



REPUBLIC OF MOZAMBIQUE

MINISTRY OF LAND AND ENVIRONMENT

FIRST BIENNIAL UPDATE REPORT (BUR)

**THE UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE
CHANGE**

Mozambique

November 2022



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PREFACE



I am pleased to deliver the First Biennial Update Report of Mozambique (PBURM), which is presented together and therefore as a summary of the country's Second National Communication. By using this opportunity, I would like to point out that climate change in Mozambique is increasingly showing its negative impacts at national and local levels. Cyclones Idai and Kenneth, which have recently affected the country, droughts and cyclical floods, are proof of what several studies on the impacts of climate change predicted: the increased frequency and intensity of extreme weather events. The occurrence of these events resulted in several losses, including the destruction of infrastructure, reduction of agricultural incomes, eruption of river flow, and loss of human life. These negative impacts are felt at all levels, affecting communities in both rural and urban areas, ecosystems and the national economy.

It is in this context that the United Nations Framework Convention on Climate Change, to which Mozambique is a signatory, has urged the parties to report on the climate phenomena observed, the direct and indirect impacts and the measures taken to mitigate and adapt to climate change. Therefore, the Parties are asked to submit the results of greenhouse gas inventories, to declare the measures that are taken to reduce these emissions or increase the removal of greenhouse gases from the atmosphere.

This document is the first biennial update report for Mozambique (PBURM) drawn up following the guidelines of the Biennial Update Report of the Parties not included in Annex I to the Convention, set out in Annex III to Decision 2/CP.17. BURs are reports to be presented by Non-Annex I Parties, containing updates to national greenhouse gas (GHG) inventories, information on mitigation actions, needs and support received. As mentioned above, this, in presenting together with the Second National Communication, outlines a summary of the main aspects included in this, with the appropriate updates and, to the extent of the country's capacities, the response to the additional requirements of the guidelines for the preparation of the BUR.

In addition to information on national circumstances, this PBURM updates the estimate of greenhouse gas emissions and removal contained in the First National Communication (1990-1994) and estimates emissions and removal that occurred between 2000 and 2016. On the other hand, the PBURM also presents ongoing and planned mitigation actions, including their effects; describes the National Measurement, Reporting and Verification (MRV) System for Monitoring and Assessing Climate

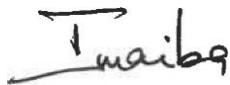
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Change action created to measure, report and verify the actions and support received and needed; provides information on the constraints and gaps found in the implementation of the country's climate policy and the barriers encountered specifically during the preparation of this document, including the proposed actions to improve upcoming reports.

This PBURM has estimated emissions from all sectors on the greenhouse gas inventory, following the Intergovernmental Panel on Climate Change (IPCC) Guidelines for Inventory, including Energy (including production and use in the national sector, industry, transport and agriculture), the use of industrial products and processes (which includes the entire manufacturing industry), Agriculture (including agricultural production, livestock), Forestry and Land-Use and Land-use Change and Forestry (LULUCF) and Waste Management (includes solid waste and municipal and industrial waste waters).

The exercise of data collection and GHG removal, as well as the potential for emission reduction and increased removal, have also helped the country and sectors become more aware of the environmental quality situation, as well as the need for systematic recording and information sharing.

However, the country recognizes that there is still a long way to walk and that there are many points to improve in the next reports to be presented. Mozambique is aware of the road to transition to the Enhanced Transparency Framework under the Paris Agreement and already has initiated internal discussions, as well as with key climate and cooperation partners, to boost this journey, through submission of a second BUR before get ready the first Biennial Transparency Report under the Paris Agreement.



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Briefing Note:

This document constitutes the First Biennial Update Report of Mozambique (PBURM). It has been prepared following the guidelines for the Biennial Update Report for Parties not included in Annex I of the Convention, contained in Annex III of decision 2/CP.17.

This report is jointly presented and it is a summary of the country's Second National Communication. To avoid repetition of information, where relevant, references are made to the information included in the Second National Communication.

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SECTION 1: NATIONAL CIRCUMSTANCES

This chapter presents a brief characterization of the national circumstances and it should be complemented with the detailed characterization included in the Second National Communication.

Geographic Profile

Geographical location

The Republic of Mozambique is located in the Southern hemisphere, on the southeast coast of the African continent. The country has an area of 801,590 km² of land and about 13,000 km² of inland water. Along the approximately 2,700 km of coastline, there are numerous islands.

Administratively, the country is divided into 10 provinces. However, the municipality of Maputo city (the country's capital) has provincial status, bringing the number to 11. The provinces are currently divided into 154 districts.

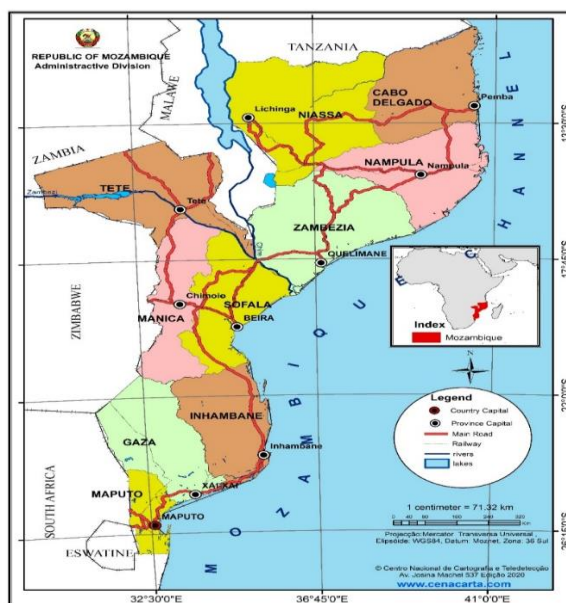


Figure 1 - Map of Mozambique's geographical location with the appropriate administrative division by provinces

Population

The Mozambican population is made up of 27,909,798 inhabitants (INE 2017), with about 52% women and 48% men. The distribution by age group is about 45% between 0-14 years, 52% from 15-64 years and 3% for over 64 years.

Mozambique is experiencing significant population growth with an average annual rate of 2.4% over the last ten years.

Economy

Agriculture in Mozambique is the pillar of the national economy. Agriculture employs 90% of the country's female labor force and 70% of the male labor force, which means 80% of the country's economically active population is employed in the agricultural sector (PEDSA, 2011). Agriculture has an average share in GDP above 20% of the total. The trade, transport and communication services sectors contribute an average of 10% each (**Error! Reference source not found.**). The extractive industry sector has shown great performance in recent years, rising from 2% in 2013 to just over 7% in 2018 (INE: National Accounts of Mozambique).

Weather

According to the Köppen-Geiger classification, Mozambique's climate is generally of type Aw (tropical wet and dry) and with pockets of BSh (semi-arid hot climate), with two very distinct seasons; one hot and rainy, from October to April, and the other cold and dry, from May to September (Gelcer et al. 2018). Other weather characteristics such as As, Cfa, and Cwa type can be found in isolated form.

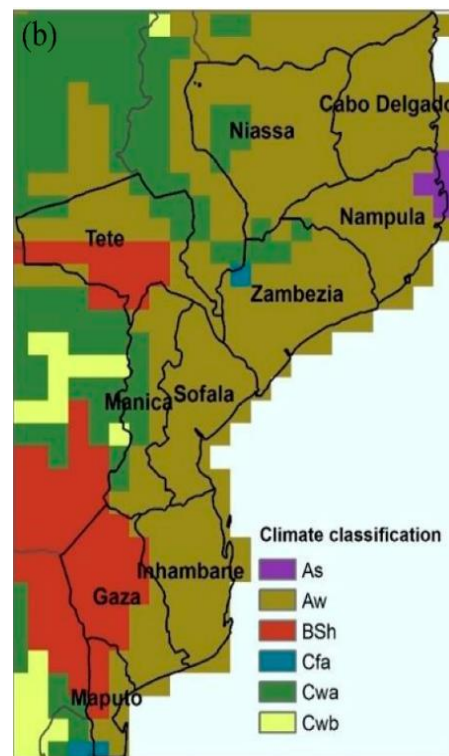


Figure 2 - Climate of Mozambique, according to the Köppen-Geiger classification. As = rainy tropical climate; Aw = dry humid tropical climate; BSh = hot semi-arid climate; Cfa = hot humid temperate climate; Cwa = hot temperate climate with dry winter.

Source: Gelcer et al. (2018).

The spatial distribution of rainfall is very variable throughout the country. Rainfall is most abundant in the north of the country, where the annual average varies between 800 and 1200 mm, becoming exceptionally high, 1500 mm, in the highlands of Zambézia, Niassa, and the mountainous areas of Gorongosa. The center of the country and the entire coastline receive rainfall amounts ranging between 800 and 1000 mm. However, in some regions of Tete province, rainfall amounts drop as low as 600 mm. The southern region of Mozambique is generally drier, with an average rainfall of less than 800 mm, reaching values of 300 mm in the administrative post of Pafuri in Gaza province (Figure 3).

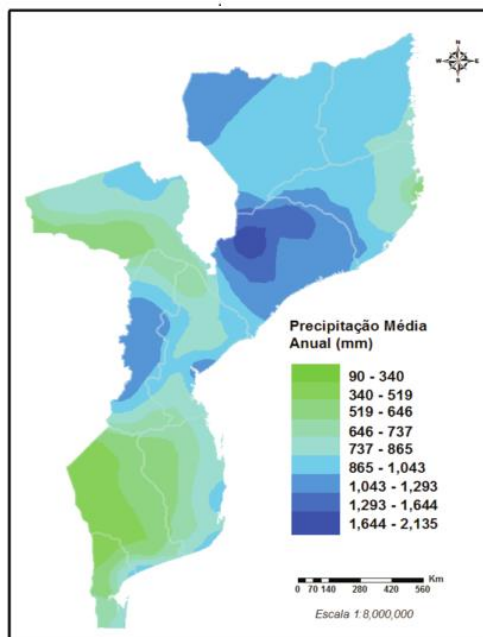


Figure 3 - Spatial distribution of accumulated annual precipitation in Mozambique (Source: Atlas of precipitation Mozambique, INAM, 2012)

SECTION: GREENHOUSE GAS INVENTORY

The preparation for the National Inventory of Greenhouse Gas (GHG) Emissions, hereafter referred to as the Inventory, is in accordance with the guidelines for the preparation of National Communications of non-Annex I Parties to the Convention, established by Decision 17/CP.8.

The methodological approaches and guidelines used in the preparation of the National Inventory of GHG Emissions are based on the “Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories” - 1996 Guidelines; “Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Emission Inventories” - 2000 Good Practice Guidance, and “Good Practice Guidance for Land Use, Land Use Change and Forestry” - 2003 Good Practice Guidance. Some of the estimates already consider the information published in the document “Revised IPCC Guidelines for National Greenhouse Gas Inventories 2006” - 2006 Guidelines.

The table below presents the results of anthropogenic emissions by sources and removals by sinks of greenhouse gases for the years 1990 and 1994 (CN1 Base), and updates of 2000, 2005, 2010, 2012, 2014 and 2016 by gas and sector (Energy, Industrial Processes, Solvent and Other Product Use, Agriculture Land Use, Land Use Change and Forestry, and Waste Treatment).

Table 1 - GREENHOUSE GAS (GHG) EMISSIONS BY SOURCES FOR THE YEAR 1990, IN GIGAGRAMS (GG).

1990	CO ₂ eq Emissions per gas (Gg)				CO ₂ eq (Gg)
	CO ₂	CH ₄	N ₂ O	PFC	
Sources					
Total Nacional per Gas	-60909	2553	27	0	-58329
Energy	105	2495	26	NO	2627
IPPU	40	0	0	NE	40
Agriculture	0	55	0	NO	55
LULUCF	-61054	0	0	0	-61054
Waste	0	3	0	NO	3
Total Nacional WITH LULUCF	-60909	2553	27	NO	-58329
Total Nacional WITHOUT LULUCF	145	2553	27	NO	2725
MEMO					
International Bunkers	83	0	0	0	83
Biomass CO ₂ emissions	27839	0	0	0	27839

Table 2 - GREENHOUSE GAS EMISSIONS BY SOURCES FOR THE YEAR 1994, IN GIGAGRAMS (GG).

1994	CO ₂ eq Emissions per gas (Gg)				CO ₂ eq (Gg)
	CO ₂	CH ₄	N ₂ O	PFC	
Sources					
Total Nacional per Gas	-46324	3225	40	34	-43024
Energy	130	3081	32	0	3243
IPPU	17	0	0	34	51
Agriculture	3	123	5	0	131
LULUCF	-46473	0	0	0	-46473
Waste	0	21	3	0	24
Total National WITH LULUCF	-46324	3225	40	34	-43024
Total National WITHOUT LULUCF	150	3225	40	34	3449
MEMO					
International Bunkers	83	0	0	0	83
Biomass CO ₂ emissions	27839	0	0	0	27839

Table 3 - GREENHOUSE GAS EMISSIONS BY SOURCES FOR THE YEAR 2000, IN GIGAGRAMS (GG).

2000	CO ₂ eq Emissions per gas (Gg)				CO ₂ eq (Gg)
	CO ₂	CH ₄	N ₂ O	PFC	
Sources					
Total Nacional per Gas	-22238	2904	84	954	-18297
Energy	1888	2239	42	0	4169
IPPU	461	0	0	954	1414
Agriculture	13	525	21	0	560
LULUCF	-24602	0	0	0	-24602
Waste	2	140	21	0	162
Total Nacional WITH LULUCF	-22238	2904	84	954	-18297
Total Nacional WITHOUT LULUCF	2364	2904	84	954	6305
MEMO					
International Bunkers	83	0	0	0	83
Biomass CO ₂ emissions	20786	0	0	0	20786

Table 4 - GREENHOUSE GAS EMISSIONS BY SOURCES FOR THE YEAR 2005, IN GIGAGRAMS (GG).

2005	Emissions (Gg)				CO ₂ eq (Gg)
	CO ₂	CH ₄	N ₂ O	PFC	
Sources					
Total Nacional per Gas	27881	4434	147	936	33398
Energy	2223	2667	49	0	4940
IPPU	750	0	0	936	1687

2005	Emissions (Gg)				CO ₂ eq (Gg)
Agriculture	39	1528	61	0	1628
LULUCF	24866	0	0	0	24866
Waste	3	239	36	0	278
Total National WITH LULUCF	27881	4434	147	936	33398
Total National WITHOUT LULUCF	3016	4434	147	936	8532
MEMO					
International Bunkers	83	0	0	0	83
Biomass CO ₂ emissions	22950	0	0	0	22950

Table 5 - GREENHOUSE GAS EMISSIONS BY SOURCES FOR THE YEAR 2010, IN GIGAGRAM (GG).

2010	Emissions (Gg)				CO ₂ eq (Gg)
Sources	CO ₂	CH ₄	N ₂ O	PFC	
Total Nacional per Gas	43768	5008	180	1136	50093
Energy	3233	3202	65	0	6500
IPPU	910	0	0	1136	2047
Agriculture	37	1423	57	0	1516
LULUCF	39584	0	0	0	39584
Waste	4	383	58	0	446
Total National WITH LULUCF	43768	5008	180	1136	50093
Total National WITHOUT LULUCF	4184	5008	180	1136	10508
MEMO					
International Bunkers	83	0	0	0	83
Biomass CO ₂ emissions	24922	0	0	0	24922

Table 6 - GREENHOUSE GAS EMISSIONS BY SOURCES FOR THE YEAR 2012, IN GIGAGRAM (GG).

2012	Emissions (Gg)				CO ₂ eq (Gg)
Sources	CO ₂	CH ₄	N ₂ O	PFC	
Total Nacional per Gas	50543	9682	387	1520	62132
Energy	6858	6793	138	0	13789
IPPU	1218	0	0	1520	2737
Agriculture	43	1685	67	0	1796
LULUCF	42410	0	0	0	42410
Waste	14	1204	182	0	1400
Total National WITH LULUCF	50543	9682	387	1520	62132
Total National WITHOUT LULUCF	8133	9682	387	1520	19722
MEMO					
International Bunkers	83	0	0	0	83
Biomass CO ₂ emissions	25597	0	0	0	25597

Table 7 - GREENHOUSE GAS EMISSIONS BY SOURCES FOR THE YEAR 2014, IN GIGAGRAM (GG).

2014 Sources	Emissions (Gg)				CO ₂ eq (Gg)
	CO ₂	CH ₄	N ₂ O	PFC	
Total Nacional per Gas	40181	11465	413	1427	53485
Energy	8538	8456	172	0	17166
IPPU	1143	0	0	1427	2570
Agriculture	49	1923	77	0	2049
LULUCF	30438	0	0	0	30438
Waste	13	1085	164	0	1262
Total National WITH LULUCF	40181	11465	413	1427	53485
Total National WITHOUT LULUCF	9743	11465	413	1427	23047
MEMO					
International Bunkers	83	0	0	0	83
Biomass CO ₂ emissions	26271	0	0	0	26271

Table 8 - GREENHOUSE GAS EMISSIONS BY SOURCES FOR THE YEAR 2016, IN GIGAGRAM (GG).

2016 Sources	Emissions (Gg)				CO ₂ eq (Gg)
	CO ₂	CH ₄	N ₂ O	PFC	
Total Nacional per Gas	42932	10627	385	1553	55498
Energy	7909	7834	159	0	15902
IPPU	1245	0	0	1553	2798
Agriculture	45	1766	71	0	1882
LULUCF	33721	0	0	0	33721
Waste	12	1027	155	0	1194
Total National WITH LULUCF	42932	10627	385	1553	55498
Total National WITHOUT LULUCF	9211	10627	385	1553	21776
MEMO					
International Bunkers	83	0	0	0	83
Biomass CO ₂ emissions	26945	0	0	0	26945

The net emissions reported in the First Inventory of Anthropogenic Emissions by Sources and Removals by Sinks of Greenhouse Gases Not Controlled by the Montreal Protocol were not updated, because there was a change in methodology and there was no room to perform new searches for data needed to perform the update.

Due to the ongoing preparation of the Second National Communication, which will bring the most recent data from the National GHG Inventory, the data in this BUR should be considered provisional and are subject to revision to be aligned with the upcoming publications, i.e. the forthcoming Third National Communication and Second BUR.

The inventory results were a combination of Tier 1 and Tier 2 and reported in Gigagrams (thousand tons) of each specific gas. To estimate total emissions, the units of the other gases were converted to CO₂ equivalent (Gg CO₂eq.), corresponding to the global warming potential of carbon dioxide over a 100-year period. The conversion used the conversion factors defined by the IPCC (Table).

Table 9 - GLOBAL WARMING POTENTIAL FOR THE MAIN GHGS

Gas	Symbol	Global Warming Potential (Gg CO ₂ eq.)
Carbon dioxide	CO ₂	1
Methane	CH ₄	21
Nitrous oxide	N ₂ O	310
PFCs	CF ₄ & C ₂ F ₆	6500 / 9200

Source: IPCC SAR

The updated results in the BUR show that during the period after the National Communication 1, the country that had a LULUCF sector that totalled removals at the beginning of the period became an emitter. The reported removals are primarily the result of tree growth from forest land that remained forest during this period.

Due to the difficulty in accessing data, removals due to timber forest products were not accounted for. Thus, the category “forest land remaining forest” had the largest contribution in GHG removal.

In the period between 2000 and 2016 the population of Mozambique almost doubled. However, a reduction in the rate of increase of GHG emissions in Mozambique has been seen since the early 2010s due mainly to the drop in deforestation rates in Mozambican biomes, whose rates have been falling since 2010.

Thus, the Land Use, Land Use Change and Forestry (LULUCF) sector even though it is still the one that represents the largest sources of national GHG emissions was also responsible for the largest declines in GHG emissions.

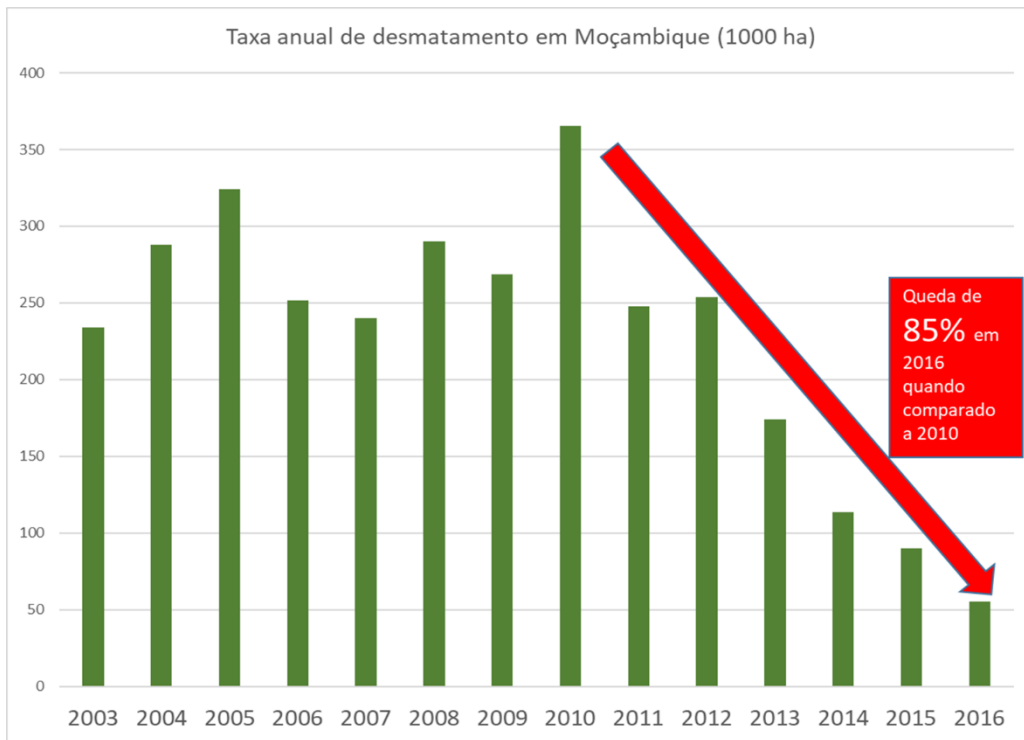


Figure 4 - Annual deforestation rate from 2003 to 2016 (in 100 hectares).

With increasing emissions from the energy, industry and waste sectors, their proportional contribution has consistently increased throughout the period of analysis, but they are still much lower than the overall per capita GHG emissions. The country has an emission without LULUCF of well below 1tCO₂e per capita and with LULUCF of about 2 tCO₂e per capita. The total emissions from the data series can be compared in the following graphs of total national emissions with and without LULUCF.

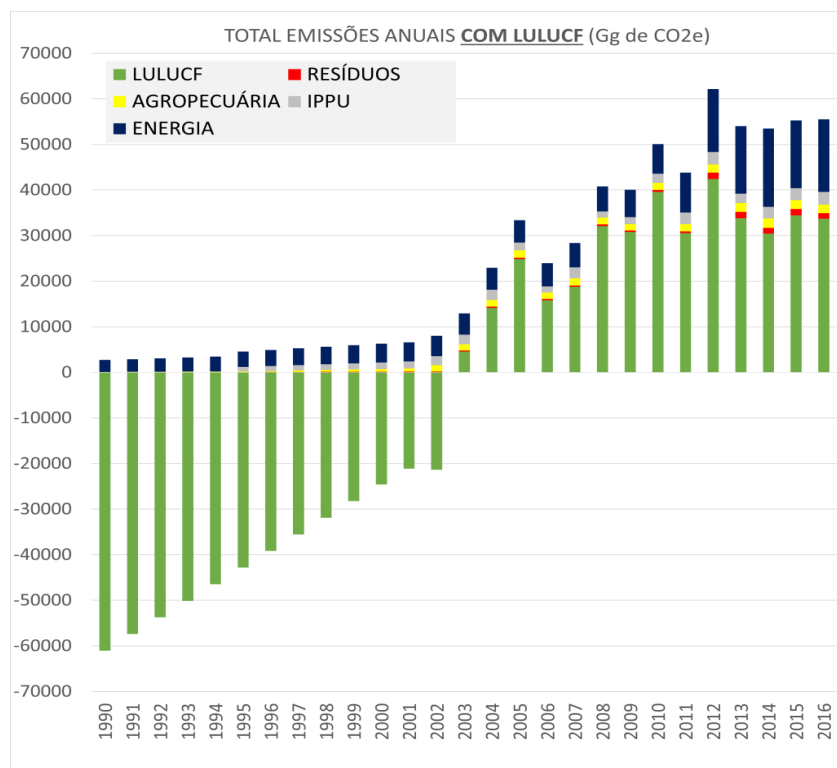


Figure 5 -Total national emissions by sector with LULUCF from 2000 to 2016 (Gg CO₂eq).

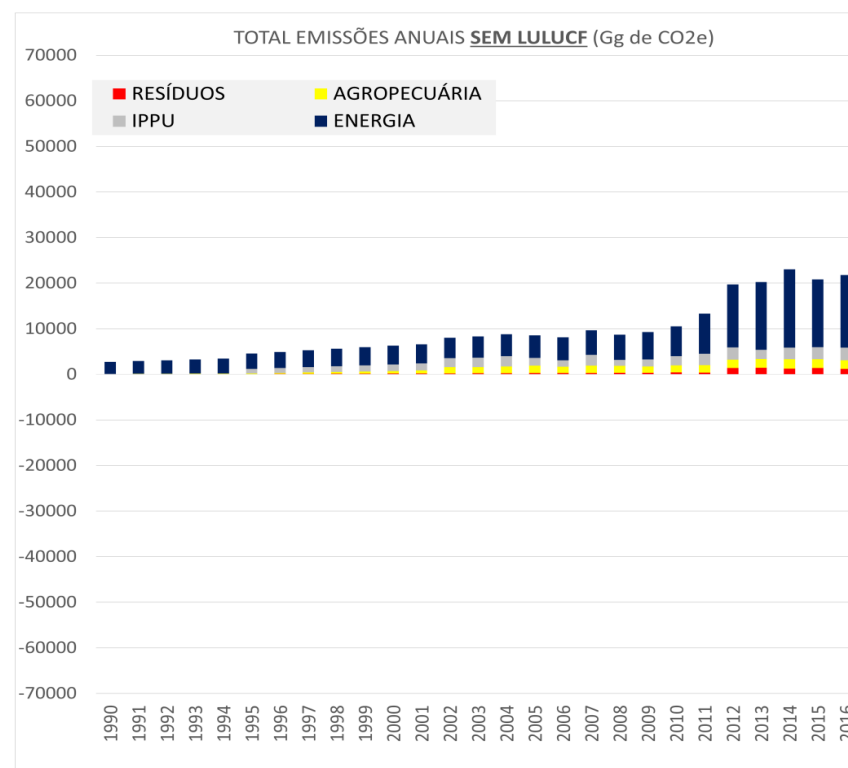


Figure 6 - Total national emissions by sector WITHOUT LULUCF from 2000 to 2016 (Gg CO₂eq).

SECTION 2: MITIGATION

Introduction

The information on Mitigation Actions presented in this chapter of the First Biennial Update Report is, pursuant to Article 41 (f) of Decision 2/CP.17, a summary of the information included in Mozambique's second National Communication with which this report is submitted.

Mozambique as, party to the Convention, has committed to formulate, implement, publish and regularly update national and, where possible, regional programs containing measures to mitigate climate change, taking into account emissions by sources and removals by sinks of all GHGs not controlled by the Montreal Protocol.

The country has also undertaken to promote and cooperate in the development, application and diffusion, including the transfer of technologies, practices and processes that control, prevent and reduce GHG emissions in all relevant sectors, covering energy, transport, industry, agriculture, forestry and waste, as well as to promote sustainable management and cooperate in the conservation and enhancement of sinks and reservoirs of GHGs not controlled by the Montreal Protocol.

Mozambique adopted the National Strategy for Climate Change Adaptation and Mitigation (NSCCAM), which integrates the mitigation and low emissions development pillar, whose objective is to identify and implement opportunities to reduce GHG emissions that contribute to the sustainable use of natural resources and access to financial resources, affordable technology, and the reduction of pollution and environmental degradation, promoting low carbon development.

With the negotiations of the Paris Agreement the country formulated and submitted to the Convention its Intended Nationally Determined Contribution, covering the period 2020 - 2030. This document was updated in 2018 and Mozambique's Nationally Determined Contribution 2020 - 2025 was formulated which in 2021 was revised and produced the First Updated Mozambique Nationally Determined Contribution 2020 - 2025 (FUNDC).

The mitigation component of Mozambique's FUNDC 2020 - 2025 represents the effort that the country will make to participate in achieving the goals of the Paris Agreement. Thus, with the implementation of this contribution, Mozambique expects to reduce about 40 million tCO₂eq in the period between 2020 and 2025. The emission reductions proposed in the mitigation contribution of Mozambique would represent a mitigation effort of about 1.2 tCO₂eq per capita by 2025, a very relevant figure when compared to the total GHG emissions per capita of Mozambique, which were respectively 0.6 tCO₂eq in 1990 and about 2 tCO₂eq today (total emissions with LULUCF) (MTA, 2021).

Also under the Paris Agreement, the country made a commitment to formulate and submit to the Convention the Long-Term Development Strategy for Low Greenhouse

Gas Emissions, a document in the process of finalization and that is aligned with the mitigation components of the NSCCAM and the Mozambique FUNDC 2020 - 2025.

It should be noted that Mozambique indicates in its NDC that the achievement of the proposed goal is conditional on the availability of financial, technological and capacity-building support from the international community. The mitigation component is budgeted at about 25% of the total cost of the NDC.

It should also be noted that, of utmost importance, the Government approved, on November 02, 2016, the National Strategy for Reducing Emissions from Deforestation and Forest Degradation, Forest Conservation and Increasing Carbon Reserves through Forests (REDD+) 2016-2030 and which the country has set the goal of having reduced emissions from deforestation and forest degradation, improved conservation of forest ecosystems and increased forest carbon reserves, thus avoiding the emission of 170 MtCO₂/year by 2030.

Mozambique has not indicated any mitigation actions (known as Nationally Appropriate Mitigation Actions - NAMAs) to be included in the FCCC/AWGLCA/2011/INF.1 document, nor has it registered any others in the Registry of NAMAs maintained by the UNFCCC Secretariat. However, the country has designed some mitigation measures, which it has designated as NAMAs, for which efforts continue to be made for their funding and implementation, including through international support.

The Waste sector NAMA is the one in the most advanced stage of formulation; while the transport sector NAMA is in the process of being transformed into a project and applying for available climate funding. The two remaining NAMAs (agriculture and forestry - sustainable charcoal production and use) are part of the actions of Mozambique's FUNDC and Mozambique's Long Term Low Emissions Development Strategy - LTS that are seeking support for their formulation and implementation.

Mozambique has encountered some difficulties in effectively implementing a monitoring system for mitigation measures. In this context, the country notes that the information on mitigation actions included in this report is scarce and does not contain a clear analysis of the objectives, targets and implementation status of each of the actions. The country intends to improve the quality of information on mitigation actions, in a logic of continuous improvement, in the second BUR and the first Biennial Transparency Report to be submitted under the Enhanced Transparency Framework of the Paris Agreement.

The exception to this framework of gaps in country capacity, relates to reduced emissions in the context of REDD+ or projects registered under the carbon markets. As such, below is more detailed and, where possible, quantified information on reduced emissions in the context of REDD+ and carbon markets. This information should be read in complementarity with the information contained in the SNC and the REDD+ Technical Annex to this BUR.

Reduced emissions in the context of REDD+

Mozambique's deforestation rate has reached a historic low since it has been monitored (2003): in 2016, just over 50,000ha were deforested in the country, compared to around 230,000ha in 2003 and 360,000ha in 2010.

Between 2014 and 2016 alone, the reduction in the rate of deforestation prevented the emission of **78.8 million tCO₂e** into the atmosphere, which in itself is an extremely ambitious contribution by Mozambique to the global reduction of GHG emissions.

The 2016 figures represent a reduction in this rate of about 85% when compared to the year 2010. Since that year, the deforestation rate has been falling steeply (with a brief exception in 2012 for unidentified reasons), demonstrating a success - that the country is very proud of - in defining and implementing policies and instruments to combat deforestation.

Mozambique believes that this result is due to the combination of a wide range of cross-sectoral measures, including poverty reduction, which the REDD+ Framework, adopted at the Warsaw COP, has embodied and made consistent. However, the country recognizes that the drivers underlying deforestation and the challenges to implementing measures to counteract them are strong, and as such we will not fold our arms in the face of the excellent results we have achieved so far. The country now needs to strengthen its capacity to continue to promote the implementation of measures to combat deforestation and to continue to monitor them in order to identify and correct any changes in this course in a timely manner, and for this we will continue to rely on the support of our international partners.

Figure 8 presents the trend in emissions associated with deforestation, which, as can be seen, shows the significant downward trend described in the paragraphs above.

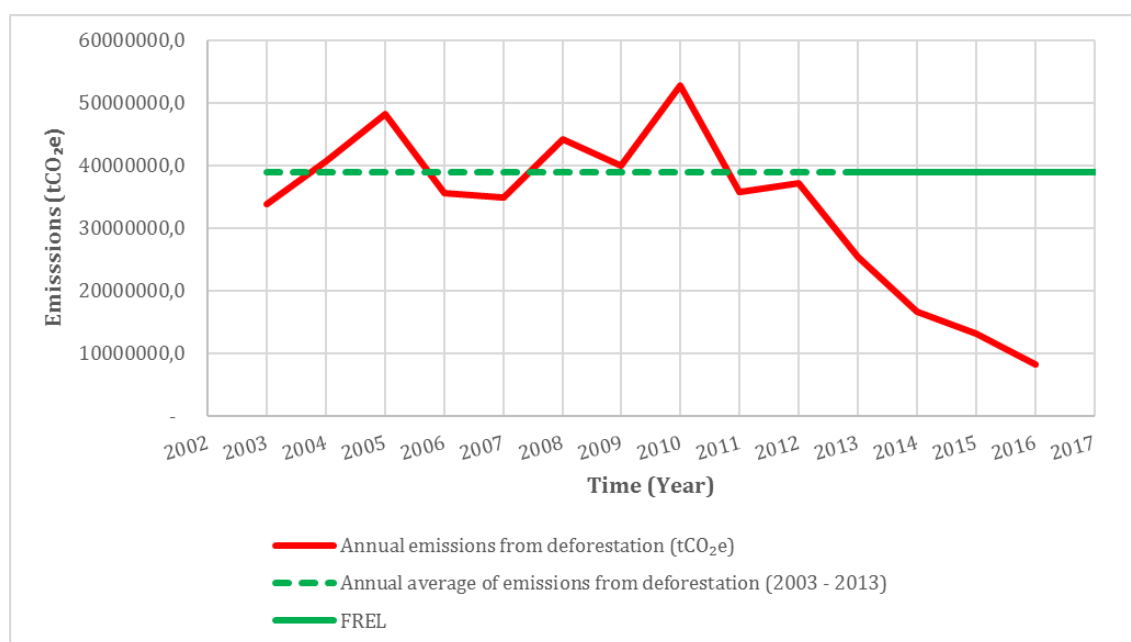


Figure 7 - Emissions associated with deforestation

The REDD+ Technical Annex included in this report presents more details on the concrete results achieved by the country.

Potential emission reductions and carbon credits issued in the context of international carbon market projects

In the period from 2010 to 2016, eight carbon projects were registered in the country: four projects were registered under the UNFCCC Clean Development Mechanism, three projects under the Gold Standard, and one project was registered under both mechanisms. In the registration process, the projects estimated that they would generate more than 8 million carbon credits over their lifetime, equivalent to an emission reduction of more than 8 million tons of CO₂. For the period 2010 to 2016 the estimated emissions reduction corresponded to about 1.1 million tons of CO₂.

Table 10: Carbon projects registered in the period 2010-2016

Mechanism	Project Title	Registration Date	Sector	Estimated carbon credits (2010-2016)	Carbon credits issued (up to 2016)
CDM	Cimentos de Mozambique - Matola Gas Company Fuel Alteration Project	rejected	Fuel switching	259,155	-
CDM	New Natural Gas Power Plant in Ressano Garcia	16/11/2016	Grid-connected power	- ¹	-
CDM	Reforestation Project of Niassa	14/01/2014	Forest	78,391	-
CDM - POA	Off-grid renewable energy for rural electrification in Mozambique (managed by FUNAE)	5/5/2016	Energy not connected to the grid	4,857	-
GS	Improved stoves in Chamanculo C, Maputo (Mozambique)	23/02/2015	Improved stoves / Biomass	28,368	19,404
GS	Improved stoves in Chamanculo C, Maputo (Mozambique), Phase II	29/03/2016		24,367	16,464
GS	Improved stoves at Chamanculo C, Maputo (Mozambique), Phase II	29/03/2016		22,584	13,798
GS+CDM	Cleanstar Mozambique - Ethanol Stoves in Maputo Project 1	5/4/2013		721,808	-
Total				1,139,530	49,666

¹ As planned, this project will only issue credits starting in 2017.

The first carbon credits in Mozambique were issued by Gold Standard in 2015 for an improved stove project. In total, 49,666 credits were issued over the period 2010 - 2016, equivalent to an emission reduction of 49,666 tCO₂. Although projects were registered in the off-grid and on-grid electricity sector, including a gas-fired power generation and reforestation project, all carbon credits issued in the period 2010 - 2016 were for projects related to efficient stoves.

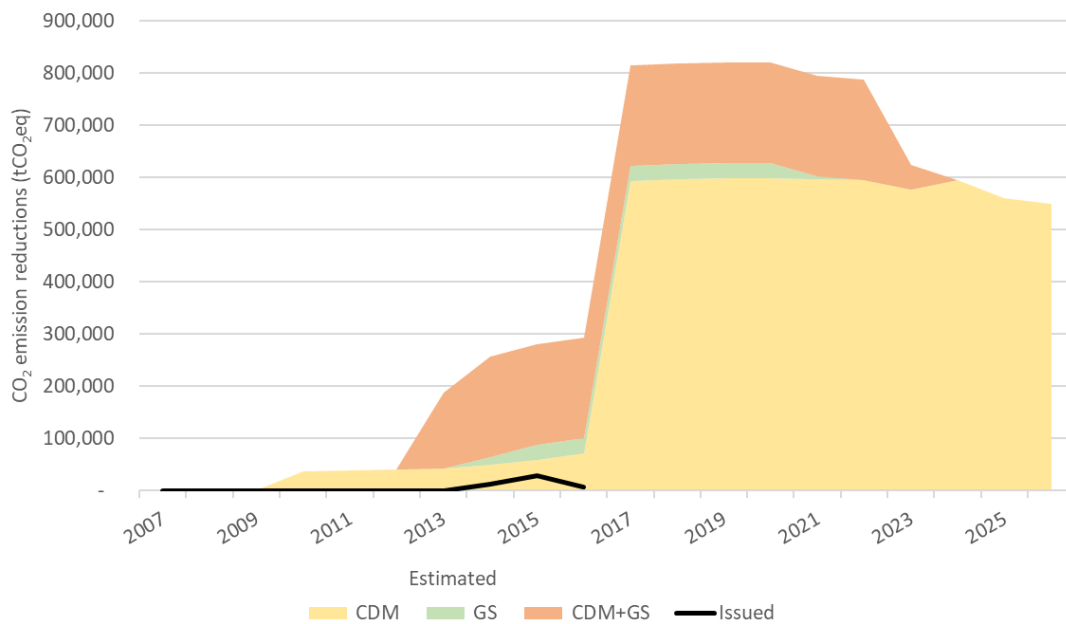


Figure 8 - Estimated and issued carbon credits in the period 2010-2016 for registered projects ²

As can be seen in the graph above, the mitigation potential associated with projects registered in the context of the carbon markets in Mozambique is quite high. However, the level of verified emissions reductions that have led to the issuance of carbon credits is very small compared to the potential of the projects, even for the period leading up to 2017 (when the potential for emissions reductions grows exponentially). Mozambique will investigate further, in the context of preparing subsequent BURs and BTRs, the implementation status of such projects and whether or not emission reductions are occurring beyond those formally verified and issued under the relevant rules of the carbon market mechanisms.

As mentioned above, Mozambique is not currently able to provide detailed information in tabular format on each of the mitigation measures planned and/or implementation

² The significant increase in emission reduction potential estimated as of 2017, is related to the registration of the CDM project "New Natural Gas Plant in Ressano Garcia" which is estimated to generate about 541,610 carbon credits from that year on.

beyond those described above. In that context, the table below, which should be read in complement with the information included in the SCN, lists the measures included in the NSCCAM and a set of corresponding measures that are being considered at the national level for the post-2020 period.

Table 11: NSCCAM measures and their potential readjustment for the post-2020 period

Sector	Action	Measure at NSCCAM	Measure under analysis for the post-2020 period
Energy	Improve access to renewable energy	Promote the electrification of rural communities using renewable energy	
		Promote the use of renewable energy sources (biogas, biomass, solar, wind, thermal, wave and geothermal))	Promoting the use of renewable energy sources - hydro
			Technology Action Plan for Regular Hydro Turbine Technology
			Promotion of the use of renewable energy sources - wind
			Promotion of the use of renewable energy sources - photovoltaic
		Implementation of the Technological Action Plan for Regular Scale Photovoltaic Plants - TNA	
		Promote the expansion of the national grid or the creation of energy distribution micro-grids	Expansion of the urban grid, making new connections; promoting 100% coverage in the connection of domestic consumers in suburban areas, in the districts and interconnected to the national grid (SILE)
Promote and disseminate techniques and technologies for sustainable production and use of biomass energy			

Sector	Action	Measure at NSCCAM	Measure under analysis for the post-2020 period	
		Assess mitigation mechanisms in electricity generation and transmission infrastructures		
	Increase energy efficiency		Ensure availability and access to low-carbon fossil fuels	
			Promote initiatives to replace high carbon and non-renewable fuels with low carbon or renewable fuels in the transport and production process sectors	
			Ensure the implementation of regulatory instruments, programs and low-carbon projects for the transport sector such as production of biodiesel for use in transport fleets that generate new sources of income and diversification of the economy in rural areas;	
			Develop projects and programs for microgeneration of energy in commercial and residential buildings	Installation of 50,000 photovoltaic or wind turbine lighting systems Installation of 5000 solar PV systems for pumping water for domestic, community or public use in isolated (SIE) or mixed (SILE/SIE) areas, including agricultural irrigation and livestock watering
			Promote the use of efficient household appliances	Powering of 5000 glaciers for domestic use, through photovoltaic technology or with wind turbines, in homes in areas isolated from the national grid (SIE)

Sector	Action	Measure at NSCCAM	Measure under analysis for the post-2020 period
			Substitution of 2,500,000 incandescent light bulbs for efficient light bulbs in all domestic consumers in the country
		Productive use of energy - construction of 8 centers for fish conservation	
		Use of “clean coal” technologies in coal-fired power plants (including the use of cogeneration, where applicable)	
		Reduce emissions associated with thermal power plants	
	Ensure compliance with regulated standards for emissions from extractive industry activities	Recover methane during the mineral and hydrocarbon extraction process	
		Evaluate the possibilities of carbon capture and storage	
	Promote low carbon urbanization 4.6.2.1.4	Develop and implement policies and measures to integrate the component of energy efficiency and the use of renewable energy sources into the directives for the construction of infrastructure such as buildings, communication routes and related structures	

Sector	Action	Measure at NSCCAM	Measure under analysis for the post-2020 period
			Construction of 450 MW thermal power plant based on natural gas: Technological Action Plan for Natural Gas Combined Cycle Technology
		Increase Energy Efficiency in Travel	Expansion of Metrobus to the country's main capitals
		Encourage the use of solar thermal systems in large commercial and industrial buildings, public buildings, and residential buildings	
		Encourage the replacement of incandescent light bulbs for low consumption ones	
		Promote the massification of the use of gas for domestic, industrial, and public and private transportation as an alternative to less clean energy sources	LPG Massification - Increasing the number of people with access to cooking gas to about 309.02% compared to today
			Massification of the Use of Natural Gas: o Construction of ten (10) Compressed Natural Gas filling stations, - Importation of one hundred and fifty (150) CNG Buses - Importation of one thousand (1000) kits and respective conversion Cylinders for Natural Gas. - Conversion of One Thousand (1000) Cars to NG

Sector	Action	Measure at NSCCAM	Measure under analysis for the post-2020 period
			Repair of 150 NG-fuelled buses for public transport
		Promote, through building codes and production norms, energy efficiency practices and the use of equipment that makes use of renewable energy sources and decentralized energy production	
Industrial processes and product use	Control emissions from industrial processes including waste and associated effluents	Develop policies and measures of inspection and regulation of industrial activity in order to control compliance with national legislation and international conventions	
		Encourage investors to evaluate potential GHG emissions in investment projects when considering clean technologies and energy sources	
		Promote projects and programs of microgeneration of energy in the industrial sector	
Agriculture, forestry and other land uses - AFOLU	Developing low-carbon agricultural practices	Encourage conservation agriculture	
		Promote agricultural practices that reduce GHG emissions (particularly in sugarcane harvesting)	
		Use energy efficient water pumping systems for crop irrigation	

Sector	Action	Measure at NSCCAM	Measure under analysis for the post-2020 period
		Recover methane from agricultural activities in intensive farming systems (in particular in rice paddies)	
		Promote the collection of and biodigestion of animal and vegetable waste to use methane for energy generation	
	Reduce the rate of deforestation and uncontrolled burning	Explore, in a sustainable way, forests in order to maximize their potential for carbon capture and sequestration	
		Promote mechanisms that lead to the natural regeneration of forests	
		Create mechanisms to prevent the spread of wildfires.	
	Plan and manage biodiversity and coastal ecosystems	Develop programs for sustainable exploitation, regeneration and protection of mangroves, seaweed and seagrass associated with the potential for carbon capture and sequestration (Blue Carbon).	
Waste	Manage and	Promote the reduction, reuse, and recycling of waste	Promotion of Sustainable Waste Management in

Sector	Action	Measure at NSCCAM	Measure under analysis for the post-2020 period
	valorise waste	Encourage the establishment of sanitary landfills with recovery and consequent use of methane	Mozambique (NAMA Waste) Implementation of the Technological Action Plan and Project Ideas for the Management and Treatment of Municipal Solid Waste
Promote the generation of energy from waste using anaerobic digestion processes, thermal or mechanical treatment			

Information on national arrangements for monitoring, reporting, and verification

Mozambique already has a first approximation of the institutional arrangements for its National Monitoring, Reporting and Verification System (MRV) of climate change. Demarches for its effective implementation are at an advanced stage and are being coordinated by the ministry that oversees the area of environment, the Ministry of Land and Environment (MTA). Similar to the MRV System of countries like Ghana and South Africa, Mozambique's MRV System, is an integral part of the National Climate Change Monitoring and Assessment System (SNMAMC). The SNMAMC was created in 2014 as part of the key tools for operationalizing the National Strategy for Adaptation and Mitigation of Climate Change (NSCCAM; Micoa, 2012) and is of strategic importance for the country's response to climate change.

The National MRV System aims to collect data and information on climate change that allows the country to, (i) show the progress of interventions undertaken by the Government in the scope of GHG emissions reduction, with transparency, technical-methodological robustness, consistency and necessary credibility, and (ii) show mitigation actions and present results and impacts resulting from the support provided or received by the Government in the scope of climate change.

The figure below represents the institutional arrangements that underlie the preparation of this report. In the context of learning from this exercise, the country has been making efforts to evaluate the effectiveness of this model and to identify other models of institutional arrangements that may be used in the future.

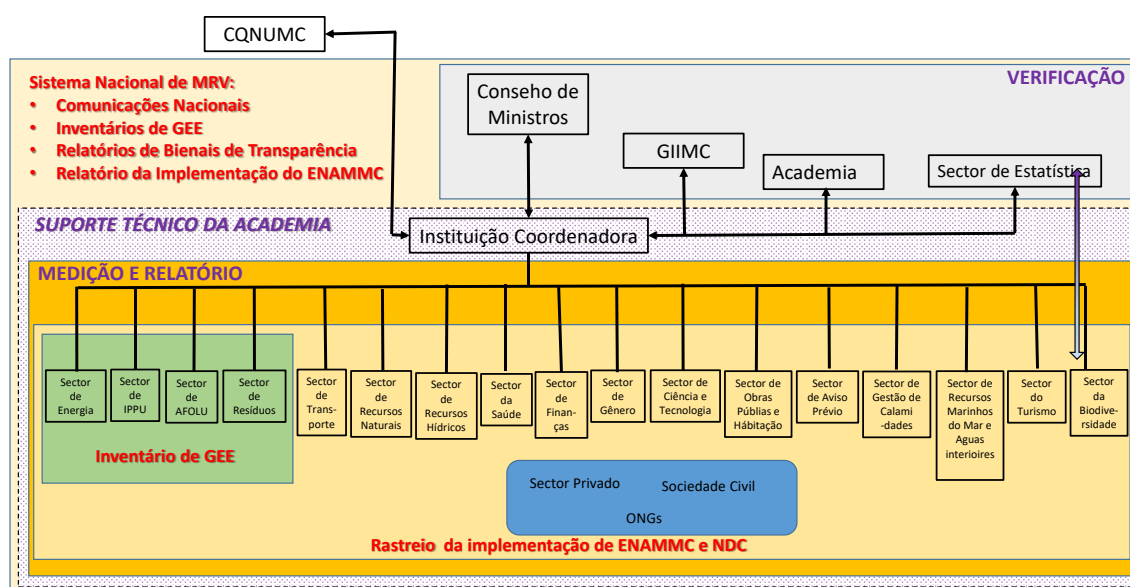


Figure 9 - MRV's institutional arrangements

SECTION 3: CONSTRAINTS AND GAPS AND RELATED FINANCIAL, TECHNICAL AND CAPACITY BUILDING NEEDS

Constraints and gaps

Mozambique is part of the Least Developed Countries, extremely vulnerable to the impacts of climate change. Although public and private institutions, particularly at the central level (such as Ministries and Universities), enjoy some stability, the country has faced major difficulties in both implementing and monitoring climate policy, including mitigation and adaptation.

The country has received important financial and capacity building support that has been reflected in a significant strengthening of our climate policy planning capacity, examples of which are the NSCCAM and the NDC. However, this planning capacity is not yet matched by implementation and monitoring capacity. For this reason, the country has decided to include in this report detailed information about the constraints and gaps and related financial, technical and capacity building needs. Even so, throughout this chapter we make several references to additional information contained in the Second National Communication, which we avoid repeating here, but which should be read in conjunction with this report.

Mozambique has implemented initiatives that have identified existing constraints and gaps both for the preparation of national communications, biennial transparency reports and NDCs and for resource mobilization, formulation and implementation of adaptation and mitigation actions, including cross-cutting actions. These initiatives also present the training needs required to overcome the identified gaps and constraints.

The Second National Communication presents, in a tabular format, the constraints and gaps identified in the context of the following initiatives: National Capacity Self-Assessment (NCSA) - NCSA - Thematic Report, National Adaptation Action Programs, Nationally Determined Contributions (NDCs) and their respective Implementation Plan that includes the needs presented by the country to the NDC Partnership ((NDC Partnership Plan 2018 - 2021), in the process of drafting the SCN and the first BUR. In the process of identifying gaps and needs, the information produced in the following ongoing initiatives was considered:

- **The Second National Communication** (SCN, funded by GEF and implemented with assistance from UNEP)
- **Mozambique's First Biennial Update Report** (PBURM, GEF funded and implemented with assistance from UNEP)
- **Mozambique's Long Term Low Emissions Development Strategy 2020 - 2025** (formulated with support from the NDCP (NDC Partnership) - these two documents contributed to updating the chapter on national GHG inventories and the chapter on mitigation; e,
- **Technology Needs Assessment (TNA)**, an initiative implemented with support from UNEP-DTU that resulted in project ideas reported in this document, including capacity building needs.

With the approval of the NSCCAM in 2012, the foundations were created for the implementation of adaptation and climate risk reduction measures, in some sectors, namely agriculture, social protection, fisheries and health, having formulated their plans that integrate climate change adaptation measures. In parallel, the Government, with the support of cooperation partners, has started the process of formulating and implementing Local Adaptation Plans (PLAs), a process that promotes the participation of communities in assessing their vulnerabilities, identifying and prioritizing measures that, when implemented, will help build the capacity to cope with climate change. The Implementation Review of the NSCCAM done in 2019 by the Government with the support of UNDP identifies the following weaknesses in the implementation of the Strategy:

1. The institutional framework designed in the NSCCAM is outdated and has not worked as a guide.
2. The SNMAMC is not being implemented and this weakens the NSCCAM because the scopes are not documented
3. Lack of Provincial Adaptation Plans that should culminate in a National Adaptation Plan
4. Poor implementation of PLAs due to limited funds;
5. Frequent mobility of technicians between different sectors
6. Weak involvement/participation of the private sector
7. Poor implementation of legal instruments
8. Weak human resource capacity in sectors to monitor compliance with CC-related legislation
9. Deficit of technicians for the CC area
10. Dependence on partners to fund the implementation of PLAs
11. Centralization of inventories at the MTA level
12. Weak capacity to implement NSCCAM actions
13. Change of ministries and sectors dealing with MCs in the country
14. Lack of legal instrument for GIIMMC (weak inter-institutional coordination)
15. No implementation of the MC Network
16. Lack of legal instrument creating the CGCMC

Although the institutional framework designed in the NSCCAM is outdated and does not work as a guide, its implementation resulted in the following strengths:

- i. NSCCAM is a widely recognized and accepted reference document for climate change in Mozambique
- ii. Building local resilience was identified as a priority for the first period and provided the basis for preparing PLAs
- iii. The NDC action plan was prepared using the NSCCAM framework and thus provided continuity and a strong link between the two instruments.
- iv. The preparation of PLAs and their ownership in some districts.
- v. The existence of a facilitative working environment between the technical teams at district, provincial and national levels (GIIMC)
- vi. The availability of legal instruments in the environmental sector
- vii. The integration of MC themes in courses implemented in national universities
- viii. The approval of the National REDD+ Strategy
- ix. The NSCCAM's strategic vision

Specific gaps regarding the preparation of this report

For the preparation of this report several difficulties were faced, in particular in the preparation of the inventory, in all sectors considered for the preparation of this report, namely, AFOLU, energy, IPPU and waste.

On the one hand, these resulted from the fact that this type of report is a new requirement of the Convention and is the first of its nature that the country prepares. On the other hand, because for its elaboration there is a need for consistent data, collected on a regular basis and systematized for the IPCC software. This has not been the case in some sectors of activity.

In the energy sector, for example, the existence of data in monetary values, metric system, sum of different types of fuels, or even the lack of data throughout the period selected for the report was notorious. In the AFOLU sector, the situation was striking because this sector is the one that needs the most information for GHG estimation. In this sector, the data from the statistical yearbooks of INE, FAO and those provided by the different directorates of agriculture are not consistent. In addition, there is also the lack of data from some activities simply because they are not collected, such as the quantities and destination of animal manure.

In the absence of regular and systematized data, inventories for GHG estimation, monitoring of mitigation and adaptation measures, progress achieved and required in each sector, information about the support received from different partners, the area to which it is directed, specific identification of the technical, capacity building and financial needs the country receives for the various projects that are proposed and implemented is somewhat compromised.

Data on the estimated costs of implementing mitigation measures were mostly not found in the national institutions, and the data used in this report were derived from local studies, but also from references from the continent and tropical region (mainly Brazil and India).

To fill these gaps, there is a need for training of the technical staff responsible for data collection, systematization and preservation. To make this possible there is a need for the existence of a centralized entity that functions as a link and guardian of the information necessary for the elaboration of this type of report. Additionally, the sectors need to establish a mechanism to collect, systematize, store, and share data with the level of detail that allows the analysis required for this type of report. The section on the National MRV System presents a proposal for institutional arrangements that can facilitate the interaction between institutions in this process as a way to minimize data discrepancies and facilitate access for the teams that prepare the greenhouse gas inventory reports as well as the planning, implementation control and monitoring of mitigation measures.

The limitations of the availability of energy sector data are mainly related to two aspects, namely, the consistent and systematic collection of data and compilation of the respective energy balances by those entitled to do so and the effort that must be made to present energy balances in the most disaggregated form possible from the point of view of activity sectors and fuels. The other important aspect is the elaboration of the energy statistics reports and their publication on a periodic basis. The INE Statistical Yearbooks do not include energy

statistics, and MIREME does not register these data in a systematic way, so there is an urgent need to raise awareness about the importance of this type of data, with the desired quality.

In the AFOLU sector, the main limitation was related to obtaining data on activities related to the use of waste and animal waste, burnt area by type of coverage, were difficult to access and the field survey did not make it possible to capture this information because it was not available in the basic documents consulted at the sector level or at the INE.

As for the IPPU sector, one of the major limitations faced during the preparation of this report was obtaining reliable and quality data, particularly information regarding the processes and use of industrial products in time for the estimation of its emissions.

As in other cases already reported, the main constraint for the waste sector was that, nationally and in almost all other sectors, there is poor data recording on waste generation in general, particularly the type of waste, quantities and forms of treatment. However, available studies on municipal solid waste generation suggest that the IPCC default parameters for Africa are applicable. This, makes it difficult to estimate with a satisfactory degree of accuracy the emissions resulting from waste generation and management in Mozambique. In this context, the use of general indicator data such as population, gross domestic product and other data, as well as interpolation and extrapolation of data was the path used to obtain data to perform the emissions calculation.

Financial, technical and capacity building support needed and received

Financial support needed

In order to fulfil the obligations of the Climate Change Convention, the country needs substantial financial support from cooperation partners. For this to happen, there is a need for the existence and alignment of sectoral strategies with the national development agenda, particularly national plans, such as the Government's Five Year Plans, National Territorial Development Plan (NNDP), National Adaptation Plan (NAP) and Local Adaptation Plans (PLAs), with the different climate finance mechanisms established under the UNFCCC, such as NAMAs, NDCs and other existing multilateral mechanisms and bilateral partnerships. As a complement to the existence of these instruments, it is important that the country also has competent staff capable of preparing funding proposals acceptable to donors in terms of quality and alignment with the proposed development plans.

With the preparation and submission of the NDC and other instruments, Mozambique has already taken an important step towards meeting the requirements of the Convention. According to the submitted NDC, the country expects to reduce GHG emissions by about 31.2 MtCO₂eq, between the period between 2020 and 2025. In order to achieve the proposed target, domestic and international support estimated at around USD7.5 billion will be required. However, it should be noted that this figure does not reflect all the financial needs required in the different sectors due to the fact that the IPPU, for example, has not received

all the required attention due to lack of data. In order to fill this gap, an additional effort to determine the cost of all the measures inherent in the different sectors will be made under the CBIT initiative.

Technological support needed

With regard to technology needs, the country has already made an effort to determine them in the agriculture, waste, electricity generation, and coastal areas sectors in an exhaustive stakeholder consultation process at the provincial and national levels. The Technology Needs Assessment for Mozambique was conducted between 2014 and 2018. The objective of this work was to identify and prioritize technologies capable of contributing to the achievement of the adaptation and mitigation targets of non-Annex II parties, while meeting their national priorities and targets for their sustainable development.

To carry out this work, the country was supported by the Global Environment Facility (GEF) and implemented by the United Nations Environment Programme (UNEP) in partnership with UNEP DTU (UDP) and in collaboration with the Regional Energy Research Centre at the University of Cape Town.

As a result of the technology needs assessment for the country, specifically in the area of agriculture, the following adaptation measures were identified as priorities: (i) Seed production and conservation, and promotion of low-cost seed and grain storage systems, (II) conservation agriculture, and (III) rainwater harvesting and conservation (GoM, 2018). For the coastal zone, adaptation priorities include: (I) flood warning system, (II) beach feedback, and (III) mangrove restoration (GoM, 2016).

As for mitigation, the priority technologies in energy production comprised: (I) regular-scale solar photovoltaic systems, (II) conventional combined cycle for gas, and (III) regular hydraulic turbines. In turn, for the area of municipal waste management, the priority technologies included: (I) Landfills with biogas production, (II) biogas production in landfill bioreactor and (III) pyrolysis (GoM, 2017).

Capacity Building Needs

Through the capacity needs self-assessment initiative in 2008, Mozambique developed the National Capacity Building Plan (NCCP) for the effective implementation of the three Rio Conventions (UNFCCC, CBD and UNCCD). Among various attributes, this plan was designed to address the country's need to build capacity at all levels to translate the provisions of these international agreements for the promotion of sustainable development into its own instruments by integrating them into national development policies and strategies. In Mozambique, climate change is seen as one of the areas that require capacity development at all levels.

Capacity building needs for the elaboration of the BUR

Despite the efforts made through the PNFC and other initiatives, there is still little information on which institutions and individuals are involved in climate change activities, let alone their potential in the country. A national level survey could help Mozambique to capture this dimension and assess the actual existing capacity and harness it, in the effective implementation of the various climate change programs that increasingly require more

qualified human resources. The roadmap on capacity development needs described below is based on the findings obtained through the components of this communication, namely national GHG inventories, mitigation measures, adaptation measures and other relevant information (technology transfer, research and systematic observations).

This survey is oriented to have a concrete idea of the institutional technical capacity and to introduce the necessary improvements, in order to implement the activities foreseen in the various components of the national communication, more effectively, to achieve the objectives of the Convention. On the other hand, the NDC 2018-2021 partnership plan contains the needs (financial, technological and technical) identified by the sectors with actions and/or responsibilities in the NDC for its implementation in the context of climate action.

Although the country has prepared its first BUR, the need for capacity building of national staff for the improvement of the next reports remains pressing. There are many aspects that still need to be improved, both in the collection of activity data and the design of the surveys or instruments used for this purpose, and also in their analysis, including the emission factors that are used for GHG estimation. In order that the next reports reflect the reality of the country, it is imperative that the emission factors used are calculated locally.

The other aspect to take into account in the harmonization of data collection is the institutional arrangement. The one currently in force only allows for the collection of basic data. However, the identification and formalization of an institution that will take care of this desideratum, not only for the future BURs but also for the national communications, among other GHG-related reports, is pertinent.

In the energy sector, it is pertinent to train national staff in the compilation of national statistics for the sector, both by sector and by sub-sector of activity, and by type of fuel, as well as the calculation of national energy balances with a certain periodicity and categorization required by the IPCC, in addition to the determination of emission factors specific to this sector.

Being the most complex of all the sectors involved in GHG inventories, the AFOLU sector needs special attention. At the level of this sector, there is a need for capacity building in the collection, quantification and storage of activity data from biomass burning processes, organic processes resulting from soil organic matter reduction as well as soil drainage, animal population throughout the country and their characterization by types, use of animal waste in agriculture or for other purposes, use of chemical fertilizers, water pumping based on different energy sources (electric, solar, liquid fuels, among others), rice cultivation, among others, according to IPCC categories. The other areas of the AFOLU sub-sector that also need special attention are biophysical processes, particularly land cover changes due to net annual biomass growth and removals from existing forest and non-forest plantation areas, and possible regrowth of biomass in abandoned areas. The latter areas need to be assessed on a regular basis because of the effect they have on GHG estimates.

In IPPU, it is necessary to demystify the secrecy that industries raise when seeking to know the technology they use in the different manufacturing processes of their products. This secrecy makes it somewhat difficult to design mitigation measures to stop emissions resulting from the use of obsolete technology. The other aspect to take into account in this sector is the

characterization of the industrial waste resulting from the different sub-sectors of the sector and the treatment that is given to it.

For the waste sector, capacity building will have to be done at various levels, from hospitals, industry, municipalities, among other sectors, in terms of characterization, quantification and data storage of the waste that is generated in each of them. It is only with this type of information that one can determine national emission factors that can allow for the elaboration of BURs that are close to the reality of the country.

Capacity-building needs to conduct greenhouse gas inventories

Overall, in the national GHG inventories component, three main constraints related to the GHG inventory preparation and updating process were identified: poor sectoral statistics, lack of specific emission factor sectors, and poor knowledge of GHG inventory techniques. On the other hand, lack of knowledge and skills in inventory techniques suggests that it is the most limiting factor of all. Table 6.1 presents in more detail the main constraints and capacity development needs, including target institutions in the sectors of energy; industrial processes and product use; agriculture, forestry and other land use; and waste.

Capacity building needs for climate change adaptation

In the climate change adaptation component, several constraints and capacity development needs were also identified. The most common constraints related to the eight adaptation sectors covered include lack of data from different sectors; and lack of knowledge about climate change, its impacts and other associated issues. In this context, it is suggested that there be a comprehensive training/qualification program for national technicians in formulating and managing projects that contribute to the mobilization of climate and other funds, including institutional capacity building, particularly in developing a data infrastructure to support adaptation activities. It is also suggested that there should be training and capacity building programs on more sector-specific aspects and needs. Table 6.2 presents in more detail the main constraints and needs for training and capacity development, including target institutions in the sectors of energy; infrastructure; coastal areas; agriculture; livestock and pasture; forestry; fisheries; biodiversity and waste.

Capacity building needs for climate change mitigation

Overall, the climate change mitigation component, identified several constraints and capacity development needs. The most common constraint related to all four mitigation sectors is the “weak capacity to design projects to access climate funds.” No less important is also the “lack of databases/statistics”. In this context, it is suggested that there should be a comprehensive training/capacity building program for national technicians in formulating and managing projects to help mobilize climate and other funds, including institutional capacity building, particularly in developing a data infrastructure to support mitigation activities. It is also suggested that there should be training and capacity building programs on more specific aspects of each sector’s needs. Table 6.3 presents in more detail the main capacity building constraints, including target institutions in the energy; industrial processes; agriculture, forestry and other land uses; and waste sectors.

Capacity building needs for technology transfer

In the context of technology transfer, several constraints and capacity development needs were also identified as follows:

(i) in the infrastructure and coastal zones sector (flood early warning system; beach resurfacing and mangrove restoration), as described in the TAP Infrastructure and Coastal Zones (ICZ) report (2018). Technology options in this sector highlight the lack of trained technicians at the national level to implement technology; limited institutional and organizational capacity for technology implementation, as the most common constraints encountered in technology implementation. Table 6.4 presents in more detail the main constraints and capacity development needs, including the target institutions identified in the ICZ sector;

(ii) In the electricity generation subsectors (solar PV systems; conventional gas combined cycle; and regular scale hydro/hydro turbines); and solid waste management and treatment (landfill with biogas production; bioreactor landfill for biogas production; and pyrolysis), as described in the TAP Energy & Waste report (2018). Technology options in the electricity generation and solid waste management and treatment subsectors highlight the shortage of specialists and the difficulty in hiring skilled labor as the most common constraints encountered in implementing technologies in the electricity generation and solid waste management and treatment subsectors. Table 6.5 (electricity generation) and Table 6.6 (waste) present in more detail the main constraints and capacity development needs including the target institutions identified in these sectors;

(iii) In the agriculture sector (seed production and conservation and promotion of low-cost seed and grain storage systems; conservation agriculture and rainwater harvesting and conservation), as described in the TAP Agriculture report (2018). The technology options in the agricultural sector highlight the lack of experts, lack of practices and technical weakness; lack of integration of agricultural content and specialized techniques in the courses offered by most agricultural training institutions, as the most common constraints encountered in the implementation of technologies. Table 6.7 presents in more detail the main constraints and capacity development needs, including the target institutions identified in this sector.

Capacity building needs for research and systematic observation

Both observations and research present as main constraints the low level of funding for these areas and the lack of qualified human resources. It is necessary to rethink the vast dimension and complexity of environmental problems in the country and the doubled gains that can result from investment in the massive training of qualified human resources in the areas of research and observation, particularly those institutions that are data providers or users of meteorological, hydro meteorological, hydrographic, agrometeorological, and public health observations, including equipment for processing and analysis of the observed data.

As an example, an early warning system to be effective and able to adequately inform requires an observation network with good coverage, in addition to adequate infrastructure and platforms capable of transmitting data in real time. Despite its geographical location prone to extreme destructive events, Mozambique still relies heavily on external support to make its forecasts. There is also a lack of climate, hydrological, and weather forecast models that include skilled human resources to work with these platforms. In most cases, this

working environment and facilities require enormous financial resources and adequate international assistance, which will require mobilization support.

The tables in Mozambique's Second National Communication, of which this report is a summary, which are listed below, present more information: Table 6.8 shows the main constraints and capacity development needs in the targeted institutions, namely INAM, DNGRH, IIAM, IIP, INAHINA and ONS; Tables 6. Tables 6.9 - 6.10 show the actions undertaken at the ministerial and sectoral levels; and Table 6.11, the list of projects to be developed and financed and to be included in the implementation of Mozambique's Nationally Determined Contribution (NDC).

SUPPORT RECEIVED

Financial support received between 2010 and 2016

Due to its vulnerability to climate change and the recurrent climate related disasters that have hit the country in recent years, several efforts have been made to build the capacity of national personnel to identify and implement actions to reduce the impacts of climate change, as well as to strengthen resilience to achieve sustainable socio-economic development with a rational use of natural resources. To this end, several sectoral policies and strategies, and action plans at national and local levels have been designed and implemented.

Parallel to the various programs designed over the last two decades aimed at reducing the impacts of climate change, several projects funded by cooperating partners, development agencies, and international organizations in the form of climate finance, grants or loans have been implemented. The focus of these projects has mainly centered on areas such as adaptation, mitigation, early warning, national communications preparedness, research, and capacity building for community awareness of extreme events. For the purpose of this report, only climate change-related projects that were implemented between 2010 and 2016 will be reported. Some projects started in previous years whose duration extended into the reporting period, as well as those that started within the selected period and go beyond it will also be considered.

The list of projects, objectives and their respective amounts were provided by the Ministry of Foreign Affairs and Cooperation and the Ministry of Land and Environment, including the implementing institutions. However, it should be noted that this list is not exhaustive. Among the main problems that contributed to this, one can cite the difficulty faced in obtaining the list of them, their classification into climate projects or not, the lack of detailed information about them, such as the start and end year, project value, and implementing institution.

Despite the problems pointed out above, from the survey done, it was possible to list about 76 projects related to climate change. Annex 12 presents the listing of these projects with the information it was possible to collect about each one.

Financial support received for the preparation of the BUR

Like the other Non-Annex I Parties, Mozambique received funding of \$352,000.00 from the Global Environment Facility (GEF) for the preparation of its first Biennial Update Report (BUR1) to meet its obligations under the United Nations Framework Convention on Climate Change (UNFCCC). The management of these funds was in charge of the Ministry of Land

and Environment, National Directorate of Climate Change, however the “Focal Point” of the Convention in the country.

With the amount received, it was not possible to cover all the expenses inherent in the preparation of the SUR, such as public consultations for consultation and validation of data from different sectors, as well as the report itself, among others. Thus, it was necessary to turn to other cooperation partners to cover the financial and technical needs that were lacking.

Capacity building received for the preparation of the BUR

For the preparation of this report, the country relied on the support of several international organizations for the capacity building of the national specialists involved. As this is the first report of this nature that the country is preparing, the trainings organized covered all aspects, from data collection and systematization of all sectors, greenhouse gas inventory, mitigation and MRV.

The first capacity building on BUR in which Mozambique participated was the UNFCCC-GIR-CASTT Programme on Greenhouse Gases, which took place in South Korea in 2018, under the joint organization of the Greenhouse Gas Inventory and Research Center of the Ministry of Environment of that country in coordination with the United Nations Climate Change Secretariat. This training covered all aspects of the BUR from climate change policies in the host country, Paris Agreement, Paris Agreement transparency framework, Greenhouse Gas Inventory, MRV, projection of greenhouse gas emissions and need for support for inventories.

The second capacity building on the BUR took place in Maputo from March 15 to 21, 2020. This training was guided by experts from the Lusophone Cluster supported by GSP/UNDP and the Partnership on Transparency in the Paris Agreement (PATPA). It aimed at training national technicians in the use of the 2006 IPCC Guidelines for national greenhouse gas inventories. Specifically, it focused on giving an overview of the IPCC guidelines, uncertainty analysis, analysis of key categories; approach for collecting data from activities in different sectors (energy, IPUP, agriculture and cattle ranching, LULUCF and waste) and practical exercises for calculating GHG emissions and removals. In addition to these aspects, the presence of the experts from the Lusophone Mission in the country also served to provide technical support on inventories to the national experts in charge of preparing the country’s first BUR.

The third training that the national experts received was on the use of the Greenhouse Gas Abatement Cost Model (GACMO), a tool developed to help countries or regions analyse their mitigation options. It has the advantage of allowing the calculation and visualization of the Business as Usual Scenario (BAU) mitigation scenario and provides calculations for all selected mitigation options. This training was divided into two parts, the first took place on August 5-6, 2020 and the second in February 2021, under UNDP funding.

Additionally, the country hosted in August 2022 the practical training process called Lusophone ICA carried out by the experts of the Lusophone Core supported by PATPA, UNDP/Climate Promise (with support from the Government of Belgium via the ECT project) and UNEP through GSP-CBIT.

A- Appendix 1: TECHNICAL ANNEX OF REDD+



Republic of Mozambique
Ministry of Land and Environment

Mozambique's BUR REDD+ Technical Annex

**Results achieved by Mozambique for REDD+
Results-Based Payments**

Maputo, October 2022

Technical information

Title: Mozambique's modified BUR REDD+ Technical Annex

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1 INTRODUCTION

In the context of results-based payments for reducing emissions from deforestation and forest degradation, conservation of forest carbon stocks, sustainable management of forests, and enhancement of forest carbon stocks in developing countries (REDD+), under the United Nations Framework on Climate Change (UNFCCC), Mozambique is submitting this Technical Annex to its Biennial Update Report (BUR).

The submission of this Technical Annex with REDD+ results is voluntary and exclusively for the purpose of obtaining and receiving results-based payments in accordance with the decisions 13/CP.19, paragraph 2 (UNFCCC COP19 – Warsaw, 2013a), and 14/CP.19, paragraphs 7 and 8 (UNFCCC COP19 – Warsaw, 2013b).

This submission, therefore, does not modify, revise or adjust in any way the Nationally Appropriate Mitigation Actions (NAMA) voluntarily submitted by Mozambique under the Bali Action Plan ([FCCC/AWGLCA/2011/INF.1](#)), nor does it interfere with its Nationally Determined Contribution (NDC) under the Paris Agreement of the UNFCCC.

This submission was developed by the Mozambican government with the technical support from the Technical Working Group of Experts on REDD+ (MRV for REDD+) created in May 2016 by the National Fund for Sustainable Development (FNDS). This document presents the results achieved in reducing emissions from deforestation in Mozambique during the 2014-2016 period, and also the progress made in producing data and information to continuously improve Mozambique's submissions.

The technical annex is part of the international consultation and analysis of BURs referred to in decision 2/CP.17, annex IV, paragraph 4, the objective of which is to increase the transparency of mitigation actions and their effects through analysis by the TTE (team of technical experts) in consultation with Mozambique and through a facilitative sharing of views, resulting in a separate summary report.

2 SUMMARY OF INFORMATION FROM THE ASSESSED FREL

Mozambique's Forest Reference Emission Level (FREL) for reducing emissions from national native forest for REDD+ results-based payments under UNFCCC, within a national basis resulting from an historical average from 2003 to 2013, was submitted on a voluntary basis for a technical assessment in the context of results-based payments. The FREL covers the activity “reducing emissions from native forest deforestation” which is Mozambique's most significant of five activities included in paragraph 70 of 1/CP.16 (UNFCCC COP16 – Cancun, 2010). The country is still developing the methodologies for monitoring the

emissions and removals from the other REDD+ activities (forest degradation, conservation, sustainable management of forests and enhancement of forest carbon stocks).

Mozambique submitted its FREL on 10 January 2018 in accordance with decisions 12/CP.17 (UNFCCC COP17 – Durban, 2011) and 13/CP.19 (UNFCCC COP19 – Warsaw, 2013). The technical assessment took place from 19 to 23 March 2018 in Bonn, Germany, and was coordinated by the UNFCCC secretariat. As a result of the facilitative interactions with the Assessment Team (AT), Mozambique provided a modified version of its submission on 28 May 2018, which took into consideration the technical inputs of the AT. Finally, the technical assessment report was published on 20 November 2018.

To the referred FREL, Mozambique used a national forest definition, which is: lands occupying at least 1 ha, with a canopy cover equal or greater than 30% and with trees with the potential to reach a height of 3 m at maturity (Falcão & Noa, 2016). Mozambique uses a tiered Land Use and Land Cover (LULC) classification system, which fits within the IPCC system that was used as the basis for the NFI, activity data and mapping of land-use and land cover (LULC). However, the national system highlights the forest class, making a distinction between different types of forest existing in the country.

Mozambique's forests are categorized as a "tropical forest", and subdivided at the national level, considering level 1 as the IPCC system, level 2 that distinguishes between open and closed canopy, as well as evergreen or deciduous evergreen or deciduous forests. It also includes a class of forest plantation. At level 3, forest types are further differentiated into evergreen forests including montane forest, gallery forest, mangrove, coastal forest and Mecrusse forest.

The activity data used for the construction of the FREL in Mozambique were obtained from an annual historical analysis of land use, land use change and forestry (LULUCF) conducted by the MRV Unit for the period 2001-2016, using the tool Open Foris Collect Earth (MITADER, 2018). However, the FREL covered the period 2003 - 2013, to maintain consistency with the historical record of deforestation estimates of the country. The activity data was generated following IPCC Approach 3 for representing activity data as described in the 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 4, Chapter 3, Section 3.13 (Eggleston *et al.*, 2006).

The national forest inventory is the second sub-system within the NFMS, which produces the emission factors. The forest inventory conducted in 2016-17 (MITADER, 2017) produced the emission factors used for the FREL submitted to the UNFCCC in 2018.

For estimating emission factors and other purposes (volume, density, etc.), Mozambique aggregated fourteen forest types into five forest strata (Table 12), based on the similarity of the forest type. The aggregation was done with the purpose of harmonizing the forest strata of activity data (AD) from collect earth and the emission factors from NFI.

The construction of the FREL considered equation 2.16 of the 2006 IPCC GL for estimating annual change in carbon stocks in biomass on forestland converted to other land-use categories. The FREL did not consider changes in carbon stocks in forest lands remaining forest lands. In this regard, the Technical Annex differs from the BUR, since the BUR included such changes, namely biomass growth and degradation due to fuel wood removal

and wildfires. Therefore, the annual emissions presented in this Technical Annex differ to those from the BUR.

Table 12: Mozambique forest types.

Initial forest type	Aggregated strata
Semi-deciduous open forest	Semi-deciduous forest
Semi-deciduous closed forest	
Miombo open forest	
Miombo closed forest	
Semi-evergreen mountain open forest	Semi-evergreen forest
Semi-evergreen mountain closed forest	
Semi-evergreen open forest	
Semi-evergreen closed forest	
Mopane open forest	Mopane forest
Mopane closed forest	
Mecrusse open forest	Mecrusse forest
Mecrusse closed forest	
Mangrove open forest	Mangrove forest
Mangrove closed forest	

Based on the methodology described above, Mozambique's FREL for the period of 2003 – 2013 was assessed to be 38,956,426 tCO₂eq (Table 14) from an annual average of 267,029 hectares deforested (Table 13).

Table 13: Annual deforestation for the FREL period.

Year	Annual deforestation per forest stratum (ha)					Total
	Semi-deciduous	Semi-evergreen	Mangrove	Mecrusse	Mopane	
2003	192,108	38,633	-	1,755	1,704	234,198
2004	235,354	38,874	1,716	-	12,100	288,044
2005	242,940	74,239	-	-	6,754	323,934
2006	200,388	35,283	-	5,246	10,476	251,393
2007	192,401	40,605	1,716	1,709	3,424	239,854
2008	213,758	76,531	-	-	-	290,289
2009	206,592	60,370	-	-	1,669	268,632
2010	268,354	68,104	5,140	-	23,831	365,431
2011	190,519	45,389	-	-	11,975	247,884
2012	198,476	50,123	-	-	5,128	253,726
2013	137,050	33,514	-	-	3,373	173,937
Average	207,086	51,060	779	792	7,312	267,029

Table 14: Annual emissions from deforestation for the FREL period.

Year	Annual emissions from deforestation per forest stratum (tCO ₂ e)					Total
	Semi-deciduous	Semi-evergreen	Mangrove	Mecrusse	Mopane	
2003	25,559,439	7,942,668	-	273,615	142,096	33,917,819
2004	31,338,894	7,981,362	325,087	-	1,009,247	40,654,590
2005	32,356,914	15,257,126	-	-	566,963	48,181,004
2006	26,703,194	7,251,572	-	806,709	873,834	35,635,309
2007	25,608,983	8,343,784	350,931	262,747	285,589	34,852,034
2008	28,482,723	15,727,697	-	-	-	44,210,420
2009	27,481,558	12,388,883	-	-	139,242	40,009,683
2010	35,724,524	13,998,072	999,748	-	1,998,642	52,720,986
2011	25,379,684	9,318,237	-	-	1,002,489	35,700,409
2012	26,423,022	10,362,675	-	-	427,686	37,213,382
2013	18,236,643	6,907,066	-	-	281,338	25,425,047
Average	27,572,325	10,498,104	152,342	122,097	611,557	38,956,426

The REDD+ decisions under the UNFCCC value the continuous update and improvement of relevant data and information over time. Mozambique values consistency and transparency of the data submitted as fundamental, and gives the highest priority to these. On the other hand, Mozambique continues its efforts to improve the accuracy of the estimates for all carbon pools included in the FREL, and continue presenting the data in a much more transparent and verifiable manner, allowing the reconstruction of the FREL.

3 RESULTS IN TONNES OF CO₂ PER YEAR, CONSISTENT WITH THE ASSESSED FOREST REFERENCE EMISSION LEVEL

The necessary data for the reconstruction of FREL, is publicly available, in a manner which allows its replication, as result of decision 14/CP.19 of COP-19, which determines that “the data and information used by Parties in the estimation of anthropogenic forest-related emissions by sources and removals by sinks, forest carbon stocks, and forest carbon stock and forest-area changes, as appropriate to the activities referred to in decision 1/CP.16, paragraph 70, undertaken by Parties, should be transparent, and consistent over time and with the established forest reference emission levels and/or forest reference levels in accordance with decision 1/CP.16, paragraph 71(b) and (c) and chapter II of decision 12/CP.17”. The activity data of deforestation is publicly available through the Deforestation Statistics Webportal ([link](#)) and the emission factors used are described in the FREL.

The emission reductions in tonnes of CO₂e per year from 2014 – 2016 were estimated applying the Equation 1, i.e., by subtracting the annual emissions from the FREL.

$$\text{Emission reductions (tCO}_2\text{e)} = \text{FREL} - \text{Annual emissions from deforestation} \quad \text{Equation 1}$$

For the period 2014 – 2016, Mozambique reduced about 78,809,278 tCO₂e (Table 15 and Figure 10), an average reduction of 67% in relation to the FREL.

Table 15: Summary of information from assessed results of emission reductions from 2014 to 2016.

Year	FREL (tCO ₂ e*yr ⁻¹)	Annual deforestation (ha)	Annual emissions from deforestation (tCO ₂ e)	Annual Emission Reductions (tCO ₂ e)
2014	38,956,426	113,491	16,596,306	22,360,120
2015	38,956,426	90,136	13,217,737	25,738,689
2016	38,956,426	55,600	8,245,956	30,710,470
Total		259,227	38,059,999	78,809,278

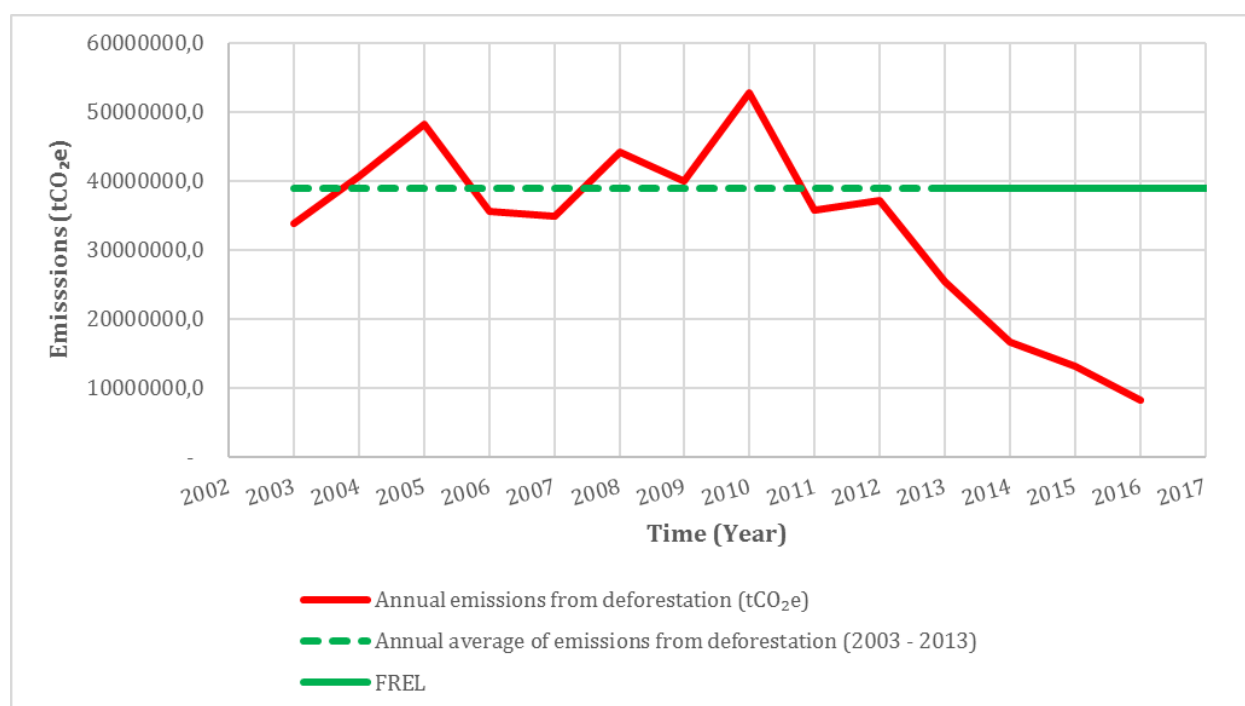


Figure 10: Annual emissions from deforestation in Mozambique between 2003 and 2016.

4 DEMONSTRATION THAT THE METHODOLOGIES USED TO PRODUCE THE RESULTS ARE CONSISTENT WITH THOSE USED TO ESTABLISH THE ASSESSED FOREST REFERENCE EMISSION LEVEL

The present REDD+ results method is overall consistent with Mozambique's FREL, as it used the same national forest definition, national land use and land cover classification system, REDD+ activities, carbon pools, gases and scales.

4.1 activity data

The Activity Data of Mozambique, derived from the remote sensing products, which were obtained from an historical analysis time series of land use, land-use change and forestry (LULUCF) for the period of 2001 – 2016, using *Open Foris Collect Earth*.

The approach to produce all the information of Activity Data is described in Box 1. For more detailed information see the methodological description in the FREL of Mozambique ([link](#)).

Box 1. Summary Information of the approach, sample design and the source of remote sensing products used to produce national Activity Data

Activity data have been generated following IPCC Approach 3 for representing the activity data as described in the 2006 IPCC Guidelines for National Greenhouse Gas Inventories (Volume 4, Chapter 3, Section 3.13), i.e., using spatially-explicit observations of land-use categories and land-use conversions over time, derived from sampling of geographically located points. A systematic sampling design was used, with a 4 x 4 km grid at national level (the same grid used to allocate the National Forest Inventory clusters from the Stratified Random Sampling design). This analysis was conducted from 2001 to 2016 and served as the basis for the construction of the FREL submitted in 2018. Detailed information can be found in Mozambique's 2003-2016 deforestation report (MITADER, 2018).

Regarding the spatial sampling unit, from each point of the 4 x 4 km grid, a 1 ha plot was overlaid, where an internal grid of 5 x 5 points (20m x 20m grid) is overlapped (with the weight coverage of 4% by each internal grid point).

The Tool used to perform the national Activity data calculation was OpenForis Collect Earth (www.openforis.org), which enables access to high resolution imagery in Google Earth and Bing Maps, a medium resolution imagery available through Earth Engine Explorer and Code Editor. This tool also provides a form designed to collect the land use and land cover information for each sampling unit (1 ha plot). The Earth Engine Code Editor was used to facilitate the interpretation of the vegetation types and of LULC changes (by displaying MODIS MOD13Q1 Imagery) including Sentinel-2 Imagery, Landsat 7 and 8 Time Series Imagery. The medium resolution imagery also includes products of Reflectance composites and vegetation indexes from Landsat 5 to 8.

4.2 emissions and removals factors

The Emissions Factors for all forest types were derived from the National Forest Inventory (NFI) conducted between 2015 and 2017 (MITADER, 2017). The NFI considered four types of forest, namely Semi-deciduous forest, Mopane forest, Mecrusse forest and Semi-evergreen forest. Emission factors for mangrove were based on the default values of IPCC Guidelines for national greenhouse gas inventories. For belowground biomass, a combination of local and regional allometric equations were used, as well as IPCC default values for semi-evergreen forest.

Mozambique included post-disturbance carbon stocks for above and belowground biomass for conversions to cropland and grassland from the IPCC default values.

4.3 carbon pools

For the monitoring of carbon emissions, Mozambique considered in the FREL the use of only 2 of the 5 carbon pools presented in section 4.2.2 of chapter 4 of the IPCC good practice guide. The two reservoirs considered were: aboveground biomass (AGB) and belowground biomass (BGB).

With the exception of semi-evergreen forest, all other strata used national and regional allometric equations for estimating biomass. For semi-evergreen forest, IPCC (2003) allometric equation was used to estimate aboveground biomass and root to shoot ratio from Mokany *et al.* (2006) was used to estimate belowground biomass. Other pools such as soil organic carbon (SOC) and dead organic matter (DOM and litter) were not considered for the construction of the FREL, hence they are also not included in the monitoring of emissions.

National DOM data (tier 2 and 3) are scarce, and the few that exist are not representative. This fact limited the inclusion of these pools in the emission estimates, because the IPCC in **section 4.2.2 of chapter 4** establishes as a condition for the inclusion of DOM in the emission estimates the following “*countries that want to quantify DOM dynamics need to develop Tier 2 or 3 methodologies*”. Otherwise, the IPCC assumes the following: “*Tier 1 methods assume that the net carbon stock changes in DOM pools are zero because the simple input and output equations used in Tier 1 methods are not suitable to capture the DOM pool dynamics*”.

For the SOC, Mozambique is still considering the possibility to include this pool in the future for the monitoring of emissions. There is national SOC data available from 8 of the 10 provinces of the country, obtained during the national forest inventory, which is one of the conditions for including the SOC in the emission estimates, as described in the 2006 IPCC guidelines, section 4.2.3 of chapter 4, which establishes the following “*forest land classes must be stratified according to climate regions and major soil types, which can be accomplished with overlays of suitable climate and soil maps*”. Thus, in the future, Mozambique is expected to incorporate SOC into the FREL and annual emission estimates.

4.4 REDD+ activities

Mozambique is currently only monitoring emissions from deforestation, at the district, provincial and national level. The MRV unit produces data of annual deforestation, annual emissions and emission reductions.

The MRV Unit has developed a methodology to monitor emissions from forest degradation. This methodology will be tested in Zambézia province for the year of 2021.

Other REDD+ activities are not monitored at this stage, but it is expected that as the private sector starts implementing REDD+ projects that include enhancement of carbon stocks, these activities will start being monitored.

5 DESCRIPTION OF THE NATIONAL FOREST MONITORING SYSTEM AND THE INSTITUTIONAL ROLES AND RESPONSIBILITIES FOR MEASURING, REPORTING AND VERIFYING THE RESULTS

To achieve the intended activities of the national forest monitoring system, continuous efforts are carried out by different institutions within the government of Mozambique. In 2016, Mozambique initiated the establishment of an MRV unit under the National Fund for Sustainable Development (FNDS) to carry out the monitoring, report and verification of national forest greenhouse gas emission, as well as monitoring emissions from REDD+ projects.

The National Forest Monitoring System (NFMS) is being developed jointly between the National Directorate of Forest (DINAF), FNDS (through the MRV Unit) and other relevant stakeholders. The current monitoring system has three sub-systems: Satellite and land monitoring system, National forest inventory and National GHG inventory.

The first version of the NFMS document was finalized in 2021 ([link](#)) and defines the NFMS as a system which:

- i. Allows for accountable reporting of REDD+ results.
- ii. Allows for Monitoring the implementation and effectiveness of Policies and Measures for sustainable forest management, which include national and international purposes and beyond REDD+.
- iii. Builds on a robust IT system to support data management and transparency.

Responsibilities within the NFMS:

DINAF - Responsible for the National Forest Inventory as a Leader, and responsible for the Quality Control and Quality Assurance of the NFI process.

FNDS/MRV - Coordinate the operations and logistics of the National Forest Inventory activities, and Production of activity data for REDD+ Activities, Production and submission of the FREL document.

IIAM - Provide technical staff for tree species identification and fieldwork support, establish permanent sampling plots.

Academic Institutions - Support in the production of the National Forest Inventory, National Forest Inventory Report, providing allometric equations for carbon estimation.

CENACARTA - Evaluation of the data production process.

6 NECESSARY INFORMATION THAT ALLOWS FOR THE RECONSTRUCTION OF THE RESULTS

For REDD+ purposes, complete information means the provision of data that allows for the reconstructions of the FREL and the REDD+ results.

The methodology used to calculate activity data, emission factors and FREL is described in detail in the FREL document through the link:

https://redd.unfccc.int/files/moz_frel_report_final.v03_03102018.pdf

The activity data of deforestation is publicly available through the Deforestation Statistics Webportal ([link](#)) and the emission factors used are described in the FREL.

use of the most recent ipcc guidance and guidelines

The construction of Mozambique's FREL and the results presented in this Technical Annex are based on the 2006 IPCC Guidelines for National Greenhouse Gas Inventories (IPCC, 2006) for estimating the annual carbon stock change on forest land converted to non-forest land, considering the carbon stock in the biomass immediately before and immediately after a conversion. Mozambique applies the product of activity data (in hectares/year) and emission factor (in t CO₂e/ha) for estimating emissions.

Mozambique considered updating the post-disturbance emission factor for cropland, which was revised in the 2019 IPCC Revised Guidelines, but this would require updating the published FREL. However, since this emission factor has increased slightly, it is conservative to maintain it at its previous value.

Establish, according to national circumstances and capabilities, robust and transparent national forest monitoring system

Mozambique's National Forest Monitoring System (NFMS) is still in development, and it will allow long-term forest monitoring to improve forest management in a transparent, accurate, consistent and complete, and also will provide robust and transparent information for the Agriculture, Forestry and Other Land Use (AFOLU) sector, including sustainable forestry, management of protected areas and buffer zones, agricultural expansion, and land-use planning. NFMS is being developed by the National Directorate of Forests (DINAF) in coordination with the National Fund for Sustainable Development (FNDS) and other stakeholders. Actually, NFMS includes Satellite and land monitoring systems, NFI and GHG inventory done by the MRV unit of FNDS.

7 LEAKAGE OUTSIDE OF THE NATIONAL BOUNDARY

The measurement of leakage outside of Mozambique's boundaries is challenging to account for and quantify as little or no monitoring may occur in neighboring countries. In addition, the identification of reasons and allocation of responsibilities or liability for the leakage is very difficult. Finally, neither the National REDD+ Strategy, nor the Strategic Environmental and Social Assessment mention leakage outside the national boundary. As a result, we do not report on leakage outside the national boundary.

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ANNEX 1: National REDD+ Strategy

The national REDD+ strategy was finalized and approved by the government in 2016 with the objective to conserve wooded areas, promote sustainable development, and to reduce deforestation by enhancing forest resilience to climate change, all with integrated approach to rural development. This strategy also aims to increase carbon stocks by reducing emissions of 170MtCO₂e per year and restore 1 million hectares of forests until 2030.

The national REDD+ strategy address strategic actions to tackle deforestation and forest degradation, considering the commercial agriculture, shifting agriculture, extraction of timber products, production of firewood and charcoal, urban expansion, mining and livestock as the drivers of deforestation and forest degradation.

The national REDD+ strategy has six strategic pillars: (i) governance; (ii) sustainable agriculture; (iii) alternative sources of energy; (iv) protection of conservation areas; (v) sustainable forest management; and (vi) restoration of degraded forests and forest plantations.

The national REDD+ strategy document is available at

<https://www.fnds.gov.mz/index.php/pt/documentos/publicacoes/estrategia-nacional-do-redd>

ANNEX 2: SAFEGUARDS INSTRUMENTS

To support the implementation of the National REDD+ Strategy, a Social and Environmental Strategic Assessment (SESA), was produced. The objective of the Strategic Environmental and Social Assessment (SESA) for the REDD+ National Strategy is to integrate key environmental and social considerations in the design and actual establishment of forest development initiatives, considering a long-term perspective in which integrated rural development and improved wealth and well-being of rural communities and the country in general are based on the sustainable use of natural resources, particularly land and forests.

The SESA identifies priority environmental and social considerations to guide design, implementation and operation of forest development and investment programs. It establishes the legal, institutional and governance framework within which such programs should take place. The SESA is also anchored in long-term economic and social development objectives, and sets a strategic framework for individual forest development programs. It identifies priority environmental and social considerations that are important at national level.

With a focus on forest development and improved and sustainable forest management, more specifically the objective of the SESA is to (i) promote the harmonization of the forest, agriculture, energy and rural development specific strategies and policies in order to support the integration of sustainable resource management and use in forest and rural development planning processes; (ii) contribute to streamlining forests, agriculture, energy and rural development in the long-term integrated development planning for sustainable economic growth and poverty reduction; (iii) identify environmental, social and local economy investment opportunities, and promote environmentally sustainable and socially responsible development; and (iv) support the understanding and inclusion of priority environmental and social considerations in the preparation of forest investment programs that will stem from the country's REDD+ Strategy.

The SESA document is available at

<https://www.fnds.gov.mz/index.php/pt/component/edocman/sesa-for-redd-strategy-mozambique-october-30/download>

ANNEX 3: NATIONAL MRV SYSTEM FOR REDD+

Mozambique has not formalized its national monitoring system (NFMS). There is a work in progress between the DINAF and FNDS and other relevant stakeholders to formalize the NFMS. This process started in 2019, with the establishment of the NFMS Task Force, responsible for designing, developing and operationalizing the NFMS. Technical officers of DINAF and FNDS (MRV unit) were appointed as its members.

The NFMS Working Group, as a group of stakeholders related to the NFMS with its role to provide related information, inputs and advice to the development and operationalization of the NFMS. The initial members included DINAF, National Directorate of Environment (DINAB), National Directorate of Land (DINAT), FNDS, Eduardo Mondlane University (UEM), Institute of Agricultural Research of Mozambique (IIAM), FAO (Food and Agriculture Organization of the United Nations), World Bank, International Union for Conservation of Nature (IUCN) and Federation of Timber Operators (AMOMA). However, the Working Group is, by its nature, an open forum which the members can change flexibly depending on the needs and interests.

The first version of the NFMS document was finalized in 2021 ([link](#)) and defines its NFMS as a system which enables accountable reporting of REDD+ results; monitoring the implementation and effectiveness of Policies and Measures (PaMs) for sustainable forest management which include national and international purposes and beyond REDD+; and builds on robust IT system to support data management and transparency. The following principles are stated in the document as the basis of the NFMS:

- The NFMS shall be designed and operationalized under the full ownership of Ministry of Land and Environment (MTA), and in collaboration with related stakeholders;
- The NFMS should be target-driven, oriented towards specified sub-national, national and international objectives;
- The NFMS shall build on existing system as far as practical;
- The NFMS shall be developed through step-wise improvement, take into consideration the national circumstances, reflect the phased approach for the implementation of REDD+ activities, and sustainable in the long-run. The development shall be realistically feasible within the available time, financial and human resources; and
- The NFMS shall meet the international requirement under REDD+, and as appropriate, apply international and national good practices.

Responsibilities within the NFMS:

DINAF - Responsible for the National Forest Inventory as a Leader, and responsible for the Quality Control and Quality Assurance of the NFI process.

FNDS/MRV - Coordinate the operations and logistics of the National Forest Inventory activities, and Production of activity data for REDD+ Activities, Production and submission of the FREL document.

IIAM - Provide technical staff for tree species identification and fieldwork support, establish permanent sampling plots.

Academic Institutions - Support in the production of the National Forest Inventory, National Forest Inventory Report, providing allometric equations for carbon estimation.

CENACARTA - Evaluation of the data production process.

More information regarding the institutional arrangements can be found in section 8 on the NFMS document through the [link](#).

The current monitoring system has three sub-systems:

- Satellite and land monitoring system
- National forest inventory
- National Greenhouse Gases (GHG) inventory

Satellite and land monitoring system

The satellite and monitoring system is a sub-system within the NFMS that produces the activity data. The MRV Unit within FNDS is responsible for this system. It specifically generates the information on the number of hectares of deforestation within a given geographic area. This system produced information of deforestation that was used to produce the National Forest Reference Emissions Level (FREL). This information was also used to generate historical deforestation statistics by Provinces, districts (link <https://fnds.gov.mz/mrv/index.php/documentos/estudos/15-anuario-ambiental-para-instituto-nacional-de-estatistica-ine/file>), conservation areas and Zambézia Integrated Landscape Management Program (ZILMP) using a systematic stratified sampling.

To ensure a good quality of data the team developed and implemented Quality Assurance/Quality Control (QA/QC) processes in all production processes including the development of Standard Operating Procedures (SOPs). This ensures a high standard of quality of the data produced. To guarantee the replication of processes, the MRV unit developed a Portuguese version guideline to produce activity data, accessed through the link <https://fnds.gov.mz/mrv/index.php/documentos/guioes/46-protocolo-de-monitoria-e-estimativa-de-emissoes-por-desmatamento-vjun2021/file>. Data collection is conducted by a core team of professional interpreters who work permanently for FNDS and who have received adequate training in the implementation of the SOPs.

National forest Inventory

The national forest inventory is the second sub-system within the NFMS, which produces the emission factors. They give the tonnage of carbon stored per unit hectare of forest. The tonnage of carbon per hectare varies from one type of forest to another. Mozambique has conducted four national forest inventories and the updating of NFI is carried out every 10 years. The information from these inventories were used to produce information for timber purposes. The last inventory in 2016-17 produced the emission factors used for the FREL submitted to the United Nations Framework Convention on Climate Change (UNFCCC) in 2018 (report may be accessed in the following link https://redd.unfccc.int/files/moz_frel_report_final.v03_03102018.pdf).

The entity responsible for the National Forest Inventory is DINAF. The NFI report (<https://fnds.gov.mz/mrv/index.php/documentos/relatorios/26-inventario-florestal-nacional/file>) was produced by FNDS and DINAF. The data collection involved the IIAM, the Faculty of Agronomy and Forest Engineering (FAEF), the Department of Biological Sciences and Provincial Forest Services. The estimation of emissions also relies on the allometric equations that have been developed by Masters and PhD students and research projects from FAEF and the Department of Biological Sciences (DCB) of the UEM.

To ensure the quality of the data collected, the team followed QAQC procedures defined by the National Directorate of Forest. To maintain the processes of the national forest inventory, the MRV unit developed a practical field manual for training teams in data collection that can be accessed on the link <https://fnds.gov.mz/mrv/index.php/documentos/guiões/21-manual-do-inventario-florestal/file>.

The Permanent Sampling plots are another component of the National Forest Monitoring System that will improve the estimation of emissions factors and the IIAM leads the process. Currently, under the MozFIP project, a joint group of institutions that involves IIAM, FNDS, UEM and DINAF are establishing the network of Permanent Sampling plots across the country.

National GHG inventory

The National GHG inventory for the purpose of REDD+ combines the Activity data and the emission factors to estimate the annual emissions and the FREL.

At the national level, the recent experience of GHGs inventory was with the submission of the FRELs to the UNFCCC (https://redd.unfccc.int/files/moz_frel_report_final.v03_03102018.pdf). The National Directorate of Climate Change is responsible for the communication of GHG emissions of Mozambique, as the focal point for climate change with the UNFCCC. The National Directorate of Climate Change coordinates with DINAF and FNDS on the production of such information.

At the subnational level, the MRV unit from FNDS is currently responsible for the generation of all information related to emissions from deforestation for the country. To maintain the quality standards in the production of emissions estimates from deforestation, the MRV unit has developed SOPs on how to produce the estimates.

B- Appendix 2. Support received (2010-2016)

N°	Program/project name	Sector	Objective	Donor	Budget (USD)	Target area	Implementing Institution	Execution period
1	Local Climate Adaptive Living in Mozambique 2014-2023 (LOCAL)	AFOLU	Increase the climate resilience of districts by increasing access to climate change adaptation funding through performance-based climate resilience grants	EU/ UNCDF	15,000,000	Transversal	Government at different levels and United Nations Capital Development Fund (UNCDF)	2014 - 2023
2	Elaboration of Local Adaptation Plans in districts vulnerable to climate change	Transversal	Assessment of climate vulnerability and adaptive capacity of communities to extreme events; Identification and prioritization of concrete climate change actions; Integration of climate change aspects in the planning process at the level of different sectors	OE/DANIDA	14,206,128	Adaptation	MITADER	2011 - 2015
3	Support Program for the Environment Sector (PASA II)	AFOLU	Mapping of erodic areas in the country; Mapping of risk zones in the scope of the elaboration of the territorial planning instrument	Danida/EU Commission (Irish Aid)	75,902,196	Mitigation	MICOA, MTA, MADER and INGC support from more than 90 institutions at the central, provincial and district level	
4	Coastal Cities Adaptation Project: building resilient houses	Transversal		UN-Habitat	45,000	Adaptation	UN-Habitat4	
5	Involving the private sector in the development of	Energy	The goal is to achieve a significant reduction in CO2 emissions while supporting the growth of electricity	AFD (co-financed: EU-Africa)	4,429,679	Mitigation	Electricity of Mozambique	Since 2016

N°	Program/project name	Sector	Objective	Donor	Budget (USD)	Target area	Implementing Institution	Execution period
	renewable energy		demand. The involvement of private actors is crucial, given the amount of investments to be made.	Infrastructure Trust Fund)				
6	Climate Protection Program for Developing Countries	Transversal	In selected developing countries, the conditions for active participation in the climate regime after 2012 and the development of strategies, action plans and monitoring systems for climate protection have improved.	Germany	64,226,220	Transversal	German Federal Ministry for Economic Cooperation and Development (BMZ) GIZ	2011 - 2021
7	Cities and Climate Change Project	Transversal	The objective of the project is to strengthen municipal capacity for the provision of sustainable urban infrastructure and environmental management that increase resilience to climate-related risks	World Bank and KfW	120,000,000	Transversal	World Bank Group and the Government of Mozambique	2012 - 2020
8	PPCR Project - Hydromet (Transformation of hydrological and meteorological services in Mozambique)	Transversal	The project aims to strengthen meteorological and hydrological information services in order to provide reliable and timely climate information to local communities.	World Bank and Nordic Fund	25,000,000	Adaptation	DNGRH/INAM	2012 - 2019
9	Project for Value Chain Development in the Maputo and Limpopo Corridors (PROSUL)	AFOLU	Sustainable increase of small producers' income by increasing production volumes, productivity, quality improvement and market linkage, intervening in 3 target value chains (Horticulture, Cassava and Red meat), expecting to cover 20,350 families in 19 districts of Maputo, Gaza and Inhambane provinces.	IFAD/ Spanish Trust Fund/ Family Farming Adaptation Program	45,000,000	Adaptation	National Directorate of Rural Development	2012 - 2019

N°	Program/project name	Sector	Objective	Donor	Budget (USD)	Target area	Implementing Institution	Execution period
10	Adaptation to Climate Change in Mozambique			GIZ		Adaptation	INGC, MICOA/MITADER	2012 - 2017
11	Project for Promotion of Conservation Agriculture (PROMAC), financed by the Norwegian Embassy ... (https://ncbaclusa.coop/project/promotion-of-conservation-agriculture-promac/)	AFOLU	Raise awareness among producers about the importance of this type of agriculture for food security and for reducing the adverse effects of climate change, by sharing knowledge and experiences in the country and in the southern region of Africa	FAO, Austrian Development Cooperation (ADC) and the Norwegian Embassy	13,540,159	Transversal	FAO	2012 - 2017
12	Artisanal Fisheries and Climate Change Project		The objective of the project is to improve community management of selected priority fishing areas.	World Bank	3,400,000	Adaptation	Ministry of Sea, Inland Waters and Fisheries	2015 - 2020
12	Artisanal Fisheries and Climate Change Project		The objective of the project is to improve community management of selected priority fishing areas.	World Bank	3,400,000	Adaptation	Ministry of Sea, Inland Waters and Fisheries	2015 - 2020
13	Sustainable natural resource management for resilience and equitable growth and development (SUNRED)	AFOLU	Sustainable and effective management of natural resources and disaster risk reduction benefiting all people in Mozambique, particularly the most vulnerable.	(EU, DFID, and UNEP pooled funds – Norway, SIDA, Spain)	1,059,000	Adaptation and Mitigation	MITADER	2014 -2018
14	Cities and Climate Change Initiative - CCCI	Transversal		World Bank		Adaptation	MAE and Municipalities	2012 - 2016

N°	Program/project name	Sector	Objective	Donor	Budget (USD)	Target area	Implementing Institution	Execution period
15	Coastal Zone Climate Change Adaptation Project			UNDP		Adaptation	MITADER	2012 – 2016
16	Climate Change Technical Assistance Project	Transversal	The objective of the Project is to strengthen the institutional and technical capacity of the Government of the Republic of Mozambique to mainstream climate change resilience into key economic sectors and improve the evidence base for future development policy and planning.	World Bank	2,500,000	Adaptation	MITADER	2012 – 2016
17	Lower Limpopo Climate Resilience and Irrigation Project	AFOLU	The goal is to increase agricultural productivity through the development of 3050 hectares for vegetable production (cereals and legumes) and provision of marketing and processing services for agricultural products.	African Development Bank (AfDB)	44,000,000	Adaptation	Regadio do Baixo Limpopo (RBL) MASA	2012 – 2016
18	Municipal Capacity Development Program (PRODEM)	Transversal	Prepared urban plans (for 10 municipalities) for resilience to MCs , focusing on erosion control, tree planting, water drainage, and adjustments to the cadaster.	Denmark, Ireland, Sweden, and Switzerland		Transversal	10 Municipalities in the center and north of the country	2015 – 2017
19	Mozambique Coastal Cities Adaptation Project CCAP-USAID	Transversal	The objective of CCAP is to strengthen Mozambique's capacity to build resilience to the challenges of climate change, especially in vulnerable coastal communities	USAID	19,900,000	Adaptation	Chemonics International	2016 – 2018
20	Climate Resilient	Transversal		USAID		Adaptation	Municipal Council	2013 – 2015

N°	Program/project name	Sector	Objective	Donor	Budget (USD)	Target area	Implementing Institution	Execution period
	Infrastructure Services Project (CRIS)	1					of Nacala City	
21	Spatial data enhancement project for flood risk assessment (LIDAR)	Transversal		World Bank	10,000,000	Adaptation	DNGRH	2014 – 2016
22	Assistance for strengthening institutional capacity in water-related disaster risk management in Mozambique	Transversal		JICA		Adaptation	DNGRH	2014 – 2016
23	Municipal Capacity Development Program (PRODEM)	Waste	Drafted 11 PGIRSU and three simplified landfill projects and carried out two landfill rehabilitations (Ministry of State Administration and Civil Service, 2018).	Denmark, Ireland, Sweden, Switzerland		Mitigation	26 Municipalities in the center and north of the country	2015-2017
24	Sustainable natural resource management for resilience and equitable growth and development (SUNRED)	AFOLU	Contribute to the objectives of sustainable development and efficient natural resource management by supporting the government in addressing the gaps related to insufficient coordination, capacity, funds and information that have been identified as the main problems in promoting sustainable pro-poor development in Mozambique	UNDP e PNUMA	2,118,000	Mitigation	MITADER	2015 – 2017
25	Establishment and operationalization of the	Transversal	Train, build capacity and implement disaster risk reduction activities in cities	UN-Habitat	810,000	Transversal	UN-Habitat	Since 2013

N°	Program/project name	Sector	Objective	Donor	Budget (USD)	Target area	Implementing Institution	Execution period
	Technical Center for Disaster Risk Management, Sustainability and Urban Resilience in Southern Africa - DiMSUR		and countries exposed to floods, cyclones, earthquakes and droughts					
26	Strategic Environmental and Social Assessment (SESA) under REDD+	AFOLU	Optimize the reduction in degradation and deforestation, and contribute to the goals of reducing greenhouse gas emissions	World Bank		Mitigation	MITADER	Since 2015
27	Adaptation to Climate Change in Coastal Zones of Mozambique (GEF-LDCF)	Transversal	Building capacities of communities living in coastal areas to manage Climate Change risks	GEF-LDCF	4,433,000	Adaptation	MITADER	Expected completion December 2016
28	Pro-poor Value Chain Development Project in the Maputo and Limpopo Corridors (PROSUL)	AFOLU		The International Fund for Agricultural Development (IFAD)	16,300,000			2012-
29	Adaptation for Smallholder Agriculture Programme (ASAP) Trust Fund	AFOLU		Spanish Food Security Co-financing Facility Trust Fund	6,430,000	Adaptation		2012-
30	FFS (Farm Field School)	AFOLU	Strengthening the capacity of smallholder farmers to cope with the impact of climate change to improve	FAO	6,000,000	Adaptation	Government ministries and civil society	2016 – 2020

N°	Program/project name	Sector	Objective	Donor	Budget (USD)	Target area	Implementing Institution	Execution period
			food security through FFS approaches				organizations relevant to agricultural associations	
31	Support Program for Institutional Development of the Land Sector (GesTerra)	AFOLU	(i) Ensure the continuity and sustainability of DNTF's mandate in the land sector (ii) Strengthen DNTF in representing its role as the organization responsible for land management and administration.	Netherlands	11,646,086		National Directorate of Land	2013 – 2018
32	Land Sector (GesTerra)		representation of its role as the organization responsible for land management and administration.	Sweden	7,000,000			
33	Project for the Establishment of a Sustainable Forest Resources Information Platform for REDD+ Monitoring	AFOLU	Contribute to the establishment of the REDD+ system in Mozambique	Government of Japan	5,500,000	Mitigation	National Directorate of Forests	2013 – 2018
34	REDD+ Project	AFOLU	Reduce Emissions from Deforestation and Forest Degradation and increase stocks through sustainable forest management	World Bank	8,800,000	Mitigation	FNDS	2013 – 2018
35	Pilot Implementation of Local Adaptation Programs of Action - Pilot Implementation in Mozambique	AFOLU	Increase resilience to climate change impacts in 9 Mozambican localities through the implementation of Adaptation measures, allowing communities to be more resilient towards a green economy through the	Portuguese Carbon Fund	1,209,657	Adaptation	National Directorate of Environment	2013 – 2016

N°	Program/project name	Sector	Objective	Donor	Budget (USD)	Target area	Implementing Institution	Execution period
			dynamization of local activities					
36	Climate Change Unit Project	Transversal	Support the Government through key sectors in planning climate change actions. Elaborate policies on climate change. Operationalize the Center for Knowledge Management on Climate Change.	World Bank	2,000,000	Adaptation	National Directorate of Environment	2014 – 2016
37	Mozambique Coastal Zones Adaptation Project	Transversal	Empower communities living in the coastal zone to manage climate change risks	UNDP	4,333,000	Adaptation	National Directorate of Environment	2012 – 2016
38	Project for Strengthening the Integrated System of Solid Waste Management (PROSIGRU)	Waste	Foster the environmental sustainability of the country's municipalities	Italian Ministry of Foreign Affairs	1,349,235	Mitigation	National Directorate of Environment	2014 – 2016
39	Program for Local Economic Development (ProDEL)	Transversal	Contribute to the poverty reduction of the rural population in the provinces of Gaza, Inhambane and Sofala through the support to the Local Economic Development (LED) based on micro, small and medium rural enterprises in the districts and municipalities of the three provinces.	European Development Fund/European Commission (EDF/EC), Government of the Kingdom of Sweden	32,500,000	Transversal	National Directorate of Rural Development	2012 – 2017
40	Inclusive Finance and	Transversal	Contribute to poverty reduction by	UNDP and	6,000,000	Adaptation	National Directorate	2012 – 2015

N°	Program/project name	Sector	Objective	Donor	Budget (USD)	Target area	Implementing Institution	Execution period
	Markets Program (PFMI)	1	promoting financial inclusion and the development of inclusive markets, promoting local economic development, with emphasis on supporting the creation and development of MSMEs at the local level by increasing the level of income and livelihoods of vulnerable groups, especially women and youth.	United Nations Capital Development Fund (UNCDF)			of Rural Development	
41	Zambezia Rural Development Program - Phase 2 (PRODEZA II)	Transversal?	Contributing to the reduction of poverty - especially women - in Zambézia Province	Government of Finland	9,283,820	Adaptation	National Directorate of Rural Development	2010 – 2015
42	Support Program for the Environment Sector (PASA)	Transversal?	Strengthening the capacity of the environment sector to coordinate and implement environment and climate change policies and strategies	Kingdom of Denmark	36,211,699	Transversal	National Directorate of Planning and Cooperation	2011 – 2016
43	Operationalizing the Green Economy Transition in Africa	Transversal	Enabling African countries like Mozambique to translate national Green Economy strategies or roadmaps into concrete national development plans at local or district (sub-national) level	UNEP, GIZ	60,000	Adaptation	National Directorate of Planning and Cooperation	2016 – 2017
44	Sustainable Management of Natural Resources for Resilience and Equitable Growth and Development (SUNRED) Phase I	Transversal	Enable local participation in planning and decision making processes for sustainability in favor of the most disadvantaged	UNEP, DANIDA and IPMA	1,059,000	Transversal	National Directorate of Planning and Cooperation	2014 - 2018
45	Mapping Project of the Zambezi Valley on the scales 1: 25 000, 1:50	Transversal	Institutional capacity building, technology transfer and production of systematic cartography at scales 1:25	Government of South Korea	4,500,000	Adaptation	CENACARTA	2015 - 2017

N°	Program/project name	Sector	Objective	Donor	Budget (USD)	Target area	Implementing Institution	Execution period
	000 and Tete City		000, 50 000 of the Zambezi Valley Region and 1:2500 of Tete City	(KOICA)				
46	Aerial Gravimetric Surveys	Transversal	Production of the geoid model of Mozambique	Kingdom of Denmark	600,000	Institutional Capacity Building	CENACARTA	2014 - 2016
47	Mozambique Protected Areas for Biodiversity Development Project (MOZBIO) Phase I	AFOLU	Promote Conservation of the flora and fauna resources of the conservation areas and develop and create alternatives for income generation for the communities living within and adjacent to the conservation areas.	AIDA- International Association for Development	46,300,000	Transversal	National Administration of Conservation Areas	2014 - 2018
48	Mozambican Protected Areas System Sustainable Financing Project - PFSSAP	AFOLU	Catalyze the sustainability of Mozambique's conservation areas system, to ensure more productivity and efficiency in the use of available natural resources to promote equity and economic development, increased revenue generation and diversification of the revenue system in the conservation areas	GEF-	5,600,000	Transversal	National Administration of Conservation Areas	2013 - 2016
49	Resettlement Program of Parque Nacional do Limpopo	Transversal	Resettle the Communities living within the Limpopo National Park	UNDP GEF-	18,867,925	Transversal	National Administration of Conservation Areas	2015 - 2017
50	National Park Wildlife Protection Project	AFOLU	Support the actions for the Protection of the Rhinoceros in Mozambique	KfW - German Bank	1,487,714	Mitigation	National Administration of Conservation Areas	2014 - 2019
51	Gilé National Reserve	AFOLU	Reduce the deforestation and	PPF- Peace	6,640,106	Mitigation	National	2013 - 2016

N°	Program/project name	Sector	Objective	Donor	Budget (USD)	Target area	Implementing Institution	Execution period
	Co-Management Project		degradation of the miombo woodland of the Gilé National Reserve and its periphery to mitigate the pressure on the ecosystems	Parks Foundation			Administration of Conservation Areas	
52	Construction of Landfill Site in Maputo and Matola	Waste	Build and expand sanitation infrastructure and reduce open dumps	AFD-French Development Agency	48,621,000	Mitigation	FNDS	2015 - 2018
53	Forest Carbon Partnership Facility (FCPF) REDD+	AFOLU	Contribute to the establishment of the REDD+ system in Mozambique	World Bank	8,600,000	Mitigation	FNDS	2013 - 2018
54	Mapping of eight provinces	AFOLU	Update the forest cover of the country	JICA	1,000,000	Institutional Capacity Building	National Directorate of Forests	2016 - 2017
55	National Forest Inventory	AFOLU	Estimate the Carbon Stock for the eight provinces of Mozambique and the qualitative and quantitative volumes of forest resources	World Bank	940,000	Mitigation	National Directorate of Forests	2016 - 2017
56	Capacity Building for Low Carbon Strategies	Transversal	Build institutional capacity to design, implement, measure, report and verify low carbon strategies adapted to a changing climate, properly aligned and integrated into recipient countries' poverty reduction strategies	Portuguese Carbon Fund	632,312	Institutional Capacity Building	National Directorate of Environment	2013 - 2016
57	Mainstreaming Climate Change Adaptation into Development	Transversal	Build capacity to integrate the response to climate change vulnerability into the policy and project design process by	Portuguese Carbon Fund	252,702	Institutional Capacity	National Directorate of Environment	2013 - 2016

N°	Program/project name	Sector	Objective	Donor	Budget (USD)	Target area	Implementing Institution	Execution period
			building capacity to design policies and projects that are resilient to the impacts of climate change			Building		
58	Second National Communication	Transversal	Prepare the Second National Communication (Report on the implementation stage of the United Nations Framework Convention on Climate Change)	UNEP	410,000	Report	National Directorate of Environment	2011 - 2016
59	Adaptation Technology Needs Assessment	Transversal	Assess the technology needs for reducing vulnerability in the agriculture and infrastructure and coastal zones sectors and reducing greenhouse gas emissions in the energy and waste sectors and formulate the Plan for Technology Transfer including three project ideas for the transfer and diffusion of the three selected technologies in each sector	UNEP-DTU	28,000	Institutional capacity building	National Directorate of Environment	2015 - 2017
60	Projects for the formulation of Mozambique's Internationally Determined Contribution (INDC)	Transversal	Help the country to formulate its INDC	UNEP-DTU	200,000	Report	National Directorate of Environment	2015 - 2018
61	Small Scale Agreement for preparation of Green Economy Assessment Report	Transversal	Elaborate studies on the implementation of the Green Economy in Mozambique, on the Green Economy indicators and fiscal policies on Green Economy	UNEP	100,000	Adaptation	National Environment Directorate	2014 - 2015
62	Institutional Support to	Transversal	Support G-Ozono in the production of	UNEP	103,000	Vienna	National Directorate	2016 - 2017

N°	Program/project name	Sector	Objective	Donor	Budget (USD)	Target area	Implementing Institution	Execution period
	the Environment (ISProject) Vienna Convention and Montreal Protocol	1	materials for public awareness and good environmental practices. Acquisition of equipment (computers, printers, fax, telephones, internet)			Convention Montreal Protocol/other convention	of Environment	
63	Project on Phasing out Ozone Depleting Chemicals (HPMP) Vienna Convention and Montreal Protocol	Waste	Phase out ozone-depleting chemicals in the refrigeration and air conditioning sector	UNEP	350,000	Mitigation	National Directorate of Environment	2013
64	REDD+	AFOLU	Institutional strengthening Elaborate the National REDD+ strategy	Forest Carbon Partnership	3,800,000	Institutional Capacity Building	National Directorate of Environment	2012 - 2016
65	Project to Prepare Mozambique's First Biennial Updated Report (BUR)	Transversal	Assisting the country in meeting its commitment to ratify the Convention to prepare and submit every two years a Biennial Update report	UNEP	352,000	Report and Institutional Capacity Building	National Directorate of Environment	2016 - 2018
66	Participatory Research of Additional Methods to Reduce the Impact of Beach Trawling and Seagrass	Transversal	Identify current gaps in the management of beach net fisheries that lead to overexploitation of resources and	Mohamed bin Zayed Species Conservation Fund (MbZSCF)	12,299	Adaptation	National Directorate of Environment	2015 - 2016
67	National Facilitation Committee for GEF Dugong and Seagrass Conservation Project	Transversal	Build an effective and informed National Facilitation Committee (NFC) to provide country-level oversight of project activities to ensure that dugong	Mohamed bin Zayed Species Conservation	8,085,886	Adaptation	National Directorate of Environment	2015 - 2018

N°	Program/project name	Sector	Objective	Donor	Budget (USD)	Target area	Implementing Institution	Execution period
			and seagrass conservation considerations are integrated at the level of relevant national policy, regulatory frameworks and environmental planning	n Fund (MbZSCF)				
68	Review of NBSAP and Preparation of 5 ^o National Report	Transversal	Enable Mozambique to review the National Strategy and Action Plan and to prepare the 5 ^o CBD Report	UNEP	220,000	Adaptation	National Directorate of Environment	2012 - 2016
69	Development of the information exchange mechanism for ABS and Taxonomy	Transversal	Assist Mozambique in monitoring the status of CBD implementation in the country and identifying weaknesses and constraints	UNEP	175,200	Adaptation	National Directorate of Environment	2011 - 2016
70	Technical Support Project for the recovery of degraded areas in Mozambique using sustainable management technologies (TCP/MOZ3502)	Transversal	Build institutional capacity to prevent and control soil erosion problems in the country	FAO	365,000	Mitigation	National Directorate of Environment	2014 - 2016
71	Project on National Inventory of chemicals under control of the Vienna Convention and Montreal Protocol and Framework Convention on Climate Change	Waste	Identify the quantities of chemicals under control of the two environmental conventions	UNEP	65,000	Mitigation	National Directorate of Environment	2016 - 2017
72	Technical Assistance for the Implementation of the Stockholm	Waste	Bio Pesticides Management	UNEP	30,000	Mitigation	National Directorate of Environment	2016 - 2017

N°	Program/project name	Sector	Objective	Donor	Budget (USD)	Target area	Implementing Institution	Execution period
	Convention							
73	Update of the National Implementation Plan (NIP) of the Stockholm Convention on Persistent Organic Pollutants	Waste	Management, handling, use, transport and safe disposal of POPs	UNEP	70,000	Mitigation	National Directorate of Environment	2016 - 2017
74	Adaptation Project in Coastal Zones of Mozambique	Transversal	Empowering communities living in the coastal zone to manage climate change risks	UNDP	4,333,000	Adaptation	National Directorate of Environment	2012 - 2016
75	Joint Management Agreement and development of the Zinave National Park	AFOLU	Conserving biodiversity and maintaining the ecological integrity of the Zivane National Park through wildlife reintroduction, development of ecotourism products, and establishment of partnerships with local authorities		20,000,000	Mitigation	National Administration of Conservation Areas	2015 - 2020
76	PSAN - Program of Food Security and Nutrition, Gaza Province	Transversal	Improve the Local Governance process, Public Finance management and financing of small public infrastructures that contribute to the improvement of food security and nutrition	Belgian Fund /UNCDF	21,248,340	Transversal	SETSAN (FAO, UNCDF, PMA, FOS e DISOP)	2013 - 2019
				Total	825,241,363			

