REPÚBLICA DE MOÇAMBIQUE
MINISTÉRIO DA TERRA, AMBIENTE E DESENVOLVIMENTO RURAL

Intended Nationally Determined Contribution (INDC) of Mozambique to the United Nations Framework Convention on Climate Change (UNFCCC)

National development goals and priorities, climate change context

Mozambique is located in the eastern coast of Africa and has frontiers with Tanzania (north), Malawi, Zambia and Zimbabwe (west) and South Africa and Swaziland (south). The country has an area of 799 380 km^2, of which 13 000 km^2 are coastal and 786 380 km^2 are terrestrial, with an eastern shoreline bathed by the Indian ocean extending to 2700 km. The Mozambican population has been increasing at a rate of 2,4% per year. According to the Demographic Census of 2007, the population was estimated at 20,6 million of inhabitants, from which 48% were men and 52% women. The demographic projection of the National Statistics Institute indicates that by 2030 the country will have about 36 million inhabitants, implying that the country will need to prepare the conditions for Mozambique to satisfy the needs of this number of inhabitants.

The geographical location and extension of the county provide for the privilege of a big diversity of natural resources, namely wide fertile areas suitable area for aquaculture, forest, wildlife and fisheries, important watersheds, mineral resources including renewable and non-renewable energy sources and a long coastline of great economic, touristic and environmental potential. However, the country is extremely vulnerable to climate change occurring through alterations in the precipitation and temperature patterns and increased intensity and frequency of the occurrence of extreme weather events like floods, droughts, wind storms, including cyclones, and a rising sea level.

Therefore, as established in the National Climate Change Adaptation and Mitigation Strategy (NCCAMS) (MICOA, 2012), the national priority is defined in its mission "to increase resilience in the communities and the national economy including the reduction of climate risks, and promote a low-carbon development and the green economy through the integration of adaptation and mitigation in sectorial and local planning".

However, to achieve this goal, and despite the fact that the Government already has put in place a legal and institutional framework, it is still necessary to mobilize, at the national and international levels, the financial and technological resources needed and also to strengthen the national technical and institutional capacities.

Adaptation Contribution	
1. Rationale and process for developing INDC on adaptation	Mozambique has elaborated its Initial and Second[1] National Communications and other studies[2], which indicate that the country is extremely vulnerable to climate change impacts. Based on the results of those studies' and from the experience arising from actions implemented to prepare and protect people, ecosystems and infrastructures from the negative impacts occurring due to extreme weather events, the Inter-Institutional Group on Climate Change (GIIMC) conducted the participatory process to formulate the NCCAMS, which was approved by the Government in November 2012. The NCCAMS identifies adaptation and the reduction of the climate risk as a national priority and presents eight strategic actions aimed at creating resilience and reducing the climate risk in the communities, ecosystems and national economy. The NCCAMS identifies also a set of key cross cutting actions including (i) institutional and legal reform, (ii) research and systematic observation and (iii) capacity building and technology transfer. These are relevant to achieve a prosperous and climate change resilient Mozambique, with a green economy in all social and economic sectors. Mozambique has decided to include adaptation in its INDC, so as to consider this document as a means to communicate its present and future great climate vulnerability and the effort that the Government, in collaboration with its partners, has to make to create the national capacity to deal with climate change. The INDC formulation process started with the compilation of the strategic action proposed in the adaptation and risk reduction pillar of the NCCAMS, and other climate change studies done as well as the legal ordinances. This resulted in the preliminary version of the document that served as a basis for the consultations at the provincial level and at the central level, in the Technical Council of the National Council for Sustainable Development (CONDES), and with other different stakeholders as the civil society, private sector representatives and governmental institutions. This process ended with the realization of the Forum to debate the validation of the INDC and afterwards with its approval by the Council of Ministers and subsequent submission to the UNFCCC's Secretariat.
2. Summary of climate change trends, impacts and vulnerabilities	The analysis of the impacts and frequency of its occurrence in Mozambique in the period covering 1956 to 2008 demonstrates that drought and floods are the events that most affect the population, living in vulnerable areas, and that the latter are the most common occurrences

[1] The Second National Communication is in the process of being submitted to the UNFCCC

[2] Studies about Climate Change elaborated by the Instituto Nacional de Gestão das Calamidades (INGC), Study on the Economy of Climate Change elaborated by the World Bank, among others

followed by tropical cyclones.

The consequences of the observed impacts of climate change in the country include the loss of human lives, destruction of socioeconomic infrastructures and property, loss of livelihoods and environmental degradation, including erosion and saltwater intrusion, with impacts in the communities and the national economy.

The economic impacts of climate change are well described in the study *Economics of Adaptation to Climate Change: Mozambique* (World Bank, 2010). This indicated that the economic cost of the disasters that occurred in Mozambique between 1980 and 2003 was 1,74 thousand million USD. However, this value underestimates the losses and impacts on the poor populations that live mostly in the coastal zones (60%) and derive their basic subsistence from fisheries and rainfed agriculture. This population, the coastal resources and infrastructures are exposed to tropical cyclones and to sea level rise.

Based in the same study, the climate scenarios indicate the reduction of the national welfare. The report projects greater losses, estimated between 2 to 7 thousand million USD (real 2003) for the period covering 2003 to 2050. This is equivalent to an annual loss that varies among 0,6 and 1,2 thousand million USD per year until 2030. The major losses are those associated with infrastructures, mainly roads due to floods, although agriculture is also severely affected by drought.

As referred above, the country is vulnerable to climate change. Assessment studies have shown that Mozambique is already suffering the negative impacts, of climate change and the climate projections recommend adoption and implementation of measures to mitigate the future climate change impacts. Some of the observed impacts include:

1. Trend in the increase of the averages of the maximum and minimum temperature (INGC, 2009) all over the country (Table 1), where the central region had the higher variation in the minimum temperature (+1,62ºC)

Table 1: Variation of the average maximum and minimum temperature by region, between 1960 and 2005 in four stations (INGC, 2010)

Region	**Trend**	**Variation $TMax_{Ave}$**	**Variation da $TMin_{Ave}$**
North	Increase	0,76 – 1,16	0,80 – 0,88
Centre	Increase	0,40 – 1,11	1,12 – 1,62
South	Increase	0,50 – 0,98	0,69 – 1,35
Coast	Increase	0,74 – 1,01	0,52 – 0,65

2. Increase of the occurrence of extreme climate events such as floods, droughts, tropical cyclones and epidemics (Figure 1).

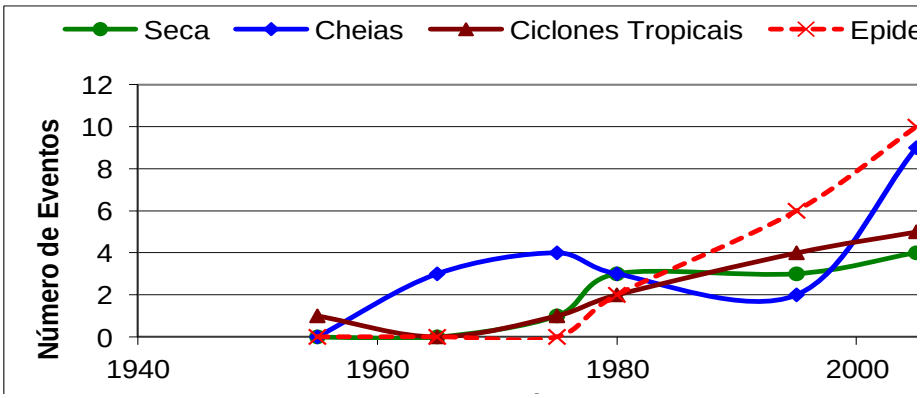

Figure 1. Number of climatic events between 1950-2010 (INGC, 2015).

3. Increase of the frequency and intensity of the tropical cyclones between 1980 and 2012. As seen in Figure 2, from 1980 to 1997 five tropical cyclones hit the Mozambican coast with a wind speed of 92 to 142 km/h and from 2000 to 2012 the country has had 11 tropical cyclones and six had wind speed above 167 km/h;

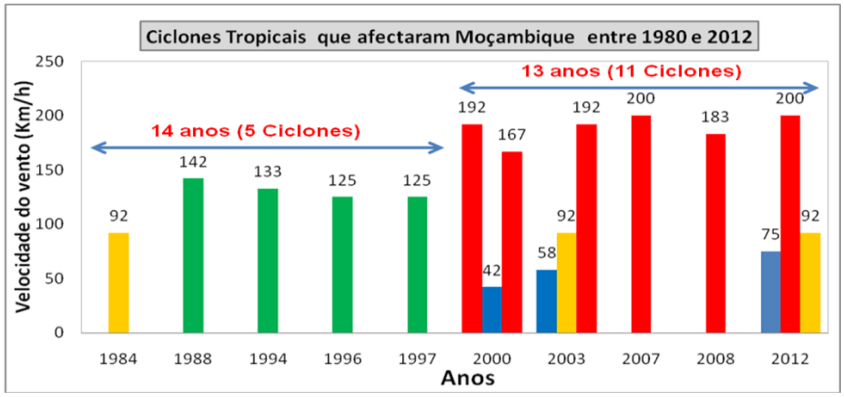

Figure 2. Number of climatic events in the period form 1984 to 2012 (INGC, 2015)

4. Floods from 2000 to 2015 affected about 4 629 000 people, 1 204 deaths and caused damage in 1 176 000 houses, of which 638 700 have been destroyed. Damage also occurred in water storage and flood protection infrastructures, mainly in dyques of Licungo in Nante and Limpopo in Chókwe, Guijá and Xai-Xai, and in railways and ports. The cost of these events was estimated as 1 356,9 million USD;

5. The damage in roads from 2011 to 2015 include 130 aqueducts, 119 bridges and 41 drifts destroyed or affected, 15 512 km of impassable roads, and the amount of destruction was estimated at about 13 316 443 530 MT, corresponding to 333 million USD;

6. The losses in yields due to the occurrence of extremes are summarized in table 2.

Table 2: Impact of climate change on yields from 2005 to 2014.

Year	Event	Affected region	Loss of area
2005	Severe drought	South and Centre	369 ha
2005	Cyclone Fávio	Provinces of Inhambane, Sofala and Manica	75 000 ha
2007	Moderate drought	South and Centre	102 000 ha
2009	Drought and floods	South and Centre	715 696 ha
2010/11	Flood	South and Centre	21 889 ha
2011/12	Storms Dando and Funso	Entire country	41 979 ha
2012/13	Drought and floods	Entire country	216 745 ha
2013/14	Floods	South and Centre and Province of Cabo Delgado	26 085 ha

7. Nowadays the saltwater intrusion represents a problem in the Umbeluzi, Incomati, Limpopo, Save, Púngoe, Buzi and Zambeze rivers where the irrigation is developed. Table 3 (INGC, 2010) shows to which degree some rivers are affected.

Table 3: Saltwater intrusion in some rivers.

River	Distance in the interior (km)	Affected area (km^2)
Zambeze	28	240
Save	16	170
Limpopo	29	83
Buzi	20	19
Maputo	11	5
Ligonha	5	6

According to climate projections these impacts will be exacerbated considering the expected increase in temperature of 1,5 to 3,0ºC between 2046 and 2065 and the sea level rise of 15 cm, 30 cm and 45 cm as a consequence of thermic expansion and of 15 cm, 110 cm and 415 cm from ice melting in 2030, 2060 and 2100, respectively. Studies from the World Bank indicate a loss of 0,6 to 1,2 million USD per year until 2030.

3. Reporting on long-term and near-term adaptation visions, goals and targets

The mission is to "reduce climate change vulnerability and improve the wellbeing of Mozambicans through the implementation of concrete measures for adaptation and climate risk reduction, promoting mitigation and low-carbon development, aiming at sustainable development, with the active participation of all stakeholders in the social, environmental and economic sectors".

To achieve that, in the short term (2015-2019), the first NCCAMM action plan is being updated. In this Plan adaptation will be included as the National Adaptation Plan (NAP). In this period, as in 2013 and 2014, the goal will continue to be the Action Plan, to increase local resilience, fighting poverty and identifying opportunities for adaptation and low-carbon development at community level through its mainstreaming in the process of district planning and budgeting. As the evaluation made shows that the goal has not been accomplished in 2014, and thereby requires delaying the term of the first phase to 2019. The subsequent medium and

	long-term goals have also been adjusted to 2025 and 2030, respectively. In the medium (2020 to 2025) and long (2026 to 2030) terms Mozambique intends to update its NAP in which the goals will be similar to those in the shorter term, but referring to the provincial and national level, respectively. Therefore, from 2020 to 2025, the country intends to increase its resilience at the provincial level and to include adaptation in that scope of planning and from 2026 to 2030 to do the same at the national level, achieving in this way the vision of the NCCAMS – "A prosperous and climate change resilient Mozambique, with a green economy in all social and economic sectors". This vision is quite ambitious, has been demonstrated during the implementation of the NCCAMS's first action plan, and the need for financial and technical support and capacity building continues to be necessary.
4. Reporting on current and planned adaptation undertakings and support	According to the NCCAMS, the present and future planned actions (post-2020) directed at the increase of resilience and risk reduction will correspond to the update of the adaptation component of the Strategy which will correspond to the NAP of Mozambique. The country will update and implement its NAP for the following time periods: short (2015 to 2019), medium (2020 to 2024) and long (2025 to 2030) terms. The strategic actions to be included in the NAP are: • Reduce climate risks through the strengthening of the early warning system and of the capacity to prepare and respond to climate risks; • Improve the capacity for integrated water resources management including building climate resilient hydraulic infrastructures; • Increase the effectiveness of land use and spatial planning (protection of floodplains, coastal and other areas vulnerable to floods); • Increase the resilience of agriculture, livestock and fisheries, guaranteeing the adequate levels of food security and nutrition; • Increase the adaptive capacity of the most vulnerable groups; • Reduce people's vulnerability to climate change related vector-borne diseases or other diseases; • Ensure biodiversity's protection; • Reduce soil degradation and promote mechanisms for the planting of trees for local use; • Develop resilient climate resilience mechanisms for infrastructures,

	urban areas and other human settlements and tourist and coastal zones; • Align the legal and institutional framework with the NCCAMS • Strengthen research and systematic observation institutions for the collection of data related to vulnerability assessment and adaptation to climate change; • Develop and ameliorate the level of knowledge and capacity to act on climate change; and • Promote the transfer and adoption of clean and climate change resilient technologies. Mozambique is part of the group of countries which are implementing the Pilot Programme for Climate Resilience (PPCR), which encompasses support for the institutional and policies' reform, for the funding of pilot projects (roads, agriculture, early warning systems, coastal cities and irrigation) and for knowledge management. In addition to the PPCR, the World Bank is also funding actions in water resource sectors and conservation areas. The country is also implementing other projects supported by the Least Developed Countries Fund (LDCF), the PASA[3], the African Development Bank, the JICA, the USAID and the Portuguese Carbon Fund, among others.
5. Gaps and barriers	*Financial* • Insufficient financing available to climate proof in country, associated with the complexity of the criteria and procedures for accessing the international climate financial resources; • Low public investment and private participation in the adaptation actions; • Lack of funding to maintain and upgrade data collection stations (meteorological, hydrological, hydrographical, air quality, among others); and • Slow payback of the investment in climate change adaptation actions. *Technology and knowledge* • Weak capacity to determine the cost of the losses and damages caused by the impacts and of the measures to adapt to climate change and few research and investigation actions addressing climate change;

[3] Programme of Support to the Environmental Sector supported by DANIDA and the European Commission (Ireland)

	• Unpredictability of the intensity and magnitude of the climate change impacts; • Weak capacity to design projects to access climate change financing and funds; • Unavailability of adaptation technologies; • Low capacity to measure, report and verify (MRV), including the effects of policies, strategies, plans and projects and of the availability and use of financial and technological resources; and • Difficulties and weak capacity to disclose knowledge about the climate change risks and actions, associated with a low capacity to manage and communicate the results of studies and projects. *Political and institutional* • Insufficient incentives to attract the participation of the private sector and civil society in developing initiatives to contribute to climate change adaptation; and • Weak coordination and charge of the sectors in the implementation of the approved policies, strategies and plans, due to a low ability to verify and enforce the laws and regulations associated to a weak capacity to cross-sectoral and integrated planning.
6. Summary of needs	To implement the INDC it is necessary to: • Operationalize the NCCAMM implementation mechanisms namely the Knowledge Management Centre, the National Climate Change Network and the Financial Mechanism; • Assess the capacity needs of the National Climate Change Network and elaborate and implement the capacity plan to conduct research and investigation in the relevant areas; • Strengthen the institutions to collect and manage data and information and create a data base about the existent studies and experts; • Elaborate and implement a strategy for climate change education, awareness raising, communication and public participation; • Assess the adaptation technology needs and formulate and implement the associated plan; • Update the sectoral policies to mainstream climate change adaptation and risk reduction; • Establish climate insurances; and • Build national technical and institutional capacity to design and manage projects to access climate financing.

7. Monitoring and reporting progress	The government has approved the National System to Monitor and Evaluate Climate Change and this will be used to MRV the adaptation actions. This system is being tested and will be functioning before 2020 and onwards.
Mitigation Contribution	
8. Timetable	The INDC will be implemented between 2020 and 2030.
9. Type of contribution	Implementation of Policies' and Programmes' actions: 1. NCCAMS (2013 to 2030); 2. Energy Strategy (being updated and to be approved by 2016); 3. Biofuel Policy and Strategy ; 4. New and Renewable Energy Development Strategy (2011 to 2025); 5. Conservation and Sustainable Use of the Energy from Biomass Energy Strategy (2014 to 2025); 6. Master Plan for Natural Gas (2014 to 2030); 7. Renewable Energy Feed-in Tariff Regulation (REFIT); 8. Mozambique's Integrated Urban Solid Waste Management Strategy (2013 – 2025) 9. National REDD+ Strategy (in preparation and to be approved in 2016); 10. Renewable Energy Atlas for Mozambique; 11. Project to build and manage two solid waste landfills with the recovery of methane; and 12. Project of Urban Mobility in the Municipality of Maputo.
10. Target level	Based on the policy actions and programmes outlined above, the country estimates, on a preliminary basis, the total reduction of about 76,5 $MtCO_2eq$ in the period from 2020 to 2030, with 23,0 $MtCO_2eq$ by 2024 and 53,4 $MtCO_2eq$ from 2025 to 2030. These reductions are estimates with a significant level of uncertainty and will be updated with the results from the BUR to be available by early 2018. The implementation of any proposed reduction is conditional on the provision of financial, technological and capacity building from the international community.
11. GHG reductions	The implementation of the actions referred will limit the GHG emissions by sources and the removals by sinks at the same time as they contribute to the increase of the well being of the Mozambicans through the increase of the access to renewable energy sources and to basic sanitation services to promote the efficient use of the natural assets, reducing the

	environmental degradation. Mozambique is willing to participate in the market mechanisms to be established which would allow access to clean technologies in order to mitigate the emissions arising from exploiting, managing and using the natural capital that is available.
12. Means of Implementation	Mozambique is participating in the Second Phase of the Technology Needs Assessment Project (TNA), covering the following sectors: (i) energy and waste, (ii) agriculture and (iii) coastal zones, including infrastructures. This process will result in a Technological Action Plan identifying the needs, including the financial and capacity building needs in those sectors. This information is relevant to identify the necessary means to implement the proposed actions. This exercise will be concluded by the end of 2017. Another relevant source of information is the is the ongoing process for making the National Climate Change Network operational which includes the assessment of the existing institutional and technical capacities and their needs for the implementation of the NCCAMS to formulate and implement the Capacity Building Plan, as included in the NCCAMS.
13. Sectors	The presently identified actions are related to energy (electricity production, transports and other – residential, commercial and institutional), land use, land use change and forestry (REDD+) and waste (solid waste disposal and treatment). Despite the above identified actions, the country still has potential actions in other sectors such as industry, agriculture including in the other energy sub-sectors.
14. Gases	The main gases covered in this contribution are: carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O) In the future, other GHG may be included.
15. Accounting Methodologies	The IPCC Revised 1996 Guidelines for National Greenhouse Gas Inventories and the Good Practise Guidance and Uncertainty Management in National Greenhouse Gas Inventories were used to calculate the GHG emissions and removals as described in the Second National Communication and the LEAP software was used to develop emission scenarios for the INDC. The Global Warming Potential values used were those from the IPCC's Fourth Assessment Report and as stated below: CO_2 = 1 CO_2eq CH_4 = 21 CO_2eq N_2O = 310 CO_2eq.
16. How it is equitable and adequate	Considering Mozambique's historical GHG emissions, which are insignificant in the global total, the effort that the country is willing to

	make to create adaptative capacity and face the national challenges of reducing poverty, including those of the most vulnerable, this contribution is fair and adequate considering the ultimate objective of the UNFCCC. It is recognized that achieving a resilient and low carbon development can be a catalyser to reduce poverty and diminish the inequalities towards the most vulnerable. Therefore, the implementation of the INDC will include the most vulnerable communities, promoting an inclusive climate proofed development, with a higher degree of access to efficient technologies and cleaner energy sources, promoting environmental integrity and the creation of green jobs.
17. Institutional arrangements	The Institutional Arrangements established to implement and MRV the Mitigation component of the INDC are those established by the NCCAMS and operationalized by the National System to Monitor and Evaluate Climate Change. The relevant entities are the Climate Change Unit, the Knowledge Management Centre, hosted in the Science Academy of Mozambique, the National Climate Change Network, the GIIMC and the National Greenhouse Gases Inventory System (SNIGEE), already included in the National System to Monitor and Evaluate Climate Change.

Bibliographic References

INDC. 2009. *Estudo sobre o impacto das alterações climáticas no risco de calamidades em Moçambique Relatório Síntese, 2009*

World Bank. 2010. Economics of Adaptation to Climate Change : Mozambique. Washington, DC. © World Bank. https://openknowledge.worldbank.org/handle/10986/12748 License: CC BY 3.0 Unported.

Governo de Moçambique. 2014. Proposta do Programa Quinquenal do Governo 2014-2019.

Ministério da Coordenação da Acção Ambiental. 2012. National Climate Change Adaptation and Mitigation Strategy.

INGC, 2015. *Apresentação feita pelo INGC no seminário de Lançamento do projecto Avaliação das Necessidades Tecnológicas*