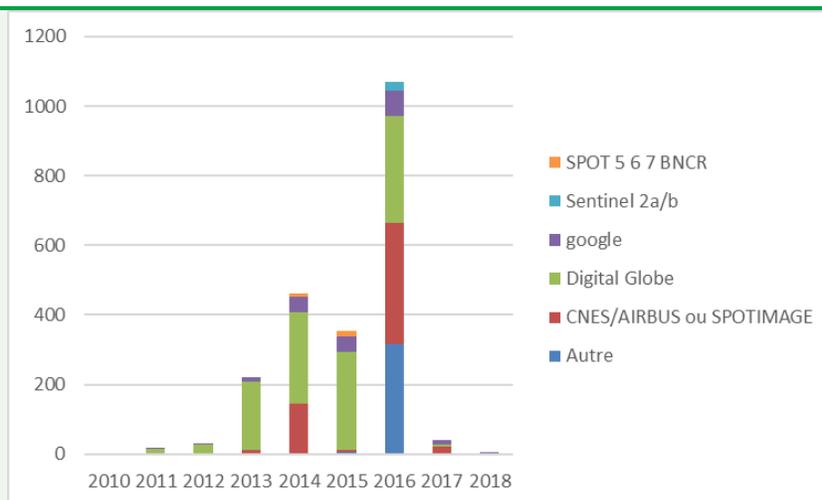
The Standard Operating Procedures of imagery interpretation found here, provide more details on the interpretation of forest degradation.

Annex III.I – Method used for calculating the average historical emissions

In accordance with the methodological framework, the ER Program was developed following the rules and methods proposed by the 2006 IPCC Good Practice Guidelines for National Greenhouse Gas Inventories. Annual GHG emissions or removals over the reference period in the Accounting Area (RL) are estimated as the sum of annual change in total carbon stocks over the reference period in the Accounting Area (ΔC_B) and the non-CO2 GHG emissions (L_{fire}).

$$RL \ = \sum_t (\Delta C_B + L_{fire})$$

Reducing Emissions from Deforestation / Land Use Change of Forest Land to other Land

a. Changes in carbon stocks in biomass

Following the 2006 IPCC Guidelines, the annual change in carbon stocks in biomass on forestland converted to other land-use category (ΔC_B) would be estimated through the following equation:

$$\Delta C_B = \Delta C_G + \Delta C_{CONVERSION} - \Delta C_L$$ Equation 3

Where:

ΔC_B	Change of total carbon stocks during the reference period, in tC per hectare, per year.
ΔC_G	Annual increase in carbon stocks in biomass due to growth on land converted to another land-use category, in tC per hectare and year;

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$\Delta C_{CONVERSION}$ Initial change in carbon stocks in biomass on land converted to other land-use category, in tC per hectare and year;

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 tC per hectare and year.

Following the recommendations set in chapter 2.2.1 of the GFOI Methods Guidance Document for applying IPCC Guidelines and guidance in the context of REDD+, the above equation will be simplified and it will be assumed that:

- The annual change in carbon stocks in biomass (ΔC_B) is equal to the initial change in carbon stocks ($\Delta C_{CONVERSION}$);
- It is assumed that the biomass stocks immediately after conversion is the biomass stocks of the resulting land-use, so ΔC_G and ΔC_L are equal to zero.

Considering equation 2.16 of the 2006 IPCC GL for estimating $\Delta C_{CONVERSION}$ and considering 2.8 b for the estimation of carbon stocks, the change of biomass stocks could be expressed with the following equation.

$$\Delta C_B = \sum_{j,i} \left(AGB_{Before,j} x(1+R_j) - AGB_{After,i} x(1+R_i) \right) x\ CF\ x\frac{44}{12} \times A(j,i) \qquad \text{Equation 4}$$

Where:

$A(j,i)$ Area of forest converted from forest to non forest during the reference period, in hectare per year. In this case, four possible conversions are possible:
- Primary forest to non-forest (DPF);
- Disturbed Forest to Non-Forest (DDF);
- Secondary Forest to Non-Forest (DSF);
- Agroforestry to Non-Forest (DAF);
- Plantations to Non-Forest (DPL);

$AGB_{Before,j}$ Aboveground biomass of forest type j before conversion, in tonne of dry matter per ha. This can be the aboveground biomass of the following two types of forest:
- Primary forest (PF);
- Disturbed Forest (DF);
- Secondary Forest (SF);
- Agroforestry (AF);
- Plantations (PL);

Rj ratio of below-ground biomass to above-ground biomass for a specific vegetation type, in tonne d.m. below-ground biomass (tonne d.m. above-ground biomass)$^{-1}$. This is equal to:
- **0.2** is the default for tropical moist deciduous forest when aboveground biomass is <125 t.d.m./ha according to 2006 IPCC GL, TABLE 4.4, Volume 4, Chapter 4. This is the case for Secondary Forest and Agroforestry.
- **0.24** is the default for tropical moist deciduous forest, >125 t.d.m./ha according to 2006 IPCC GL, TABLE 4.4, Volume 4, Chapter 4. This is the case for primary forest and disturbed forest.
- **3.35** is the root shoot ratio of Eucalyptus plantations according to RAZAKAMANARIVO et al. (2013). This is the case for Plantations.

$\text{AGB}_{\text{After,i}}$ Aboveground biomass of non-forest type I after conversion, in tonnes dry matter per ha. This is the aboveground of **non-forest (NF)**.

R_i ratio of below-ground biomass to above-ground biomass for a specific vegetation type i, in tonne d.m. below-ground biomass (tonne d.m. above-ground biomass)$^{-1}$. This is equal to:

- **0.2** is the default for tropical moist deciduous forest when aboveground biomass is <125 t.d.m./ha according to 2006 IPCC GL, TABLE 4.4, Volume 4, Chapter 4. This is the case for <u>non-forest</u>.

CF Carbon fraction of dry matter in tC per ton dry matter. The value used is:

- **0.47** is the default for tropical forest as per IPCC AFOLU guidelines 2006, table 4.3.

$44/12$ Conversion of C to CO2

b. Changes in carbon stocks in Dead wood and Litter

Considering equation 2.23 of the 2006 IPCC GL for estimating ΔC_{DOM}, the change in dead organic matter carbon stocks could be expressed with the following equation.

$$\Delta C_{DOM} = \frac{(C_n - C_o) x \, A(j,i) \, x \frac{44}{12}}{T_{on}}$$ Equation 5

Where:

$A(j,i)$ area undergoing conversion from old to new land-use category, ha. This is the same as parameter $A(j,i)$ above.

C_o dead wood/litter stock, under the old land-use category, tonnes C ha-1.

For dead wood it will have different values for each of the following forests:

- Primary forest (PF);
- Disturbed Forest (DF);
- Secondary Forest (SF);
- Agroforestry (AF);
- Plantations (PL);

For Litter, a default value for tropical broadleaf forests of **2.1** tC/ha has been used. This has been sourced from 2006 IPCC GL, TABLE 2.2, Volume 4, Chapter 4.

C_n dead wood/litter stock, under the new land-use category, tonnes C ha-1. It has been assumed that this is **zero**.

T_{on} time period of the transition from old to new land-use category, yr. The Tier 1 default is **1 year** for carbon losses, so it has been assumed one year.

$44/12$ Conversion of C to CO2

c. Changes in Soil Organic Carbon

Since in the ER program area there are only mineral soils, considering equation 2.25 of the 2006 IPCC GL for estimating ΔC_{SOC}, the change in soil organic carbon could be expressed with the following modified equation.

$$\Delta C_{SOC} = \frac{\sum_{j,i}\left(\left(SOC_{Before,j} - SOC_{After,i}\right) \times \frac{44}{12} \times A(j,i)\right)}{D}$$

<div align="right">Equation 6</div>

Where:

$A(j,i)$ land area of the stratum being estimated, ha. This is the same as parameter $A(j,i)$ above.

$SOC_{Before,j}$ the reference carbon stock, tonnes C ha-1 for forests. It has been assumed the same value for the following forest types.

- Primary forest (PF);
- Disturbed Forest (DF);

For plantations and Agroforestry it is not accounted for.

$SOC_{After,i}$ the carbon stock, tonnes C ha-1 for **non-forest (NF)**.

$44/12$ Conversion of C to CO2

d. Non-CO2 emissions from deforestation

Following the Equation 2.27 of Volume 4 of the 2006 IPCC GL, GHG emissions from forest fires are estimated with the following equation:

$$L_{fire} = A x M_B x C_f x G_{ef} x 10^{-3}$$

<div align="right">Equation 7</div>

Where

A area burnt, ha, which is equivalent to $A(j,i)$ Area of forest converted from forest to non-forest during the reference period, in hectare per year. This could be the following conversions:

- Primary forest to non-forest (DPF);
- Disturbed Forest to Non-Forest (DDF)
- Secondary Forest to Non-Forest (DSF)
- Agroforestry to Non-Forest (DAF)
- Plantations to Non-Forest (DPL)

M_B mass of fuel available for combustion, tonnes ha-1. This is equivalent to the biomass prior to conversion AGB_j. This is the aboveground biomass in forest areas as afforestation/reforestation does not involve burning prior to conversion.

C_f combustion factor, dimensionless. This is equal to:

- **0.5** for primary forest, as it is the value for primary tropical forest (slash and burn) according to 2006 IPCC GL Table 2.6
- **0.55** for modified natural forest, as it is the value for secondary tropical forest (slash and burn) according to 2006 IPCC GL Table 2.6

G_{ef} emission factor, g kg-1 dry matter burnt. This is equal to:

- **6.8** for CH4 as it is the value for tropical forest according to 2006 IPCC GL Table 2.6
- **0.2** for N2O as it is the value for tropical forest according to 2006 IPCC GL Table 2.6

In order to convert these GHG emissions to tCO2e, GHG emissions from CH4 and N2O are multiplied by the Global Warming Potential for both gases (GWP), so the equation would be as follows:

$$L_{fire} = A(j,i)xAGB_{Before,j}xC_f x(G_{ef_{ch4}}xGWP_{CH4} + G_{ef_{N2O}}xGWP_{N2O})x10^{-3}$$ Equation 8

Where

GWP_{CH4} Global Warming Potential of CH4, = 25

GWP_{N2O} Global Warming Potential of N2O, = 298

From the above, the only parameters that are not default values and that are measured are the following:

Table 93. Parameters for estimation of carbon stock changes from deforestation

	Activity Data
$A(j,i)$	Annual conversion from forest type j (primary forest, modified natural forest), to non-Forest Land uses i (Non-Forest)
$AGB_{Before,j}$	Aboveground biomass of forest type j before conversion, in tonne of dry matter per ha;
$AGB_{After,i}$	Aboveground biomass of non-forest type I after conversion, in tonnes dry matter per ha;
C_o	dead wood/litter stock, under the old land-use category, tonnes C ha-1.
$SOC_{Before,j}$	Soil Organic Carbon at 30 cm depth of forest type j before conversion, in tonne of carbon per ha.
$SOC_{After,i}$	Soil Organic Carbon at 30 cm depth of non-forest type j after conversion, in tonne of carbon per ha.

Reducing Emissions from Degradation / Forest Land remaining Forest Land

Following the recommendations set in chapter 3.1.2 of the GFOI Methods Guidance Document, GHG emissions from degradation will be estimated by taking "account of long-term reductions of carbon densities due to transitions between forest strata and sub-strata, and within the strata and substrata affected by human activity (i.e. MNF and planted forests)". In essence this means, by multiplying activity data of transition between different types of forest by the difference in average carbon stocks.

Considering equation 2.16 of the 2006 IPCC GL for estimating $\Delta C_{CONVERSION}$ and considering 2.8 b for the estimation of carbon stocks, the change of biomass stocks could be expressed with the following equation.

$$\Delta C_B = \sum_{j,i} \left(AGB_{Before,j}x(1 + R_j) - AGB_{After,i}x(1 + R_i)\right) x \, CF \, x\frac{44}{12} \times A(j,i)$$ Equation 9

Where:

$A(j,i)$ Area of forest converted from primary forest to modified natural forest – disturbed forest or to plantation during the reference period, in hectare per year. This could be the following conversions:

- Primary forest to Disturbed Forest (D-PF DF);
- Primary forest to Agroforestry (D-PF AF);
- Primary forest to Plantations (D-PF PL);
- Disturbed Forest to Agroforestry (D-DF AF)
- Disturbed Forest to Plantations (D-DF PL)

$AGB_{Before,j}$ Aboveground biomass of forest type j before conversion, in tonne of dry matter per ha. This is the aboveground biomass of **Primary forest (PF)** or **Disturbed Forest (DF)**;

Rj ratio of below-ground biomass to above-ground biomass for a specific vegetation type, in tonne d.m. below-ground biomass (tonne d.m. above-ground biomass)$^{-1}$. This is equal to:

- **0.24** is the default for tropical moist deciduous forest, >125 t.d.m./ha according to 2006 IPCC GL, TABLE 4.4, Volume 4, Chapter 4. This is the case for <u>primary forest and disturbed forest</u>.

$AGB_{After,i}$ Aboveground biomass of non-forest type I after conversion, in tonnes dry matter per ha. This is the aboveground of **Disturbed Forest (DF)** or **Agroforestry (AF)**.

In the case of **Plantation (PL)** this is assumed to be zero so as to comply with the requirements on Safeguards of the Cancun agreements.

R_i ratio of below-ground biomass to above-ground biomass for a specific vegetation type i, in tonne d.m. below-ground biomass (tonne d.m. above-ground biomass)$^{-1}$. This is equal to:

- **0.24** is the default for tropical moist deciduous forest, >125 t.d.m./ha according to 2006 IPCC GL, TABLE 4.4, Volume 4, Chapter 4. This is the case for <u>primary forest and disturbed forest</u>.
- **0.2** is the default for tropical moist deciduous forest when aboveground biomass is <125 t.d.m./ha according to 2006 IPCC GL, TABLE 4.4, Volume 4, Chapter 4. This is the case for <u>Agroforestry</u>.

CF Carbon fraction of dry matter in tC per ton dry matter. The value used is:

- **0.47** is the default for tropical forest as per IPCC AFOLU guidelines 2006, table 4.3.

$44/12$ Conversion of C to CO2

From the above, the only parameters that are not default values and that are measured are the following:

Table 94. Parameters for estimation of carbon stock changes from degradation

	Activity Data
$A(j,i)$	Annual conversion from forest type j (primary forest), to Forest type i (modified natural forest or plantations)
$AGB_{Before,j}$	Aboveground biomass of forest type j before conversion, in tonne of dry matter per ha;
$AGB_{After,i}$	Aboveground biomass of forest type I after conversion, in tonnes dry matter per ha;

Enhancement of carbon stocks in new forests / Land Use Change from non-Forest Land to Forest

Following the recommendations set in chapter 3.1.4 of the GFOI Methods Guidance Document, enhancement of carbon stocks in afforestation/reforestation will be estimated by multiplying the activity data by the yield tables or growth curves in the generation of changes in carbon density through time on afforested/reforested lands. Since there are no such tables in Madagascar in regenerated forest, it will be assumed that afforested/reforested lands take 15 years to reach the status of Modified Natural Forest (i.e.

secondary forest). This is seen as a better option than using averages, which is the alternative proposed in Chapter 3.14 of GFOI which would be a source of bias.

Therefore, the annual change in carbon stocks would be estimated as follows:

$$\Delta C_B = \sum_{j,i} \frac{\left(AGB_{Before,i} - AGB_{After,j}\right)}{\text{Years growth}} \ x (1 + R) x \ CF \ x \ \frac{44}{12} \times A(i,j)$$

Equation 10

Where:

ΔC_B	Change of total carbon stocks during the reference period, in tC per hectare, per year.
$A(j,i)$	Annual conversion from non-Forest Land use i to forest type j (planted forest or modified natural forest). Area of forest converted from non-forest to forest during the reference period, in hectare per year. In this case, it would be : • Non-forest to Secondary Forest • Non-Forest to forestry
$AGB_{Before,i}$	Aboveground biomass of non-forest type i before conversion, in tonnes dry matter per ha. In this case, it would be the aboveground biomass of **non-forest (NF)**.
$AGB_{After,j}$	Aboveground biomass of forest type j after conversion, in tonne of dry matter per ha. In this case, it would be the aboveground biomass of : • Secondary Forest (SF); • Agroforestry (AF); • Plantations (PL);
R	ratio of below-ground biomass to above-ground biomass for a specific vegetation type i, in tonne d.m. below-ground biomass (tonne d.m. above-ground biomass)[-1]. This is equal to: • **0.2** is the default for tropical moist deciduous forest when aboveground biomass is <125 t.d.m./ha according to 2006 IPCC GL, TABLE 4.4, Volume 4, Chapter 4. This is the case for Secondary Forest, Agroforestry and non-forest. • **3.35** is the root shoot ratio of Eucalyptus plantations according to RAZAKAMANARIVO et al. (2013). This is the case for Plantations.
Years growth	Number of years to transit from Non-forest to forest. The value used is: • **15** years is assumed as the secondary forest is assumed to have 20 years in average and the savouka jeune or non-forest represents a secondary vegetation of 5 years in average.
CF	Carbon fraction of dry matter in tC per ton dry matter. The value used is: • **0.47** is the default for tropical forest as per IPCC AFOLU guidelines 2006, table 4.3.
44/12	Conversion of C to CO2

From the above, the only parameters that are not default values and that are measured are the following:

Table 95. Parameters to estimate the changes in carbon stocks from afforestation reforestation

Activity Data

$A(i,j)$	Annual conversion from non-Forest Land use i to forest type j (planted forest or modified natural forest)
$AGB_{Before,i}$	Aboveground biomass of non-forest type j before conversion, in tonne of dry matter per ha;
$AGB_{After,j}$	Aboveground biomass of forest type i after conversion, in tonnes dry matter per ha;

Annex III.III – Stratification map

Data sources

The study period defined in Madagascar's ERPD is from 2006 to 2015. In this case, three sources of data were used to create a stratification map:

- the results of historical analysis of deforestation over the period 2005-2010-2013 sourced from the PERR-FH project
- The results of the time-series analysis of Landsat images conducted in the ER program area for the period 2005-2016;
- The time series analysis of Hansen over the period 2000-2016.

The historical analysis of deforestation over the period 2005-2010-2013 was conducted by the consortium WCS, ONE, MNP and ETC under the financing of the IDA / GEF Support Project for the Environmental Program, Phase 3 - Additional Financing as part of the project to define reference levels and the MRV system of the wetland ecoregion of eastern Madagascar. The objective is to map the extent of forests and changes in forest cover to determine areas and annual rates of historical deforestation [3].

The results of the time series analysis of the ER program was conducted by Agresta with the support of staff from Manondroala and financed by the WB. In this case forest cover data from 2005 was used together with annual losses from 2005 to 2016. More information may be found on the specific report [2]

The results of time series analysis of Landsat images characterizing the extent and change of the forest, made by Hansen of the University of Maryland and his colleagues [4]. Trees are defined as plants greater than 5 m in height and are expressed as percentages per gate grid cell as "2000 percent tree cover". "Loss of forest cover" is defined as a disturbance of stand replacement, or a change of forest to a non-forest state, during the period 2000-2016. The "forest cover gain" is defined as the inverse of the loss, or a non-forest change to the forest entirely during the period 2000-2016. The year of forest loss is a disintegration of total forest loss at annual time scales. The 2000 and 2016 reference images are median observations from a set of observations of the growing season that have been subjected to a quality assessment [4].

Combination of data sources

The PERR-FH results for the period 2005-2010-2013 were merged with the ER program, giving priority to the ER program results. Then, Hansen results over the period 2013-2016 were used to complete the areas where no data from the ER program was available. These three data sources have an equal spatial resolution (30m x 30m). But the merger was preceded by a co-registration of images; that is, generally, Co-registration refers to the spatial alignment of a series of images, either between two or more volumes of images. Methodologically, this overlaps with realignment and normalization. This is done so that the pixels of the Hansen image are well superimposed with the pixels of the PERR-FH maps and the ER program maps.

Then, the land occupation classes on the 2005-2010-2013-2015 map thus obtained were simplified in order to have simple but very relevant strata over the 2005-2016 period. This is to see the state of occupancy of the soil from 2005 to 2016 instead of subdividing into three period intervals.

And finally, the spatial resolution of the final map (30m x 30m) was re-sampled at 90m x 90m, but in this case we used a majority decision tree:

1. If there is at least one pixel (30m x 30m) of deforestation in the 90m x 90m pixel → classified deforestation
2. If there is at least one pixel (30m x 30m) of afforestation in the 90m x 90m pixel → classified as afforestation / reforestation
3. If there is at least one pixel (30m x 30m) of forest in the 90m x 90m pixel → classified forest
4. Rest → classified non-forest

[1] www.fao.org/docrep/x5684f/x5684f04.htm.

[2] Agresta. 2017. Support for the justification and quantification of ghg emissions from forest degradation and ghg emissions from enhancements of carbon stocks of a proposed emission reduction program in madagascar

[3] http://www.bnc-redd.mg/images/documents/rapports/20170822/141210-FCC_051013_PERR-FH_2014.pdf;

[4] M. C. Hansen , P. V. Potapov, R. Moore, M. Hancher, S. A. Turubanova, A. Tyukavina, D. Thau, S. V. Stehman, S. J. Goetz, T. R. Loveland, A. Kommareddy, A. Egorov, L. Chini, C. O. Justice, J. R. G. Townshend, « High-Resolution Global Maps of 21st-Century Forest Cover Change »,*Science,* 15 Nov 2013, Vol. 342, Issue 6160, pp. 850-853

[5] William G. Cochran, « Sampling

ANNEX IV – SAFEGUARDS PRINCIPLES AND CRITERIA FOR REDD+ IN MADAGASCAR

Résultats attendus	Indicateur	Indicateur de performance de la Stratégie Nationale REDD+	Indicateur de performance des projets REDD+ Communaux/Intercommunaux	Indicateur de performance des grands projets REDD+
Principe a : Les activités REDD+ sont cohérentes avec les programmes forestiers nationaux, complètent les objectifs de la politique forestière, tiennent compte des dina, des législations nationales et des conventions et accords internationaux et contribuent au développement durable au sens large				
Critère a1 Se conformer aux dina, aux instruments légaux communaux et régionaux et aux lois nationales et internationales applicables, ainsi qu'aux traités, aux conventions et aux instruments internationaux ratifiés ou adoptés par le pays				
A11 : La disponibilité de documents juridiques et administratifs témoignant la conformité des activités REDD+ aux dina, aux instruments légaux locaux, communaux et régionaux, et aux lois nationales	**IA11 :** Document justifiant la conformité des activités REDD+ aux instruments légaux au niveau communal, régional (attestation de conformité avec les dina, PCD, SAC) et national	**IA111 :** Disponibilité publique des documents de planification de la mise en œuvre du SN (PTA) les procédures d'application et les rapports de suivi/évaluation de la mise en œuvre de la stratégie nationale REDD+ approuvés par le COPIL et en cours de validité assurant la conformité de la mise en œuvre réalisation de la SN REDD+ avec les lois nationales.	**IA112** : Existence d'un procès-verbal de validation justifiant la conformité des activités REDD+ aux instruments légaux (y compris dina) au niveau communal délivré par le SLC, et au niveau régional délivré par la plateforme régionale	**IA113** : Existence d'un procès-verbal de validation justifiant la conformité des activités REDD+ aux instruments légaux (y compris dina) au niveau communal délivré par le SLC, au niveau local et par la plateforme régionale, (et au niveau national délivré par la PFN-REDD+)
A12 : La disponibilité de documents juridiques et administratifs témoignant la conformité des activités	**IA12** : Document justifiant la conformité de la mise en œuvre delà stratégie nationale REDD+ avec les engagements internationaux.	**IA121** : Disponibilité publique des rapports de suivi / évaluation de la mise en œuvre de la stratégie nationale REDD+ approuvé par		

Résultats attendus	Indicateur	Indicateur de performance de la Stratégie Nationale REDD+	Indicateur de performance des projets REDD+ Communaux/Intercommunaux	Indicateur de performance des grands projets REDD+
REDD+ aux engagements internationaux		le COPIL assurant la conformité avec les engagements internationaux tels le CCNUCC, CDB, OMD, CEDAW)		
Critère a2 : Assurer la cohérence avec, et la contribution aux objectifs nationaux de politique climatique, y compris les stratégies d'atténuation et d'adaptation				
A21 : Les activités REDD+ au niveau local sont alignées sur les politiques et les mesures d'atténuation et d'adaptation au changement climatique.	**IA21 :** Document/preuve préparé par BNCR, vérifié par BNCC validé et délivré par MEEF justifiant la cohérence des activités REDD+ avec la politique nationale en matière de changement climatique	**IA211 :** Disponibilité publique de documents approuvés par le COPIL et en cours de validité concernant la planification de la mise en œuvre de la SN (PTA), les procédures d'application et les rapports de suivi / évaluation justifiant la conformité de la mise en œuvre de la SN REDD+ avec la stratégie nationale en matière de changement climatique	**IA212 :** Disponibilité publique d'un PTA et RAT approuvés par le BRCR justifiant la conformité avec la stratégie nationale en matière de changement climatique de la mise en œuvre des activités REDD+, au niveau communal ou intercommunal,	**IA213 :** Disponibilité publique d'un PTA et RAT validés par le BNCR justifiant la conformité avec la stratégie nationale en matière de changement climatique de la mise en œuvre des Grands projets REDD+ (GPR)
Critère a3 Assurer la cohérence avec, et la contribution aux stratégies nationales de réduction de la pauvreté et aux objectifs de développement durable, y compris les stratégies et plans des autres secteurs, ainsi que les référentiels régionaux de développement.				

Résultats attendus	Indicateur	Indicateur de performance de la Stratégie Nationale REDD+	Indicateur de performance des projets REDD+ Communaux/Intercommunaux	Indicateur de performance des grands projets REDD+
A31 : Les activités REDD+ au niveau local sont alignées sur les stratégies nationales de réduction de la pauvreté et aux objectifs nationaux de développement durable	**IA31** : Document délivré par l'organisme compétent justifiant la cohérence des activités REDD+ avec les stratégies nationales de réduction de pauvreté (PND, PEDD, SNAT)	**IA311** : Disponibilité publique de l'approbation du PTA et RAT, procédures d'application et rapports (SN) par le COPIL préalablement validé par la plateforme REDD+ nationale justifiant la cohérence de la mise en œuvre de la SN REDD+ avec les stratégies nationales de réduction de pauvreté (PND, PEDD, SNAT)	**IA312** : Disponibilité publique du PTA et RAT validés par les SLC et la plateforme REDD+ régionale concernées justifiant la cohérence de la mise en œuvre des activités REDD+ avec les SRAT, SAC et PCD	**IA313** : Disponibilité publique du PTA et RAT validés par les SLCs et les plateformes REDD+ régionale concernées justifiant la cohérence de la mise en œuvre des activités REDD+ avec les SRAT, SAC et PCD
Critère a4 Assurer la cohérence avec, et la contribution aux politiques de préservation de la biodiversité nationale, aux autres objectifs de politiques environnementales et de gestion des ressources naturelles, aux programmes forestiers nationaux et aux engagements internationaux à la stratégie national REDD+.				
A41: Les activités REDD+ sont alignées sur les politiques et stratégies environnementales pertinentes existantes à Madagascar	**IA41** : Document justifiant la cohérence des activités dans le cadre du projet REDD+ avec la stratégie nationale de préservation de la biodiversité, politique environnementale (Polfor, Pnae, PEDD, COAP, Stratégie nationale de gestion durable de la biodiversité)	**IA411** : Disponibilité publique du PTA et RAT validés par le COPIL justifiant la cohérence de la mise en œuvre de la SN REDD+ avec les stratégies nationales environnementales (PND, PEDD, COAP, Stratégie nationale de gestion durable de la biodiversité)	**IA412** : Disponibilité publique du PTA et RAT validés par la BRCR/PF justifiant la cohérence de la mise en œuvre des activités REDD+ avec les stratégies nationales de réduction de pauvreté (PND, PEDD, COAP, SNGDB)	**IA413** : Disponibilité publique du PTA et RAT validés par la BRCR et la PFR ainsi que le BNCR/PFN
Principe b : La stratégie nationale REDD+ contribue à la transparence et l'efficacité des structures nationales de gouvernance forestière tenant compte de la législation et de la souveraineté nationale				
Critère b1 Assurer l'intégrité, la transparence et la redevabilité dans la gestion des fonds et des financements de la stratégie REDD+				

Résultats attendus	Indicateur	Indicateur de performance de la Stratégie Nationale REDD+	Indicateur de performance des projets REDD+ Communaux/Intercommunaux	Indicateur de performance des grands projets REDD+
B11 : Les rapports annuels sur la gestion des fonds REDD+ sont accessibles aux parties prenantes et au public	**IB11 :** Document fournissant les informations sur la gestion des fonds REDD+	**IB111** : Disponibilité publique des rapports financiers annuels de la structure en charge de la gestion des fonds REDD+ (BNCR)	**IB112** : Disponibilité publique des rapports financiers annuels de la structure en charge de la gestion des fonds REDD+ (BRCR)	**IB113 :** Existence d'un document fournissant les informations sur la gestion des fonds REDD+ (rapport financier annuel) pour chaque grand projet REDD + (GPR)
B12 : Les procédures pour la gestion des fonds REDD+ sont bien définies et appliquées	**IB12** : Manuel des procédures financières et administratives claire et validé par l'entité compétente pour chaque projet REDD+	**IB121** : Disponibilité publique d'un manuel de procédure pour BNCR et pour tous les projets REDD+ validé, et des preuves de la mise en œuvre de la procédure ; Rapports d'audit annuel préparé par une entité indépendante	**IB122** : Preuve de mise en œuvre effective des procédures en cours de validité. Rapports d'audit annuel préparé par une entité indépendante	**IB123** : Preuve de mise en œuvre effective des procédures en cours de validité. Rapports d'audit annuel préparé par une entité indépendante.
		IB124 : Disponibilité publique de l'organigramme précisant les fonctions, les objectifs et les missions, les obligations de gestion/suivi/publication d'information de la structure en charge de la gestion des fonds REDD+ (nationale)	**IB125** : Disponibilité publique de l'organigramme précisant les fonctions, les objectifs et les missions, les obligations de gestion/suivi/publication d'information de la structure en charge de la gestion des fonds REDD+ (communal)	Non applicable
Critère b2 Assurer la transparence et l'accès à toutes les informations relatives à la REDD+, notamment la diffusion effective auprès du public en vue de promouvoir une conscientisation générale et la bonne gouvernance.				

Résultats attendus	Indicateur	Indicateur de performance de la Stratégie Nationale REDD+	Indicateur de performance des projets REDD+ Communaux/Intercommunaux	Indicateur de performance des grands projets REDD+
B21 : Les informations concernant les activités REDD+ sont accessibles au public	**IB21 :** Disponibilité des informations sur les activités REDD+ pour le public	**IB211 :** Disponibilité publique à travers plusieurs supports (web, papiers, audio-visuel, etc.) de l'ensemble des informations pertinentes, règles et procédures liées à la SN	**IB212 :** Disponibilité publique à travers plusieurs supports (web, papiers, audio-visuel, etc.) de l'ensemble des informations pertinentes, règles et procédures liées aux activités REDD+ régionale	**IB213 :** Disponibilité publique à travers plusieurs supports (web, papiers, audio-visuel, etc.) de l'ensemble des informations pertinentes et non confidentielles liées au projet
Critère b3 Promouvoir la coordination, la culture de résultats, et la coopération entre les secteurs pour la bonne gouvernance du secteur forestier et celle d'autres secteurs pertinents.				
B31 : Disponibilité des structures et processus de coordination du secteur forestier et les autres secteurs pertinents pour les activités REDD+	**IB31** : Document prouvant l'opérationnalité des plateformes REDD+ (national, régional) et SLC au niveau local, et preuve de participation des différents Ministères en charge de - Forêts - Eau - Agriculture et Elevage - Pêche - Energie - Hydrocarbures - Mines - Aménagement du territoire - Finances - Décentralisation - Justice	**IB311** : Les PV de toutes les réunions de la plateforme REDD+ nationale, une copie de l'invitation avec liste des destinataires et des fiches de présence de tous les participants sont disponibles publiquement.	**IB312** : Les PV de toutes les réunions périodiques de la plateforme REDD+ régionale, une copie de l'invitation avec liste des destinataires et des fiches de présence de tous les participants sont disponibles publiquement.	Non applicable

Résultats attendus	Indicateur	Indicateur de performance de la Stratégie Nationale REDD+	Indicateur de performance des projets REDD+ Communaux/Intercommunaux	Indicateur de performance des grands projets REDD+
	- Gendarmerie 02 Représentants des - organismes nationaux œuvrant dans la protection de l'environnement - des fédérations des communautés de base - du secteur privé - des Partenaires Techniques Internationaux - des Partenaires Financiers - des régions - des universités et organismes de recherche			
Principe c : La stratégie REDD+ reconnaît et respecte les connaissances et les droits aux terres et aux ressources des communautés locales				
Critère c1 Identifier les différents détenteurs des droits (statutaires et coutumiers) et leurs droits aux terres et aux ressources liées aux activités REDD+				
C11 : Les différents détenteurs des droits (statutaires et coutumiers) et leurs droits aux terres et aux ressources dans les zones de mise en œuvre de REDD+ sont identifiés et cartographiés	**IC111**: Base de données/Carte des ayants droits dans les zones concernées par les activités REDD+	**IC1111** : Disponibilité publique des directives de la stratégie nationale en matière de respect des connaissances et en matière de reconnaissances des droits aux terres et aux ressources, y compris des communautés locales	**IC1112** : Disponibilité publique d'une base de données exhaustive/Carte (PLOF) des ayants droits dans les zones d'intervention des activités REDD+	**IC1113** : Disponibilité publique d'une base de données exhaustive/Carte (PLOF) des ayants droits dans les zones d'intervention du projet REDD+

Résultats attendus	Indicateur	Indicateur de performance de la Stratégie Nationale REDD+	Indicateur de performance des projets REDD+ Communaux/Intercommunaux	Indicateur de performance des grands projets REDD+
Critère c2 Identifier et respecter les connaissances traditionnelles et le patrimoine et les pratiques culturels.				
C21 : Disponibilité des documents sur les connaissances traditionnelles, le patrimoine et les pratiques culturelles liées aux activités REDD+	**IC21** : Recueil des connaissances traditionnelles, des traditions locales et les pratiques culturelles liées aux activités REDD+	Non applicable	**IC211** : Disponibilité publique d'un recueil des traditions locales et les pratiques culturelles liées aux activités REDD+	**IC212** : Disponibilité publique d'un recueil des traditions locales et les pratiques culturelles liées aux activités REDD+
C22 : Disponibilité de mécanismes permettant d'assurer le respect des connaissances traditionnelles avec procédures de partage équitable des avantages issues de l'utilisation des connaissances traditionnelles	**IC22** : Structure de dialogue au niveau local permettant de se concerter avec les représentants de communautés (choisis par les communautés concernées, par exemple : Tangalamena) sur le respect des connaissances traditionnelles et les pratiques culturels	Non applicable	**IC221** : Existence et fonctionnement effectif des structures locales de concertation (SLC) au niveau communal et intercommunal dans toutes les zones de mise en œuvre des activités REDD+ permettant de se concerter avec des représentants choisis par les communautés concernées sur le respect des connaissances traditionnelles et les pratiques culturels	**IC222** :Existence et fonctionnement effectif d'une structure locale de concertation (SLC) dans toutes les zones de mise en œuvre des activités REDD+ permettant de se concerter avec les représentants choisis par les communautés concernées, sur le respect des connaissances traditionnelles et les pratiques culturels

Résultats attendus	Indicateur	Indicateur de performance de la Stratégie Nationale REDD+	Indicateur de performance des projets REDD+ Communaux/Intercommunaux	Indicateur de performance des grands projets REDD+
C23 : La conception, la mise en œuvre et l'évaluation de la stratégie REDD+ est bâtie en respectant et en s'appuyant sur les connaissances, les compétences et les systèmes de gestion traditionnels ou autres, des détenteurs de droits, des parties prenantes et des communautés locales	**IC23** :Preuve d'obtention de consentement libre et informé au préalable (CLIP) pour toute utilisation des connaissances traditionnelles, innovations et pratiques des communautés locales pour les activités REDD+. Représentativité des parties prenantes engagées dans le processus de formalisation du CLIP.	**IC231** : Existence d'un Manuel et/ou de directives nationales en matière d'obtention du CLIP spécifiquement relatif à l'utilisation des connaissances	**IC232 :** Preuve d'obtention de consentement libre, et informé au préalable (CLIP) pour toute utilisation des connaissances traditionnelles, innovations et pratiques des communautés locales pour les activités REDD+. Nombre, pertinence et représentativité des parties prenantes signataires du CLIP. Disponibilité publique d'une preuve d'implication des tangalamena, autorité administrative dans le processus de formalisation du CLIP	**IC233** :Preuve d'obtention de consentement libre, et informé au préalable (CLIP) pour toute utilisation des connaissances traditionnelles, innovations et pratiques des communautés locales pour les activités REDD+. Nombre, pertinence et représentativité des parties prenantes signataires du CLIP. Disponibilité publique d'une preuve d'implication des tangalamena, autorité administrative dans le processus de formalisation du CLIP
Critère c3 Veiller à ce qu'il n'y ait aucune réinstallation involontaire ni de restriction à l'accès aux ressources suite aux activités REDD+				
C31 : Transparence en matière de risques de réinstallation involontaire ou de restriction d'accès aux ressources des activités REDD+. Transparence concernant les personnes effectivement	**IC31 :** Base de données et cartes des Personnes Affectées par le Projet (PAP) avec risque de réinstallation involontaire et restriction d'accès aux ressources naturelles	**IC311 :** Disponibilité publique des directives nationale REDD+ en matière de réinstallation involontaire et restriction d'accès aux ressources	**IC312 :** Disponibilité de cartes / listes des Personnes Affectées par le Projet (PAP) identifiées, y compris leurs droits dans le domaine des risques de réinstallation ou restriction d'accès aux ressources des activités REDD+	**IC313 :** Disponibilité de cartes / listes des Personnes Affectées par le Projet (PAP) identifiées, y compris leurs droits dans le domaine des risques de réinstallation ou restriction d'accès aux ressources des activités REDD+

Résultats attendus	Indicateur	Indicateur de performance de la Stratégie Nationale REDD+	Indicateur de performance des projets REDD+ Communaux/Intercommunaux	Indicateur de performance des grands projets REDD+
affectées par la survenance de ces risques.				
C32 : Identification des activités REDD+ avec risque de réinstallation involontaire ou restriction d'accès aux ressources sont identifiées	**IC32** : Liste des projets avec risque de réinstallation involontaire ou restriction d'accès aux ressources	**IC321** : Nombre et pourcentage de projets REDD+ avec fiche de tri/catégorisation environnementale et sociale catégorisée par ONE pour risque de réinstallation involontaire ou restriction d'accès aux ressources ayant pu identifier la liste des activités avec risque de réinstallation ou restriction d'accès aux ressources	**IC322** : Disponibilité publique de la décision d'ONE sur la risque de réinstallation involontaire ou restriction d'accès aux ressources et les actions à entreprendre (évaluation sociale et économique, PAR etc.).	**IC323** : Disponibilité publique de la décision d'ONE sur la risque de réinstallation involontaire ou restriction d'accès aux ressources et les actions à entreprendre (évaluation sociale et économique, PAR etc.).
C33 : Transparence, efficacité et équité de traitement des personnes affectées par le projet.	**IC33** : Plans de réinstallation approuvés. Procédures de réinstallation et de compensation des personnes affectées systématiquement appliquées.	**IC331** : Nombre et pourcentage de projets REDD+ dont des risques de réinstallation ou restriction d'accès aux ressources sont identifiées ayant un plan de réinstallation approuvé. Nombre et pourcentage des projets REDD+ ayant procédé à des réinstallations qui ont respecté leur procédure de compensation des personnes affectées	**IC332** : Disponibilité publique des plans de réinstallation approuvés et de la procédure de réinstallation et/ou compensation. Caractère effectif de la compensation des personnes affectées.	**IC333** : Disponibilité publique d'un plan de réinstallation approuvé et de la procédure de réinstallation et/ou compensation. Caractère effectif de la compensation des personnes affectées.
Critère c4 Obtenir le consentement préalable donné librement et en connaissance de cause des communautés locales pour toute activité ayant une incidence sur leurs droits aux terres et aux ressources, ainsi que respecter et défendre la décision prise.				

Résultats attendus	Indicateur	Indicateur de performance de la Stratégie Nationale REDD+	Indicateur de performance des projets REDD+ Communaux/Intercommunaux	Indicateur de performance des grands projets REDD+
C41 : Disponibilité d'un processus documenté pour obtenir le CLIP des communautés locales affectées par les activités REDD+	**IC41** : Existence d'un Manuel et/ou de directives nationales en matière d'obtention du CLIP pour les activités REDD+	**IC411** : Disponibilité publique d'un standard national y-compris des procédures en matière de CLIP (selon la SN)	Non applicable	Non applicable
C42 : Le CLIP est obtenu des communautés locales pour la mise en œuvre de chaque activité ayant une incidence sur leurs droits aux terres et aux ressources en conformité avec le standard national et les preuves sont rendus publiques pour respecter et défendre les décisions prises	**IC42** :Accord écrit entre le responsable d'un projet REDD+ et les communautés locales se portant sur le consentement de ces dernières pour la mise en œuvre de chaque activité ayant une incidence sur leurs droits aux terres et aux ressources en conformité avec le standard national (chaque activité et chaque changement des activités avec incidence sur les droits doivent faire l'objet d'un accord)	**IC421** : Disponibilité publique des documents justifiant le nombre et pourcentage de projets REDD+ ayant obtenus le CLIP des communautés locales pour chaque activité entraînant une incidence sur leurs droits aux terres et aux ressources.	**IC422** : Existence des accords publiés avec les communautés locales mentionnant leur consentement obtenu suivant les [directives/procédures] nationales pour la mise en œuvre des activités ayant une incidence sur leurs droits aux terres et aux ressources	**IC423** :Existence des accords publiés avec les communautés locales obtenu suivant les [directives/procédures] nationales mentionnant leur consentement pour la mise en œuvre des activités ayant une incidence sur leurs droits aux terres et aux ressources
Principe d : Toutes les parties prenantes en particulier les communautés locales participent pleinement et efficacement aux activités REDD+				
Critère d1 Assurer la participation pleine et effective de toutes les parties prenantes qui veulent s'impliquer dans la conception, la mise en œuvre, le suivi et l'évaluation de la stratégie REDD+ à travers une participation culturelle appropriée et efficace, en prêtant une attention particulière aux groupes les plus vulnérables.				

Résultats attendus	Indicateur	Indicateur de performance de la Stratégie Nationale REDD+	Indicateur de performance des projets REDD+ Communaux/Intercommunaux	Indicateur de performance des grands projets REDD+
D11 : Les parties prenantes des activités REDD+ sont identifiées	ID11 : Liste des parties prenantes pour chaque étape du processus des activités REDD+	ID111 : Disponibilité publique des directives de la SN sur l'identification et la participation des parties prenantes	ID112 : Disponibilité publique de la liste des parties prenantes ou groupes de parties prenantes pour chaque étape du processus des projets allant de la conception jusqu'au suivi	ID113 : Disponibilité publique de la liste des parties prenantes ou groupes de parties prenantes pour chaque étape du processus du projet allant de la conception jusqu'au suivi
D12 : Les parties prenantes sont réellement engagées	ID12 : Plan de participation spécifiant les méthodes et les activités pour assurer la participation effective de chaque groupe de partie prenante identifiée	ID211 : Existence d'un mécanisme/démarche impliquant les parties prenantes pour chaque étape du processus de la Stratégie Nationale REDD+ allant de la conception jusqu'au suivi Nombre et pourcentage de projets REDD+ ayant un mécanisme/démarche impliquant les parties prenantes pour chaque étape du processus du projet allant de la conception jusqu'au suivi	ID212 : Existence d'un mécanisme/démarche impliquant les parties prenantes pour chaque étape du processus des projets allant de la conception jusqu'au suivi	ID213 : Existence d'un mécanisme/démarche impliquant les parties prenantes pour chaque étape du processus du projet allant de la conception jusqu'au suivi
D13 : Implication effective des groupes de parties prenantes dans la conception, la mise en œuvre, le suivi et	ID13 : Preuves documentées (fiche de présence) des parties prenantes impliquées dans la conception, la mise en œuvre, le suivi et l'évaluation de la stratégie REDD+	ID131 : Nombre et pourcentage de projets REDD+ ayant une preuve écrite de l'implication suffisante des groupes de parties prenantes dans les	ID132 : Existence d'une preuve documentée, telle que la fiche de présence des parties prenantes impliquées dans la conception, la mise en œuvre, le suivi et l'évaluation des projets REDD+	ID133 : Existence d'une preuve documentée, telle que la fiche de présence des parties prenantes impliquées dans la conception, la mise en

Résultats attendus	Indicateur	Indicateur de performance de la Stratégie Nationale REDD+	Indicateur de performance des projets REDD+ Communaux/Intercommunaux	Indicateur de performance des grands projets REDD+
l'évaluation des activités REDD+		différentes étapes du processus du projet		œuvre, le suivi et l'évaluation des grands projets REDD+
Critère d2 S'assurer que les parties prenantes disposent des informations suffisantes, fournies d'une manière culturellement appropriée et à temps concernant la REDD+, ainsi que la capacité à participer pleinement et effectivement à la conception, à la mise en œuvre et à l'évaluation de la stratégie REDD+.				
D21 : Les parties prenantes reçoivent à temps voulu les informations sur les activités, les impacts, le partage des avantages du programme/projet REDD+. et au format adapté, avec attention spécifique aux groupes vulnérables	**ID211 :** Stratégie/Plan de communication prenant en considération les différentes cultures de tous les groupes de parties prenantes identifies'	**ID2111 :** Disponibilité publique de la stratégie /plan de communication REDD+ (SN)	**ID2112** Disponibilité effective auprès de toutes les parties prenantes de documents qui expliquent la SN et les projets REDD+, élaborés sous un format et sur un support adapté aux spécificités des différents groupes de parties prenantes ou existence des séances d'information du public sur les activités, impacts et le partage des avantages du programme REDD+ (surtout pour les illettrés)	**ID2113** Disponibilité effective auprès de toutes les parties prenantes de documents qui expliquent la SN et les projets REDD+, élaborés sous un format et sur un support adapté aux spécificités des différents groupes de parties prenantes ou existence des séances d'information au public sur les activités , impacts et le partage des avantages du programme REDD+ (surtout pour les illettrés)
	ID212 : Pourcentage des informations partagées reçues par les parties prenantes, Niveau de compréhension des parties prenantes des informations partagées	**ID2121 :** Disponibilité publique d'un rapport sur l'impact/effet de la mise en œuvre du plan de communication	**ID2122 :** Disponibilité publique d'un rapport sur l'impact/effet de la mise en œuvre du plan de communication de la stratégie nationale et des projets REDD+ dans la région	**ID2123 :** Disponibilité publique d'un rapport sur l'impact/effet de la mise en œuvre du plan de communication de la stratégie nationale et des

Résultats attendus	Indicateur	Indicateur de performance de la Stratégie Nationale REDD+	Indicateur de performance des projets REDD+ Communaux/Intercommunaux	Indicateur de performance des grands projets REDD+
				projets REDD+ dans la région
Critère d3 Assurer la responsabilité et la légitimité de tous les organes qui représentent les parties prenantes				
D31 : Les membres des plateformes et autres entités de concertation REDD+ sont désignés officiellement par les 9 groupes/catégories] de parties prenantes qu'ils représentent	**ID31** : Preuve écrite justifiant la légitimité des représentants des membres de la plateforme REDD+	**ID311** : Existence d'une preuve écrite justifiant la légitimité des représentants de chaque catégorie des parties prenantes membre de la plateforme nationale	**ID312 :** Existence d'une preuve écrite justifiant la légitimité des représentants de chaque catégorie des parties prenantes membre de la plateforme REDD+ (régionale)	Non applicable
Critère d4 Promouvoir et renforcer l'approche genre et l'autonomisation des femmes.				
D41 : Transparence de la différenciation des impacts des activités REDD+ entre les femmes et les hommes	**ID41 :** Cartographie des intérêts et impacts différenciés entre les femmes et les hommes pour les activités REDD+	**ID411** : Disponibilité de la stratégie pour l'intégration de l'approche genre et autonomisation des femmes (SN)	**ID412** : Disponibilité publique de la cartographie des intérêts et impacts différenciés entre les femmes et les hommes pour les différentes activités REDD+	**ID413** : Disponibilité publique de la cartographie des intérêts et impacts différenciés entre les femmes et les hommes pour les différentes activités REDD+
D42 : Mise en œuvre des projets et activités REDD+ favorisant l'autonomisation des femmes, particulièrement celles	**ID42** : Liste des activités REDD+ mis en œuvre favorisant l'autonomisation des femmes	**ID421** : Disponibilité publique d'un rapport d'évaluation de la prise en considération de l'approche genre et autonomisation des femmes dans les activités REDD+ de la stratégie nationale	**ID422 :** Disponibilité publique de la liste des activités REDD+ mises en œuvre favorisant l'autonomisation des femmes	**ID423 :** Disponibilité publique de la liste des activités REDD+ mis en œuvre favorisant l'autonomisation des femmes

Résultats attendus	Indicateur	Indicateur de performance de la Stratégie Nationale REDD+	Indicateur de performance des projets REDD+ Communaux/Intercommunaux	Indicateur de performance des grands projets REDD+
des communautés locales				
D53 : Le suivi / évaluation de l'accès effectif aux avantages REDD+ est sexospécifique	**ID53** : Ecarts hommes / femmes dans l'accès aux avantages des activités REDD+	**ID531** : Nombre de bénéficiaires hommes / femmes	**ID532 :** Nombre de bénéficiaires hommes / femmes	**ID533 :** Nombre de bénéficiaires hommes / femmes
Critère d6 Traiter efficacement les réclamations et les disputes liées à la conception, la mise en œuvre et l'évaluation de la stratégie REDD+, y compris les disputes liées au programme concernant les droits aux terres et aux ressources.				
D61 : Existence d'un mécanisme de gestion de plainte fonctionnel et accessible aux parties prenantes	**ID611** : Mécanisme de gestion des plaintes fonctionnel	**ID6111** : Disponibilité d'un guide de résolution /traitement des plaintes dans le cadre des projets REDD+ (SN)	**ID6112 :** Existence d'un mécanisme de gestion des plaintes fonctionnel au niveau des projets REDD+	**ID6113 :** Existence d'un mécanisme de gestion des plaintes fonctionnel au niveau du projet REDD+
	ID612 : Document /base de données contenant les informations relatives aux plaintes	**ID6121** : Existence d'un MGP fonctionnel et accessible Rapport sommaire du nombre de plaintes reçues, des différents types, des différentes zones, délai moyen de résolution, types de recours	**ID6122 :** Disponibilité publique des griefs des personnes, accessibilité effective au dépôt de grief Délai moyen de résolution des griefs.	**ID6123 :** Disponibilité publique des griefs des personnes, accessibilité effective au dépôt de grief Délai moyen de résolution des griefs.
D63 : Les plaintes liées à la REDD+ sont traités	**ID63** : Proportion des plaintes traitées par rapport aux plaintes enregistrées	**ID631 :** Nombre et pourcentage des plaintes résolues parmi les plaintes enregistrées	**ID632 :%** des plaintes résolues parmi les plantés enregistrées	**ID633 :%** des plaintes résolues parmi les plantés enregistrées

Résultats attendus	Indicateur	Indicateur de performance de la Stratégie Nationale REDD+	Indicateur de performance des projets REDD+ Communaux/Intercommunaux	Indicateur de performance des grands projets REDD+
Principe e : La stratégie REDD+ protège les forêts naturelles contre la dégradation ou leur conversion, accroît les avantages qu'offre la conservation de la biodiversité et des services écosystémiques, et améliore la sécurité des moyens de subsistance et le bien-être à long terme des communautés locales en accordant une attention spéciale aux femmes et aux personnes les plus vulnérables				

Résultats attendus	Indicateur	Indicateur de performance de la Stratégie Nationale REDD+	Indicateur de performance des projets REDD+ Communaux/Intercommunaux	Indicateur de performance des grands projets REDD+
Principe e : La stratégie REDD+ protège les forêts naturelles contre la dégradation ou leur conversion, accroît les avantages qu'offre la conservation de la biodiversité et des services écosystémiques, et améliore la sécurité des moyens de subsistance et le bien-être à long terme des communautés locales en accordant une attention spéciale aux femmes et aux personnes les plus vulnérables				
Critère e1 Veiller à ce que les activités de la REDD+ ne provoquent pas la conversion des forêts naturelles en d'autres utilisations des terres, y compris les plantations forestières, et faire de la réduction de leur conversion une priorité de la REDD+.				
E11 : La superficie totale des forêts naturelles dans chaque commune est maintenue dans les zones de mise en œuvre des activités REDD+	IE11 : Evolution de la superficie totale des forêts naturelles dans les zones de mise en œuvre des activités REDD+	IE111 : Disponibilité publique de la cartographie sur l'évolution des superficies des forêts naturelles dans les zones de mise en œuvre des activités REDD+	IE112 : Evolution de la superficie totale des forêts naturelles dans les zones de mise en œuvre des activités REDD+	IE113 : Evolution de la superficie totale des forêts naturelles dans les zones de mise en œuvre des activités REDD+
Critère e2 Minimiser la dégradation des forêts naturelles et faire de la réduction de leur dégradation une priorité de la REDD+				
E21 : La lutte contre les moteurs de dégradation des forêts fait partie des priorités de la REDD+	IE21 : Existence d'activités REDD+ contribuant à la lutte contre les moteurs de dégradation des forêts	IE211 : Disponibilité publique et mise à jour périodique de l'inventaire des moteurs de dégradation des forêts naturelle et des moyens d'atténuation à privilégier	IE212 : Existence des activités REDD+ contribuant à la lutte contre les moteurs de dégradation des forêts naturelles	IE213 : Existence des activités REDD+ contribuant à la lutte contre les moteurs de dégradation des forêts naturelles
Critère e3 Veiller à ce que la planification de l'utilisation des terres et les activités REDD+ tienne explicitement compte des services rendus par les écosystèmes et de la conservation de la biodiversité en lien avec les valeurs des parties prenantes locales, des synergies éventuelles et des arbitrages potentiels entre les différents avantages.				
E31 : Les services écosystémiques de valeur pour les populations locales dans les zones de mise en œuvre des activités REDD+ sont identifiés et maintenus	IE311 : Liste des services éco systémiques de valeur pour les populations locales dans les zones de mise en œuvre des activités REDD+	IE3111 :Disponibilité publique des directives de la stratégie nationale sur l'identification, maintien et le suivi des services éco systémiques de valeur pour les populations locales dans les zones d'intervention REDD+	IE3112 : Existence d'une liste des services éco systémiques avec priorisation selon leur degré d'importance pour les populations locales et rapport d'évaluation de leur évolution dans les zones de mise en œuvre des activités REDD+	IE3113 : Existence d'une liste des services éco systémiques avec priorisation selon leur degré d'importance pour les populations locales et rapport d'évaluation de leur évolution dans les

Résultats attendus	Indicateur	Indicateur de performance de la Stratégie Nationale REDD+	Indicateur de performance des projets REDD+ Communaux/Intercommunaux	Indicateur de performance des grands projets REDD+
				zones de mise en œuvre des activités REDD+
	IE312 : Changement du niveau d'eau dans les rivières principales en période d'étiage et en saison de pluie	IE3121 : Nombre et pourcentage de projets REDD+ ayant pu maintenir les ressources hydriques	IE3122 : Evolution du niveau d'eau dans les rivières principales en période d'étiage et en saison de pluie	IE312 3: Evolution du niveau d'eau dans les rivières principales en période d'étiage et en saison de pluie
	IE313 : Evolution du taux d'accès de la population en eau potable	Non applicable	IE3131 : % des populations ayant accès à l'eau potable	IE3132 : % des populations ayant accès à l'eau potable
E32 : Un Plan de gestion et de suivi pour la réduction des menaces sur les espèces menacées, est opérationnel dans les zones de mise en œuvre des activités REDD+	IE32 : Preuve de réduction des menaces ou maintien des populations d'espèces menacées dans les zones de mise en œuvre des activités REDD+	IE321 : Nombre et pourcentage de projets REDD+ ayant une preuve de réduction des menaces ou maintien des espèces menacées dans les zones de mise en œuvre des activités REDD+	IE322 : Preuve de réduction des menaces ou maintien des espèces menacées dans les zones de mise en œuvre des activités REDD+	IE323 : Preuve de réduction des menaces ou maintien des espèces menacées dans les zones de mise en œuvre des activités REDD+. Il est à signaler que La méthodologie de mesure de la réduction des menaces sera identifiée par BNCR ultérieurement
Critère e4 Protéger et renforcer le bien-être économique et social des parties prenantes concernées, en produisant des impacts positifs supplémentaires sur la sécurité des moyens de subsistance à long terme des communautés locales tout en réduisant les effets néfastes qui pèsent sur elles, avec une attention particulière aux groupes les plus vulnérables.				
E41 : Réduction des effets néfastes et augmentation des impacts positifs assurant la sécurité des	IE41 : Situation de bien être des communautés locales	IE411 :Disponibilité publique d'une stratégie d'amélioration de bien être des communautés locales	IE412 : Disponibilité publique d'une étude d'impact social/économique et d'un plan d'atténuation des impacts négatifs et de	IE413 : Disponibilité publique d'une étude d'impact social/économique et

Résultats attendus	Indicateur	Indicateur de performance de la Stratégie Nationale REDD+	Indicateur de performance des projets REDD+ Communaux/Intercommunaux	Indicateur de performance des grands projets REDD+
moyens de subsistance à long terme		touchées par les activités REDD+ (BNCR) et d'un rapport d'évaluation des impacts sur le bien être des communautés des projets REDD+ (BNCR) Nombre et pourcentage des projets REDD+ avec disponibilité publique d'une étude d'impact social/économique et d'un plan d'atténuation des impacts négatifs et de renforcement de la situation économique des communautés locales validés	renforcement de la situation économique des communautés locales validés (BRCR)	d'un plan d'atténuation des impacts négatifs et de renforcement de la situation économique des communautés locales validés (Promoteur de projet)
			IE414 : Evolution de l'indice de bien être des communautés locales. Il est à signaler que La méthode de calcul de l'indice de bien être des communautés sera identifiée par BNCR ultérieurement	**IE415 :** Evolution de l'indice de bien être des communautés locales.
Principe des mesures visant à prendre en compte les risques d'inversion sont mises en œuvre notamment le partage équitable des avantages des activités REDD+ entre toutes les parties prenantes pertinentes (voir mécanisme de partage des avantages)				
Critère f1 Evaluer et traiter les risques d'inversion des réalisations REDD+, y compris les futurs risques potentiels pour les stocks de carbone forestier et d'autres avantages afin d'assurer l'efficience et l'efficacité du mécanisme REDD+.				
F11 : l'évaluation des risques d'inversion des réalisations des activités	**IF11 :** Facteurs de risque d'inversion des réalisations des activités REDD+ identifiés	**IF111 :** Nombre de projets REDD+ ayant déjà identifié les	**IF112 :** Existence et actualisation fréquente de la liste des facteurs de risque d'inversion des réalisations REDD+	**IF113 :** Existence et actualisation fréquente de la liste des facteurs de

Résultats attendus	Indicateur	Indicateur de performance de la Stratégie Nationale REDD+	Indicateur de performance des projets REDD+ Communaux/Intercommunaux	Indicateur de performance des grands projets REDD+
REDD+ en matière de réduction d'émissions GES et sur les plans social et environnemental		facteurs de risque d'inversion des réalisations REDD+		risque d'inversion des réalisations REDD+
F12 : Réduction des risques d'inversion des réalisations des activités REDD+	IF12 : Rapport de mise en œuvre de stratégie d'atténuation des risques d'inversion des réalisations des activités REDD+	IF121 :Nombre et pourcentage de projets REDD+ ayant un document de stratégie d'atténuation des risques et produisant des rapports de suivi d'évaluation des risques d'inversion des réalisations des activités REDD+	IF122 : Rapport annuel d'évaluation et de suivi des risques d'inversion des réalisations des activités REDD+, et évaluation de l'évolution des risques	IF123 : Rapport annuel d'évaluation et de suivi des risques d'inversion des activités REDD+, évaluation de l'évolution des risques
F21 : Transparence en matière d'équité de répartition des avantages entre les parties prenantes concernées et de l'attention particulière portée aux groupes vulnérables	IF21 : Existence d'un mécanisme de partage des avantages selon une démarche concertée avec les communautés locales	IF211 : Disponibilité publique des directives de la SN sur le mécanisme de partage équitable, sans discrimination et avec attention particulière portée aux groupes vulnérables	IF212 : Existence d'un mécanisme de partage des avantages déjà fonctionnel approuvé par les communautés locales (ex : comité de concertation locale) avec dispositions particulières spécifiques envers les groupes vulnérables; Effectivité de ce mécanisme et des dispositions particulières.	IF213 : Existence d'un mécanisme de partage des avantages déjà fonctionnel approuvé par les communautés locales (ex : comité de concertation locale) avec dispositions particulières spécifiques envers les groupes vulnérables; Effectivité de ce mécanisme et des dispositions particulières.
G12 : Atténuation des risques de déplacements d'émissions	IG12 : Identification des risques et zones de déplacement de déforestation, Plan d'atténuation des risques de déplacements de la	IG211 : Nombre de projets REDD+ ayant un plan d'atténuation du déplacement de l'émission	IG212 : Existence d'un plan d'atténuation du déplacement de l'émission, % de réalisation du plan	IG213 : Existence d'un plan d'atténuation du déplacement de

Résultats attendus	Indicateur	Indicateur de performance de la Stratégie Nationale REDD+	Indicateur de performance des projets REDD+ Communaux/Intercommunaux	Indicateur de performance des grands projets REDD+
	déforestation et rapport d'évaluation de l'évolution de déforestation dans ces zones			l'émission, % de réalisation du plan

ANNEX V – PROPOSITION OF IMPLEMENTATION OF FGRM FOR REDD+ PER TYPE OF ACTORS AND COMPLAINTS

Niveau	Intervenants	Types de plaintes	Réception Accusé de réception	Localisation	Proposition de réponse Communication au plaignant	Mise en œuvre de la réponse					Clôture	Autres
						Actions directes	*Evaluation approfondie*	*Recherche de solution (médiation arbitrage)*	*Retour d'information*	*Suivi de la mise en œuvre*		
Niveau local	VOI / Fédération des VOI	Plaintes liées à l'utilisation des ressources dont les objets correspondent au DINA	Oui Transmission à CEEF pour BDD	Zones de transfert de gestion	Oui	Oui		Application Dina	Oui	Oui	Oui	
	Autorités traditionnelles	Plaintes liées à l'utilisation des R.N, sociales et culturelles et cultuelles pouvant potentiellement causer préjudice à l'ordre socio-organisationnel local voire régional	Oui Transmission à CEEF pour BDD	Hameau Fokontany Zones d'appartenance ethnique	Oui	Oui			Oui	Oui	Oui	
	Chef Fokontany	Plaintes sociales, foncières et liées à l'utilisation des R.N d'envergure local	Oui Transmission à CEEF pour BDD	Hameau Fokontany	Oui	Oui			Oui	Oui	Oui	
Niveau communal	Commune / intercommunal (OPCI)	- Plaintes sociales, foncières et liées à l'utilisation des R.N d'envergure inter-fokontany et inter-communale	Oui Transmission à CEEF pour BDD	Inter-Fokontany Inter-communal	Oui	Oui	Coordination / Facilitation SLC	Coordination / Facilitation SLC	Oui	Coordination / Facilitation SLC	Oui	

Niveau	Intervenants	Types de plaintes	Réception Accusé de réception	Localisation	Proposition de réponse Communication au plaignant	Mise en œuvre de la réponse					Clôture	Autres
						Actions directes	Evaluation approfondie	Recherche de solution (médiation arbitrage)	Retour d'information	Suivi de la mise en œuvre		
	SLC (Commune)	- Plaintes liées à la gouvernance se rapportant aux conflits d'intérêt d'utilisation de l'espace - Plaintes non résolues au niveau fokontany					Oui	Oui		Oui		
	Gestionnaire de Projet	- Plaintes liées à l'application de la loi dans la ou les zones d'action du projet - Plaintes liées au non-respect des engagements	Oui Transmission à CEEF pour BDD	Site du projet	Oui	Oui	Oui		Oui		Oui	
	Comité de gestion de plaintes du projet						Oui	Oui		Oui		
Niveau district	District	- Plaintes liées à l'utilisation des RN d'envergure inter-communale - Plaintes liées à la gouvernance se rapportant aux conflits d'intérêt d'utilisation de l'espace - Plaintes non résolues au niveau VOI, fokontany ou communal	Oui Transmission à CEEF ou DREEF pour BDD	- Inter-communal - District	Oui	Oui				Oui		

Niveau	Intervenants	Types de plaintes	Réception Accusé de réception	Localisation	Proposition de réponse Communication au plaignant	Mise en œuvre de la réponse					Clôture	Autres
						Actions directes	*Evaluation approfondie*	*Recherche de solution (médiation arbitrage)*	*Retour d'information*	*Suivi de la mise en œuvre*		
	CEEF	Plaintes liées à l'application des lois constatées par l'Agent forestier ou transmis au CEEF car non résolues au niveau local ou par le gestionnaire de projet	Oui Transmission à DREEF pour BDD	- Local - Communal - District	Oui							
	Gestionnaire de Projet	- Plaintes liées à l'application de la loi dans la ou les zones d'action du projet - Plaintes liées au non-respect des engagements	Oui Transmission à DREEF pour BDD	Site du projet	Oui	Oui			Oui		Oui	
	Comité de gestion de plaintes du projet					Oui	Oui			Oui		
Niveau régional	Région / Préfecture	- Plaintes liées à l'utilisation des RN d'envergure interdistrict - Plaintes liées à la gouvernance se rapportant aux conflits d'intérêt d'utilisation de l'espace - Plaintes non résolues au niveau communal ou district	Oui Transmission à DREEF pour BDD	- Interdistrict - Région - Gouvernance	Oui	Oui	Coordination / Facilitation SLC	Coordination / Facilitation SLC	Oui	Coordination / Facilitation SLC	Oui	
	SLC (Région)					Oui	Oui			Oui		

Niveau	Intervenants	Types de plaintes	Réception Accusé de réception	Localisation	Proposition de réponse Communication au plaignant	Mise en œuvre de la réponse					Clôture	Autres
						Actions directes	Evaluation approfondie	Recherche de solution (médiation arbitrage)	Retour d'information	Suivi de la mise en œuvre		
	DREEF	Plaintes liées à l'application des lois constatées par l'Agent forestier ou transmis au DREEF car non résolues au niveau local, CEEF ou par le gestionnaire de projet	Oui Transmission à BNCR pour BDD	Tous les niveaux (région et sous-région)	Oui							
	Plateforme régionale REDD+ [108]	- Plaintes liées à la mise en œuvre du programme REDD+ - Rétroaction (plaintes liées à la gouvernance, iniquité, liées au non-respect des engagements)	Oui Transmission à BNCR pour BDD et aux instances compétentes pour traitement	Zones de programme REDD+								
Niveau national	BNC REDD+	Rétroaction (plaintes liées à la gouvernance, iniquité, liées au non-respect des engagements)			Oui	Oui				Oui	Oui	Gestion BDD plaintes Transmission au gestionnaire du site web Transmission à l'Unité indépendante de Suivi - évaluation

[108] Plateforme régionale : Revoir par rapport à la mission qui leur sera attribuée

Niveau	Intervenants	Types de plaintes	Réception Accusé de réception	Localisation	Proposition de réponse Communication au plaignant	Mise en œuvre de la réponse					Clôture	Autres
						Actions directes	Evaluation approfondie	Recherche de solution (médiation arbitrage)	Retour d'information	Suivi de la mise en œuvre		
	Plateforme nationale REDD+	Plaintes liées à la mise en œuvre du programme REDD+ - Rétroaction (plaintes liées à la gouvernance, iniquité, liées au non-respect des engagements)	Oui Transmission à BNCR pour BDD et aux instances compétentes pour traitement									
	DGF / Directions		Oui Transmission à BNCR pour BDD		Oui	Oui	Coordination / Facilitation Comités intersectoriels	Coordination / Facilitation Comités intersectoriels	Oui	Coordination / Facilitation SLC	Oui	
	Comités intersectoriels						Oui	Oui		Oui		
	Gestionnaire d'autres programmes sectoriels	Plaintes liées à la mise en œuvre du programme REDD+		Zones du programme	Oui	Oui			Oui	Oui	Oui	
	Unité indépendante de Suivi-évaluation	Toutes catégories										Suivi-évaluation

ANNEX VI – NATIONAL LAW AND REGULATORY TEXTS LINKED TO SAFEGUARDS

PRINCIPES pour Madagascar	TEXTES ET LOIS REGISSANT
a) Les activités REDD+ sont cohérentes avec les programmes forestiers nationaux, complètent les objectifs de la politique forestière, tiennent compte des dina, des législations nationales et des conventions et accords internationaux et contribuent au développement durable au sens large	**Secteur environnement** Charte de l'environnement actualisée, loi n° 2015-003: fixe les règles de gestion de l'environnement en reconnaissant le rôle important de la biodiversité unique et des ressources naturelles de Madagascar, pose le principe de participation du public, le droit pour chaque individu d'accéder aux informations, priorise notamment les activités de restauration des habitats écologiques dégradés, de lutte contre les feux, lutte contre la conversion des forêts en terrains agricoles, de reboisement, etc. Code de gestion des Aires protégées (loi COAP n° 2005-005) : prévoit l'adoption de mesures de sauvegarde ou d'activités alternatives génératrices de revenus compensant les restrictions au droit de propriété ou au droit d'usage **Secteur forêt** Le décret n° 98-782 (exploitation forestière) exige des plans d'aménagement pour assurer la gestion durable des forêts et une étude d'impact environnemental pour toute activité à caractère économique entreprise dans les forêts **Secteur agriculture et élevage** L'Ordonnance n° 62-123 sur le classement en zone à vocation forestière, pastorale ou agricole des terres de Madagascar prévoit l'interdiction de la divagation et le pacage des animaux que dans les zones classées à vocation forestière ou de protection. L'Ordonnance n° 60-127 fixant le régime des défrichements et des feux de végétation interdit tous défrichements à l'intérieur du domaine forestier national et des zones en défens. **Secteur foncier et aménagement du territoire** Loi n° 2015-051 portant orientation de l'Aménagement du Territoire pose le principe de responsabilité de l'Etat, des Provinces, des Régions et des Communes dans la mise en valeur du territoire et le développement équilibré du territoire. La loi Foncière n° 2005-019 prévoit dans son article 38 des régimes spécifiques pour des aires qui seront soumises à un dispositif juridique particulier **Secteur mines**

	La Loi n° 99-022 portant Code minier dispose que le Ministère chargé des Mines et le Ministère chargé de l'Environnement veillent au respect des règles visant à la protection environnementale par les titulaires de permis miniers. **Loi MECIE** Le décret MECIE stipule que l'exécution du PGEP consiste en l'application par le promoteur des mesures prescrites pour supprimer, réduire et éventuellement compenser les conséquences dommageables sur l'environnement. **Secteur énergies** La loi n° 98-029 portant Code de l'Eau prévoit que la protection des forêts naturelles ou des forêts de reboisement est soumise aux dispositions prévues par la loi n° 97-017 du 16 Juillet 1997, et celles portant sur le régime des défrichements et des feux de végétation. **Secteur GIZC** Décret n° 2010-137 : prise en compte dans tout projet de développement et d'aménagement de la conservation de l'intégrité écologique des écosystèmes côtiers
b) Les structures nationales de gouvernance forestière sont transparentes et efficaces et tiennent compte de la législation et de la souveraineté nationale; **La stratégie nationale REDD+ contribue à la transparence et l'efficacité des structures nationales de gouvernance forestière tenant compte de la législation et de la souveraineté nationale**	**Secteur environnement** La loi n° 2015-003 consacre la notion de Gouvernance environnementale qui respecte l'égalité de traitement des acteurs, l'équité et la transparence Le COAP loi n° 2005-005 prévoit des types de gouvernance répondant aux pratiques nationales et internationales des ressources naturelles (la gouvernance publique, la gouvernance partagée ou cogestion, la gouvernance privée et la gouvernance communautaire) **Secteur forêt** Absence de dispositions prônant les principales de bonne gouvernance (transparence, redevabilité) dans les législations et règlementations forestières actuelles. *Propositions :* Elaborer ou améliorer les dispositions juridiques sectorielles dans la prévention des conflits d'intérêts et des cas de corruption qui peuvent constituer des blocages dans le cadre de la préparation à la REDD+ et de la mise en œuvre de sa politique. **Secteur Foncier et aménagement du territoire** L'aménagement du territoire revêt une dimension transversale incluant la gestion foncière, l'environnement, l'exploitation minière, etc. **Agriculture et élevage**

	Absence de mention dans les textes. Proposition : Instaurer et préciser les principes de bonne gouvernance environnementale prévus dans la PGE et les politiques environnementales dans les législations forestières et sectorielles
	Secteur mines Code minier et décret d'application associent les Collectivités Territoriales Décentralisées (Provinces Autonomes, Régions, Communes) en leur donnant des compétences spécifiques dans la gestion des activités minières jusqu'au niveau local.
	Secteur MECIE L'Arrêté n° 6830/2001 régit les procédures de participation du public à l'évaluation environnementale qui consacre le droit à l'information.
	Secteur énergie Absence de mention dans les textes. Proposition : Instaurer et préciser les principes de bonne gouvernance environnementale prévus dans la PGE et les politiques environnementales dans les législations forestières et sectorielles
	Secteur GIZC Décret 2010-137, qui vise l'amélioration des processus de gouvernance en les rendant plus équitables, transparents et dynamiques, par et pour le bénéfice des communautés et de la nation.
c) Le programme REDD+ reconnaît et respecte les connaissances et les droits aux terres et aux ressources des communautés locales et évalue les effets négatifs potentiels sur leurs conditions de vie à long terme et atténue ces effets s'il y a lieu en veillant à la justice sociale	**Secteur environnement** La Charte de l'Environnement assure la protection du bien-être socio-économique des communautés de base dans la gestion des ressources naturelles, le développement socioculturel et économique dans le but d'obtenir la synergie entre les coutumes et tradition et le développement de la science et de la technologie Le COAP prévoit que les règles de gestion de l'AP doivent faire prévaloir, autant que possible, le respect des normes et des pratiques traditionnelles (Dina, fady, lieux sacrés forestiers, aquatiques ou autres) observées par les communautés locales concernées. **Secteur forêt** La loi n° 97-017 autorise les membres du Fokonolona à exercer leurs droits d'usage traditionnels individuellement ou collectivement dans les forêts. Le décret GCF n° 2001-122 prévoit la gestion des droits d'usage individuellement ou collectivement par les membres de la communauté de base. **Secteur Foncier et aménagement du territoire**

	La loi foncière n° 2005-019 fixe le régime juridique de la propriété foncière privée non titrée (PPNT), applicable à l'ensemble des terrains, urbains comme ruraux appropriés selon les coutumes et les usages du moment et du lieu.
	Agriculture et élevage L'Ordonnance n° 62-123 sur le classement en zone à vocation forestière, pastorale ou agricole interdit la divagation et le pacage des animaux dans les zones classées à vocation forestière ou de protection, et l'Ordonnance n° 60-127 fixant le régime des défrichements et des feux de végétation
	Secteur mines Le Code minier et son décret d'application prévoit la protection des de propriétés closes de murs, village, groupe d'habitations, puits et sources, édifices religieux, lieux de sépulture et lieux considérés comme sacrés ou tabous sans le consentement écrit du propriétaire, ou des autorités administratives locales
	Secteur MECIE Il prévoit le recueil des avis de la population affectée.
	Secteur énergie Le décret n° 2003-942 relatif à l'utilisation hydroélectrique de l'eau détaille les obligations des concessionnaires dans la protection des sites et des paysages.
	Secteur GIZC Le décret N°2010-137 reconnaît les connaissances écologiques traditionnelles des populations côtières et leur rôle dans la conservation et la pérennité des zones côtières et marines
d) Toutes les parties prenantes en particulier les communautés locales et les détenteurs de droits aux terres et aux ressources participent pleinement et efficacement aux activités REDD+ avec leur consentement libre, informé et préalable	**Secteur environnement** La Charte de l'Environnement associe l'Etat, les Collectivités territoriales décentralisées avec les concours des communes et du population locales, la société civile, les communautés locales, le secteur privé et tous les citoyens, pour une gestion pérenne de l'environnement et de ses services. Le COAP prévoit la prise en compte des avis du public au niveau local et régional, notamment dans l'élaboration des plans de gestion, et les avis de l'administration au niveau régional et national pour sa validation. **Secteur forêt** La loi n° 96-025 sur le transfert de gestion des ressources naturelles renouvelables permet de confier aux Communautés de base (COBA) la gestion de ces ressources qui sont comprises dans les limites de leur terroir.

	La loi n° 97-017 portant révision de la législation forestière prévoit la participation effective des Fokonolona à la conservation durable des ressources naturelles renouvelables (droits d'usage).
	Le décret n° 98-782 prévoit que l'administration forestière consulte et associe les parties prenantes y compris populations riveraines concernées au processus de décisions relatives à la gestion forestière.
	Le décret n° 2005-849 prévoit que la Commission forestière est constituée d'un échantillon représentatif des parties prenantes du secteur forestier.
	Secteur Foncier et aménagement du territoire
	La loi sur l'Aménagement du territoire prévoit la participation de toutes les parties prenantes à la prise des décisions en matière d'aménagement du territoire ainsi qu'à sa mise en oeuvre et à son évaluation.
	Agriculture et élevage
	L'Ordonnance n° 60-127 prescrit que les communes rurales ou collectivités rurales coutumières ou de droit exercent la surveillance des défrichements et des feux de végétation
	Secteur mines
	Participation des parties prenantes non prévue. A insérer dans le nouveau code minier
	Secteur MECIE
	Il est dit que la consultation du publique soit fait sur place et les résultats seront intégré dans l'EIE
	Secteur énergie
	Le décret n° 2003-942 relatif à l'utilisation hydroelectrique de l'eau dispose que la concession et l'autorisation font l'objet, au préalable, d'étude d'impact environnemental
	Secteur GIZC
	Décret n° 2010-137 implique un partage des responsabilités, prises individuellement et/ou collectivement dans la gestion marine et côtière.
e) La stratégie REDD+ protège les forêts naturelles contre la dégradation ou leur conversion, accroît les avantages qu'offre la conservation de la biodiversité et des services écosystémiques, et améliore la sécurité des moyens de subsistance et le bien-être à	**Secteur environnement** - La Charte précise d'améliorer et renforcer la gouvernance des filières bois, espèces faunistiques et floristiques de Madagascar pour préserver au mieux la biodiversité et limiter l'illégalité notamment dans les régions productrices. - Le COAP prévoit l'adoption de mesures de sauvegarde ou d'activités alternatives génératrices de revenus pour les diverses parties prenantes compensant les restrictions au droit de propriété ou au droit d'usage induites par la constitution et les mesures de gestion d'une AP.

long terme des communautés locales en accordant une attention spéciale aux femmes et aux personnes les plus marginalisées et/ou vulnérables	**Secteur forêt** - La loi n° 97-017 prévoit que les réserves naturelles intégrales, les parcs nationaux, les réserves spéciales et les forêts classées, dans le respect des conventions internationals, ne sont pas susceptibles de distraction au régime forestier - Le décret GCF n° 2001-122 dispose que l'exploitation desdites ressources ne doit pas porter atteinte à la capacité productive ou reproductive de la forêt à la biodiversité. **Secteur Foncier et aménagement du territoire** La loi n° 2015-051 portant Orientation de l'Aménagement du territoire pose le principe : → de réserver à l'agriculture suffisamment de bonnes terres cultivables, en particulier, des surfaces d'assolement; → de procéder à l'identification des actions prioritaires pour le remodelage du territoire national; → de veiller à ce que les aménagements pris isolément ou dans leur ensemble ainsi que les installations s'intègrent dans le paysage; → de maintenir la forêt dans ses diverses fonctions. **Agriculture et élevage** - L'Ordonnance n° 62-123 prévoit que dans les zones classées à vocation forestière ou de protection, la divagation et le pacage des animaux sont et demeurent interdits. - L'Ordonnance n° 60-127 prescrit que les communes rurales ou collectivités rurales coutumières ou de droit exercent la surveillance des défrichements et des feux de végétation commis sur toute l'étendue et au voisinage des terres de leur faritany traditionnel ou de droit, y compris celles qui font l'objet d'un titre d'occupation temporaire, ainsi que sur les terres qui font l'objet d'un titre définitif de propriété. **Secteur mines** - Le Code minier oblige l'exploitant minier de prendre les mesures de protection nécessaires pour minimiser et réparer tout dommage pouvant résulter des travaux conduits dans le cadre des activités minières. - L'exploitant minier est responsable de toute dégradation de l'environnement du fait de ses travaux. - Cette responsabilité n'est limitée que dans la mesure où il exerce dans le respect des lois et règlements régissant les activités minières ainsi que ceux visant à la protection de l'environnement. **Secteur MECIE** - Les projets d'investissements publics ou privés, qu'ils soient soumis ou non à autorisation ou à approbation d'une autorité administrative, ou qu'ils soient

	susceptibles de porter atteinte à l'environnement doivent faire l'objet d'une étude d'impact.
	Secteur énergie - La loi n° 98-032 portant réforme du secteur de l'électricité impose le respect des législations en matière de protection de l'environnement. - Le Code de l'Eau pose le principe de renforcement de la lutte contre la pollution des eaux, l'articulation des règles de protection et de mise en valeur des ressources en eau avec les normes environnementales, le principe de pollueur payeur. - Le décret n° 2001 – 173 stipule que la construction, l'exploitation et l'entretien des Installations sont soumises à des règles administratives, des normes techniques et à des réglementations de sécurité, de protection de l'environnement et des populations sur toute l'étendue du territoire de la République de Madagascar. **Secteur GIZC** Décret 2010-137: - Améliorer la qualité environnementale, afin de s'assurer du maintien ou de la restauration, de la promotion de la diversité économique, sociale et écologique, ainsi que de la productivité d'une zone donnée. - Les actions de gestion, d'exploitation des ressources des milieux marins et côtiers doivent être entreprises en tenant compte des interrelations au sein et entre les écosystèmes constitutifs de cet ensemble terre-mer, dont l'homme est partie intégrante.
f) Des mesures visant à prendre en compte les risques d'inversion sont mises en œuvre notamment le partage équitable des avantages du programme des activités REDD+ entre tous les détenteurs des droits et parties prenantes pertinentes (voir mécanisme de partage des avantages) **g)** Des mesures visant à réduire les déplacements d'émissions sont prises	On constate l'absence des deux dernières garanties de Cancun dans la législation nationale Malagasy. Ce vide juridique peut impacter sur la mise en place du programme REDD+ à Madagascar. **Propositions:** - Procéder à des réformes juridiques ou réglementaires pour résoudre les problèmes systémiques en vue d'assurer le bon suivi du bois récolté légalement, et remédier aux lacunes en matière de données, le blanchiment des permis et le manque de données cohérentes nécessaires au suivi des permis. - Introduire ces deux garanties dans l'ordonnancement juridique des secteurs concernés par la REDD+ (Environnement, Forêt, Aires protégées)

REPOBLIKAN'I MADAGASIKARA
Fitiavana · Tanindrazana · Fandrosoana

CONSERVATION INTERNATIONAL
Madagascar

Road Map

The contribution of the

Sustainable Landscapes in Eastern Madagascar Project

(GCF FP026)

to Madagascar's National REDD+ implementation arrangements

May 2018

Introduction

In October 2016, the Green Climate Fund approved the project titled, "Sustainable Landscapes in Eastern Madagascar". The overall goal of this project is to implement sustainable landscape measures to enhance the climate resiliency of smallholders, reduce GHG emissions and channel private finance into climate-smart investments in agriculture and renewable energy that transform livelihoods. The two priority landscapes for the project are the sites of two of the three REDD+ pilot projects that are officially recognized by Madagascar, Ambositra Vondrozo Forest Corridor (COFAV) and the Ankeniheny-Zahamena Forest Corridor (CAZ). The GCF project is beginning at the time when Madagascar recently finalized its National REDD+ Strategy and the design of its jurisdictional REDD+ program, and is beginning REDD+ implementation. This document is a roadmap that describes the ways in which the GCF project will be aligned with and contribute to the establishment of Madagascar's national REDD+ implementation arrangements.

This roadmap was developed by Conservation International (CI) in collaboration with the Government of Madagascar (GoM) agency responsible for the national REDD+ strategy (BNC-REDD+), Madagascar's GCF Focal Point, and the technical team supporting the Forest Carbon Partnership Facility (FCPF) activities in Madagascar, through the BNC-REDD+.

The context of REDD+ in Madagascar

Activities related to REDD+ have been ongoing in Madagascar since the early 2000's, when payments for avoided deforestation were seen as a way to fund the expansion of the country's protected area system. Madagascar was one of the first countries in the world with operational forest carbon projects, and it was among the first countries to request support from the Forest Carbon Partnership Facility (FCPF) for the development of a national REDD+ program. At the present date, Madagascar continues to advance REDD+ initiatives at multiple scales in parallel. A national REDD+ program is being developed to fully conform with UNFCCC decisions related to REDD+, a jurisdictional REDD+ program has been developed and will begin implementation in 2019, while sub-national activities are ongoing in projects that support the management of government-designated Protected Areas. While the simultaneous operation of REDD+ activities at different scales adds complexity, it is also viewed by the GoM as a strength, bringing multiple actors together to generate the information, capacities, and incentives needed to measure and reduce emissions through forest conservation.
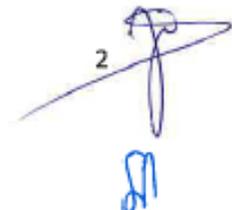
Madagascar is home to three REDD+ pilot projects (Makira, CAZ, and COFAV) that were designed to provide technical and financial support for the management of government-designated Protected Areas and generate and sell carbon credits to finance forest conservation activities. While carbon finance has been an important source of finance for all three projects, finance for activities to protect these forests and develop carbon projects has come from a variety of sources including governments (USAID and the Government of Madagascar), private foundations, and corporations (e.g. Dell, Toyota). The CAZ project was also the subject of a 2008 agreement between the Government of Madagascar and the World Bank's BioCarbon Fund to sell the first 430,000 verified emissions reduction units generated by the project. These three forest conservation projects, along with multiple research-oriented projects have made significant contributions to the national REDD+ process. They generated a great amount of knowledge and data, built capacities at various levels, and triggered discussion among stakeholders on key issues of REDD+ including the four elements of REDD+ as defined by the UNFCCC.

Madagascar was an early mover in building the capacity of its government to implement REDD+, and its Readiness Program Idea Note was accepted by the FCPF in 2008. However, due to political unrest and the resulting suspension of most international aid, the Readiness proposal was not approved until 2014 when US$3.8M was released by the FCPF. Meanwhile, other REDD+ initiatives were born and added to the activities conducted by the pilot projects. The French Development Agency provided funding to strengthen the capacity of the National Environment Office (ONE) and developed the skills of government technicians on carbon stock inventories, satellite image classification, and safeguards issues. A consortium of government agencies and non-governmental organizations (WCS, MNP, Etc Terra and ONE) received funding from the Global Environment Facility (GEF) and prioritized its work on the eastern humid ecoregion, forming the basis of the current Emissions Reduction Program (ER-P). The country also received support from the UN-REDD Programme to conduct a Country Needs Assessment. In 2016, Madagascar was granted an additional $5 million by the FCFP to complete the development of its REDD+ strategy, which has been validated and is currently in the process of integration into Madagascar's legal framework for REDD+.

Since the end of the political crisis in 2014, considerable progress on REDD+ has been made in the country. The government established a new national REDD+ agency, the BNC-REDD+ (Bureau National de Coordination REDD+), along with National and regional multi-stakeholder REDD Platforms that are supporting the BNC-REDD+ to develop and implement the National REDD+ strategy, as well as regional strategies and action plans. Technical groups on carbon measurement methods (Groupe Methodologique Carbone- GMC) and on safeguards (Groupe Technique Sauvegardes) were also established to assist the BNC-REDD+ and its consultants on technical issues. CI is a member of the National and Regional Platforms and participates in GMC and GTS working groups. This active participation in national structures promotes the flow of information that will allow the GCF project to align with the national REDD+ process and enable information to be shared with national stakeholders about the implementation of REDD+ activities on the ground. One example of this two-way information flow is the sharing of this

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roadmap with the National Platform, which will be done at an upcoming meeting of the Platform.

Examples of Madagascar's advancement include the launch of the Geomatics Lab ("Laboratoire Géomatique") hosted by BNC-REDD+, which will manage the Satellite Land Monitoring System of the Ministry of Environment and Forests, and the subsequent submission of the country's first national Forest Reference Emission Level (FREL) to the UNFCCC in January 2017. Based on updated methods and data collection for the national and subnational REDD+ program, Madagascar submitted a revised version of its FREL in 2018 and will submit a newly revised version by January 2019. A strategic environmental and social assessment (SESA) was conducted to refine the national REDD+ strategy options which led to development of an Environmental and Social Management Framework (ESMF) and other frameworks to manage social and environmental risks and enhance non-carbon benefits from REDD+ implementation. In addition, a Safeguards Information System has been developed, as well as a feedback and grievance mechanism and institutional arrangements for REDD+ implementation.

In parallel to these developments, Madagascar decided to pilot the third phase of the REDD+ process on performance-based payments at a subnational level by presenting an ER Program Idea Note (ER-PIN) to the FCPF Carbon Fund in November 2015, which was accepted at this time into the pipeline of the Carbon Fund. On 26 November 2016 Madagascar signed a Letter of Intent ("the LoI") with the World Bank for the purchase of emissions reductions from its ER-P in the Eastern Forest of Madagascar. The LoI indicates that the World Bank will purchase a maximum volume of 16.4 million ERs from Madagascar (the "maximum contract volume") on a seniority basis, subject to, inter alia, the successful approval of Madagascar's ER-P and the availability of tranche capital. The LoI provides for an exclusivity period of 24 months, with the possibility of extension, during which time Madagascar agrees not to negotiate with any other party regarding the sale of ERs included in the maximum contract volume. An extension to the LoI from 24 months to 36 months was signed in November, 2017.

On 23 May 2017 Madagascar submitted the first draft of its Emission Reduction Program Document (ER-PD) to the FCPF Carbon Fund, and, following Carbon Fund procedures which include a thorough review by an external Technical Advisory Panel, a revised version was submitted on September 19th. The ER-PD defines the ER-P as a large area running from the north to the south along the eastern part of the country, covering "the main massif of the rainforest of Madagascar" (See Figure 2 below). The emissions reduction potential of the ER-P based on the intervention strategy and funding level presented in the financing plan of the draft ER-Program Document (currently being finalized, numbers likely to be adjusted in final version) and considered set-aside of ERs to address reversal (18%) and uncertainty (4%) is estimated at 13,929,519 tons of CO_2 eq for five years. A significant amount of emissions reductions are expected to be generated in the areas where two REDD projects currently exist (Ankeniheny-Zahamena Corridor (CAZ) project and the Makira REDD+ Project).
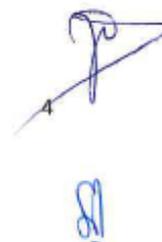
The GCF project

The GCF project activities managed by CI are focused on the landscapes of the Ambositra Vondrozo Forest Corridor (COFAV) and the Ankeniheny-Zahamena Forest Corridor (CAZ), respectively in south-central and eastern Madagascar (Figure 2). These activities will contribute to the national REDD+ implementation arrangements in several important ways, including through alignment with emerging domestic guidance for sub-national emissions monitoring and carbon accounting, and by strengthening the ability of local actors to successfully apply the strategies and actions identified in national climate change policies.

Figure 2: Map of Madagascar, showing forest cover, and the locations of the GCF project landscapes (CAZ and COFAV) and the proposed Emissions Reductions Program for the Forest Carbon Partnership Facility.

Emissions monitoring and carbon accounting

As stated in the Funding Proposal (FP), the GCF project "is completely aligned with the national REDD+ process and it will take guidance (for example in methodologies for calculating emissions reductions) from any national REDD+ developments…" (FP p. 12)

The National REDD+ Strategy has been recently validated by the National REDD+ Platform, and presented to the Inter-ministerial Committee for the Environment (CIME). The next step in integration of the strategy is its inclusion in the legal framework of REDD+, and this integration process has begun with a legal review underway through BNC-REDD+.

The GoM is finalizing the process of integration of existing REDD+ projects into the ER-P, as both the CAZ and Makira projects lie within the boundary of the proposed ER-P area. Many elements have been considered in this integration, including transfer of title of emission reductions, reference level setting, the application of the environmental and social management framework and other frameworks to address safeguards, benefit-sharing mechanisms, and monitoring / reporting on carbon and non-carbon aspects, including safeguards, both for the FCPF Carbon Fund and for Madagascar's commitments in its NDC. As stated in the project proposal, this project will be implemented in a way that is consistent with the government's guidance. The GCF project will draw from the methodological approaches used in the final ER-Program Document, which is based on UNFCCC, IPCC, and the Carbon Fund Methodological Framework, as a means to ensure that the measurement of emissions reductions is done in a consistent way with the ER Program and the National Forest Monitoring System. This will be ensured by using the same definitions, scope (sources, pools and reference period), data sources and methods used by the MRV system of the National Forest Monitoring System. The Reference Level for the GCF project will be established by BNCREDD+ in coordination with CI. Periodic measurement of ERs generated by the GCF project will be conducted by the national MRV system when monitoring occurs, or by CI. This will enable estimation of the amount of Emission Reductions generated in the area of the GCF project activities, and the fraction of ERs generated in the ER program area that result from activities from the GCF project. Madagascar is in the process of setting a REDD+ projects and program data information system and an ER transaction registry that will facilitate the reporting and tracking of emission reductions and titles. All Emission Reductions generated within the ER program area that are issued as ER titles/credits in the ER transaction registry and that result from the GCF project will be clearly labelled and processed so as to ensure compliance with the GCF requirements.

Avoidance of offsetting

The Carbon Fund of the Forest Carbon Partnership Facility (Carbon Fund) has two tranches (Tranche A and Tranche B) that provide results-based finance for verified emission reductions (ERs). The World Bank, as trustee of the Carbon Fund (Trustee), will enter into emission reductions payment agreements (ERPAs) with each REDD Country for each Tranche. Upon payment for the verified ERs generated by the ER program under each ERPA, ERs will be transferred to the Carbon Fund participants of the respective Tranche in accordance with their respective pro rata financial contribution to either of the Tranches. To date, 5% of the funds in the Carbon Fund have been contributed by Tranche A participants and 95% by Tranche B participants.

In this context, it is important to clarify that the Carbon Fund participation agreements for Tranche B participants have the following provisions: (a) the Tranche B participants represent and warrant that the ERs they acquire are not intended for sale nor for compliance with International Rules or any relevant regional or domestic regime; and (b) the Tranche B participants agree that they will cancel the ERs they acquire and instruct the Trustee to cancel them in the reporting system maintained by the Trustee or any other ER registry under

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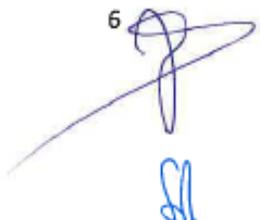
International Rules, regional or domestic regimes. There are no such provisions in the Carbon Fund participation agreements for Tranche A participants.

In other words, 95% of the ERs to be generated, verified and transferred to the Trustee under each ER program will be canceled by the Trustee on behalf of Tranche B participants (and therefore will not be used by Tranche B participants for "sale" or for "compliance" purposes, including offsetting purposes). 5% of the ERs to be generated, verified and transferred to the Trustee under each ER program will be transferred to the Tranche A participants, but the Trustee will work with the REDD Country and the registry system so that these (Tranche A) ERs will be generated from activities that were not funded through the GCF project "Climate Smart Landscape in the Eastern part of Madagascar" (GCF Project).

This approach was developed following discussions between CI, The GCF Secretariat, the FCPF Facility Management Team, and the Government of Madagascar. In our view, this approach is consistent with the GCF board decision regarding the GCF project, which requires that any greenhouse gas emission reductions achieved by the Funded Activity shall not be converted into any offset credits or units generated thereby, or if so converted, will be retired without allowing any other emissions of greenhouse gases to be offset. As mentioned above, the ERs that will be generated, verified and transferred to the Trustee on behalf of Tranche B Participants, including those ERs generated from the GCF Project, will be canceled; those ERs to be generated, verified and transferred to the Trustee on behalf of Tranche A Participants will be closely monitored to confirm that they were not generated from the GCF Project.

Strengthening Local Capacity

Outcome 3.0 of the GCF project is strengthened institutional and regulatory systems for climate-responsive planning and development. Madagascar has been moving towards increasingly decentralized governance structures over the last decade. The project includes activities designed to integrate strategies and actions from national climate change policies, including REDD+, into government planning at the regional and local levels (Output 3.1). The project will also increase the capacity of decentralized technical services to implement new REDD+ policies as they are established (Output 3.2)

The GCF project also plans to implement an innovative approach to provide communities with sustainable livelihood activities that will economically and environmentally offset the potential loss associated with the abandonment of the traditional swidden agricultural practice called "tavy". Pressures on the forest will be addressed at the watershed level and will involve the participation of various stakeholders including farmers and authorities at multiple levels. The project will promote inter-sectorial dialogue so that climate change mitigation and adaptation concepts are considered in land use planning. This is aligned with the national REDD+ program's similar promotion of inter-sectorial participation of stakeholders involved through the REDD+ platforms.
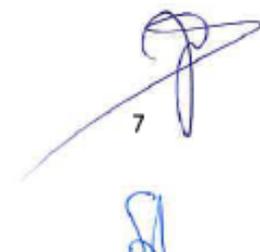
Inclusive engagement requires stakeholders to have increased knowledge about REDD+ and other climate change issues, and the project includes capacity building activities that also support the national REDD+ process. By strengthening the capacity of government employees, local conservation and development NGOs, farmer groups, and local communities, the GCF project directly contributes to the participation goals of the national REDD+ process.

Data generation and sharing

Where relevant, the GCF project will gather information in ways that adhere to guidelines from the national REDD+ program, and will make these data available to the national program. The types of data that support national objectives include spatial information, including deforestation analyses and estimations of carbon stock changes; as well as socio-economic information that will contribute to the national REDD+ Safeguards Information System.

The participation of CI staff in the REDD+ Platforms (National and Regional) and through their involvement in the REDD+ Technical Groups (methodology group-GMC and safeguards group-GTS) provides a simple conduit of information to the national REDD+ program. CI's past analyses of deforestation and development of baselines were important for the work of the REDD+ methodological group (GMC). In the same way, CI's recent experience and research on safeguards implementation in CAZ and COFAV have contributed to the deliberations of the safeguard technical group (GTS). CI expects to continue to use its participation in the national REDD+ process to share its experiences and data, and to quickly adopt guidance and information developed by the national program.

During the project implementation period, GCF-financed activities will not be eligible for financial support from Carbon Fund payments.

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