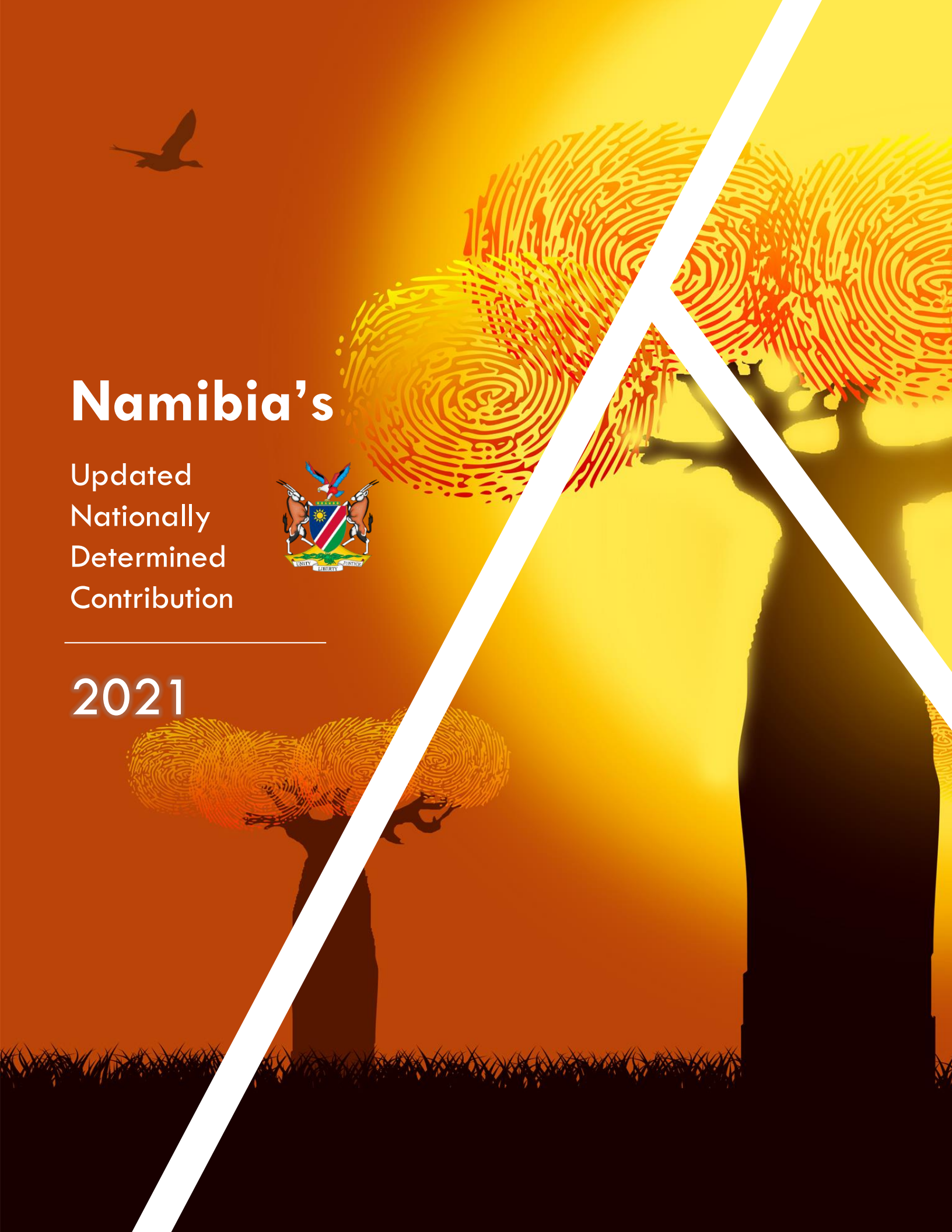
Namibia's

Updated
Nationally
Determined
Contribution

2021



Namibia's NDC UPDATE

REPUBLIC OF NAMIBIA

2021

Namibia's NDC UPDATE

COVER PAGE

© **Cover page image:** The demise of Namibia's oldest and largest trees, the baobabs, some of which have lived for 1,700 years, have begun dying in the last 15 years, because of climate change. The fingerprints represent Namibia's unique environment and biodiversity which identifies the country. Namibia is home to two global biodiversity hotspots (Succulent Karoo floral kingdom and the Namib escarpment) which also happen to be home to a vast array of endemic plants, animals, and other organisms. Notably, Namibia is home to the world's largest cheetah population and many impressive environmental features, including the oldest desert in the world and Africa's largest river canyon.

FOREWORD

The existential danger to Namibia remains climate change. We are one of the countries most vulnerable to its adverse impacts. This is partly due to our peculiar geographical climate. Extreme conditions such as persistent droughts and flooding frequently expose our land.

In addition to these challenges, we are now tackling a range of global challenges that also threaten our capacity to cope and our desire to achieve sustainable growth. This is clear from the current COVID-19 pandemic, which has further intensified our vulnerability to external shocks. Thus, without external assistance, the government's recovery strategies and stronger policies cannot be efficiently enforced. Despite these challenges, and while our contribution to GHG emissions is just 0.003% of the global share, we are committed to climate leadership and intend to promote more successful and bold steps to solve the climate problem facing the world today.

In our revised NDC, we have made aggressive proposals to avoid 91% of our BAU emissions by 2030. In addition, if we obtain sufficient foreign funding and aid, we will aim to reach net-zero beyond 2030. To meet the emission reduction goals, we have set aggressive plans to increase our share of renewable energy in the energy mix through various initiatives.

Our NDC puts equal emphasis on further improving our adaptation and developing future climate resilience to reduce climate threats to our populations and their livelihoods. Our contribution to achieving resilient growth is evidenced by a range of ongoing projects, such as the Community Based Adaptation programmes focusing on agricultural and pastoral communities in the north-central and far northeast region of the country, undertaking community-based projects to build resilience to climate change by increasing resilience against climate-induced land degradation. Also, this NDC will encourage efforts to achieve the government's vision for a 'green economy' that encourages balanced economic development while safeguarding our environment.

Several stakeholder consultations and reviews of ongoing initiatives, partnerships and programmes in various sectors are part of this revised NDC. Efforts were also made to ensure that this NDC is aligned with all the strategies, plans and visions of the Republic of Namibia. Namibia is committed to achieving a climate-resilient and low-emission pathway.

On behalf of the Government and the People of Namibia, I am delighted to present this document as our resolve to do our part in the fulfilment of our national obligations to the UNFCCC and the international community at large. Let us save the planet

Hon. Minister Pohamba Penomwenyo Shifeta

Minister of Environment, Forestry and Tourism

ACRONYMS AND ABBREVIATIONS

AAP NAM	Africa Adaptation Project in Namibia
AFOLU	Agriculture, Forestry, and Other Land Use
BAU	Business as Usual
BUR	Biennial Update report
CCA	Climate Change Adaptation
CCU	Climate Change Unit
COP	Conference of The Parties
CRM	Climate Risk Management
DEGREE	Demonstration Gobabeb of Renewable Energy and Energy Efficiency
FE	Fuel Economy
GCF	Green Climate Fund
GDP	Gross Domestic Product
GHGs	Greenhouse Gases
HFCs	Hydrofluorocarbons
ICTU	Information for Clarity, Transparency and Understanding
INDC	Intended Nationally Determined Contributions
IPCC	Intergovernmental Panel on Climate Change
IPPU	Industrial Processes and Product Use
LDVs	Light-Duty Vehicles
MAWLR	Ministry of Agriculture, Water and Land Reform
MEFT	Ministry of Environment, Forestry and Tourism
MFMR	Ministry of Fisheries and Marine Resources
MHSS	Ministry of Health and Social Services
MRV	Monitoring, Reporting and Verification
MSW	Municipal Solid Waste

NAD	Namibian dollar
NAMREP	Namibian Renewable Energy Programme
NAP	National Adaptation Plan
NC	National Communication
NCCSAP	Namibia Climate Change Strategy and Action Plan
NDC	Nationally Determined Contributions
NDPs	National Development Plans
NEEP	Namibia's Energy Efficiency Programme
NPC	National Planning Commission
NSA	Namibia Statistics Agency
RAC	Refrigeration and Air Conditioning
RES	Renewable Energy Sources
SADC	Southern African Development Community
SPA	Strategic Priority on Adaptation
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
USD	United States Dollar

CONTENTS

List of figures

List of tables

EXECUTIVE SUMMARY

Introduction

Namibia is resolutely committed to the Paris Agreement, and to taking practical and ambitious action to reduce emissions and ensure a climate-resilient economy. The revised NDC allows for a robust assessment of Namibia's mitigation and adaptation actions supported by a comprehensive stakeholder-driven dialogue mechanism and enhanced data. This report provides an update on the latest policies, measures and actions that will drive significant emission reductions whilst promoting a climate-resilient Namibia. The updated NDC presents a progressive shift above the 2015 pledge to reduce emissions from 89% to 91% by 2030.

> Namibia commits to reduce its GHG emissions conditionally by at least **91%** of its BAU scenario

Mitigation contribution

Namibia's mitigation commitment is in the form of a decrease in GHG emissions compared to the Business as Usual (BAU) baseline over the 2015-2030 period. This update presents an improvement in the commitment of the devotion of Namibia to meeting the Paris Agreement goal and following the road to net zero emissions by 2050.

In the energy sector, the national sustainable energy strategy of Namibia looks to introduce new emissions-reducing technologies and encourage healthier practices that are more energy efficient.[1] The updated NDC includes climate-friendly and energy-efficient refrigeration and air conditioning (RAC). Low Global Warming Potential technology options, particularly technology with natural refrigerants, exist as an alternative to HFCs for almost any RAC appliance. In the AFOLU sector, the main driver of the 2030 goal is to reduce the deforestation rate. The next 10 years will see a decrease in CO_2 equivalents by over 13.5 $MtCO_2e$. Namibia has acknowledged that reforestation, agroforestry and urban forests are vital to both carbon and timber productivity through best forest management practices. Under the waste sector, energy utilisation measures such as Municipal Solid Waste (MSW) transformation into compost and electricity are the most important opportunities.

In the BAU scenario, overall GHG emissions in 2030 are expected to rise by up to 24.167 $MtCO_2e$. The estimated emissions reduction will be 21.996 $MtCO_2e$ through 2030 (91% reduction of which 78.7% is from the AFOLU) (Table ES-1).

Table ES-1. Sectoral share and percentage of BAU GHG emissions in 2030.

Sector	Mitigation potential (MtCO2e)	% Reduction compared to BAU scenario in 2030
Energy	2.800	11.6%
IPPU & RAC	0.134	0.6%
AFOLU	19.030	78.7%
Waste	0.031	0.1%
Total	**21.996**	**91%**

[1] (Ministry of Mines and Energy, 2017)

Adaptation contribution

Adaption is still a relevant feature in Namibia and the country is considered one of the most vulnerable countries to the impacts of climate change. The country is particularly vulnerable to flooding and droughts. Ministries with adaptation relevance proposed a total of 49 priority actions.

The agriculture, tourism and fisheries sectors are especially critical for adaptation, and several ministries have set goals for both youth and women's participation. Therefore, in Namibia, we see gender-balanced training and the promotion of the youth and women as relevant.

Means of implementation.

The projected net cost of the NDC mitigation measures to be implemented in Namibia is expected to be approximately USD 3.61 billion by 2030 and more than USD 1.72 billion for adaptation targets, representing a total funding need of approximately USD 5.33 billion (or NAD 77 billion). Table ES-2 outlines the estimated funding requirements and conditions for the updated NDC. The unconditional measures comprise about 10 per cent of the total expected funding and 90 per cent for the conditional measures. The funding pool would constitute a mix of national and international funding.

TABLE ES-2. ESTIMATED MITIGATION AND ADAPTATION FINANCE NEEDED.

	Mitigation measures (USD)	*Adaptation measures (USD)*	*Total (USD)*
Unconditional	0.36 billion	0.17 billion	0.53 billion
Conditional	3.25 billion	1.55 billion	4.80 billion
Total (USD)	**3.61 billion**	**1.72 billion**	**5.33 billion**

Measuring, reporting and verification (MRV) framework

Namibia has institutional reporting arrangements in place. The National Climate Change Committee and its sub-working groups will oversee and track the implementation of the updated NDC. Namibia is currently developing a robust transparency reporting system on its NDC and this would be a final instrument for the national MRV system. The new MRV systems will enable the country to monitor the effectiveness of its mitigation and adaptation measures including access to the means of implementation particularly climate finance.

1 INTRODUCTION

1.1 Namibia's commitment

Namibia's second Nationally Determined Contribution (NDC) according to Article 4 of the Paris Agreement reflects its continued adherence to the goals of the Paris Agreement, to keep the rise in global average temperature well below 2°C above pre-industrial levels.

In 2015 the Namibian Government submitted its ambitious NDC with a pledge to reduce its national emissions of greenhouse gases (GHGs) by 89% by 2030. Since then, the Parties have agreed to announce a new round of enhanced NDCs. Hence Namibia has taken this major step to raise its mitigation ambition from 89% in 2015 to 91%.

Namibia commits to reduce its GHG emissions conditionally by 14% (under limited domestic and international support) and towards 77% (with substantial international support) in 2030 compared to the Business As Usual levels, corresponding to a total reduction by 21.996 $MtCO_2e$. Namibia is committed to combating climate change and accelerating the transition to a climate-resilient, low-carbon sustainable mode of development.

Namibia continues to play a part in an effective global response to climate change. Namibia is to implement an economy-wide target to reduce greenhouse gas emissions from 91 per cent below 2015 levels by 2030. The general statement by most countries is to agree to the Talanoa Dialogue[2], which states that there should be no backsliding but progression over time. Namibia endorses the Talanoa Dialogue's commitment to no backsliding in this matter. The details of Namibia's new contribution are going to be set out in this updated NDC to aid transparency, clarity and understanding.

1.2 A fair and ambitious contribution to achieve the Conventions objective

Namibia's second updated nationally determined contribution is an ambitious, fair and reasonable contribution to the global efforts to fight climate change. The target is a significant progression above Namibia's 2015 commitment. In this updated NDC Namibia aims to reduce emissions by 91 per cent below 2030 BAU levels.

Namibia commits to reduce emissions by 21.996 $MtCo_2e$ (14% unconditional part and 77% conditional part) in 2030 compared to BAU (24.167 $MtCo_2e$).

1.3 NDC implementation process

1.3.1 Building Namibia's Adaptive and Mitigative Capacities

Namibia has put in place a National Climate Change Policy of 2011 and the National Climate Change Strategy and Action Plan 2013-2020 (NCCSAP), aimed at building the country's adaptive and mitigative capacities by

[2] (UNFCCC, 2018)

identifying potential adaptation and mitigation options that can pave way for low carbon and climate-resilient economy.

The NCCSAP will be replaced by the NDC Implementation Strategy and Action Plan for 2021-2030. This document will clarify national goals and objectives regarding climate change and lay out a plan for implementing, reporting and monitoring a series of priority activities to implement the updated NDC.

1.4 Status of the NDC process in Namibia

The present existing structure for the implementation of climate change activities consists of a multi-sectoral NCCC which oversees the implementation and coordination of sector-specific and cross-sectoral NDC activities while also providing advice and guidance on them. The NCCC reports to Cabinet through the NPC while the Parliamentary Standing Committee on Economics, Natural Resources and Public Administration advises Cabinet on relevant policy matters for the INDC also[3]. The MET, which is responsible for all environmental issues in the country and is the National Focal Point to the UNFCCC and reports on NDC activities to the UNFCCC. MET monitors, tracks and follows COP decisions on NDCs, including funding possibilities, and transmits these to the concerned institutions. Sectoral activities rest with the respective Ministries through their concerned Directorates.

The Namibian Government and development stakeholders have come together to join forces in delivering on the country's commitments to advance the Paris Agreement. A newly developed Partnership Plan connects international resources for climate mitigation and adaptation to five priority areas set by the government and builds a community around climate action in Namibia.

Building off progress already made through Namibia's existing climate plans and policies, the Namibia NDC Partnership Plan identifies priority areas set by the government for implementation of its Nationally Determined Contribution (NDC) under the Paris Agreement. The Plan takes ongoing action into account but, more importantly, looks to the future for development partners to deliver on their responsibility in supporting the global south to fight climate change.

The priority areas set by the Government, and supported by the development community, private sector and others include[4]:

- Development of better framework conditions for effective climate change governance.
- Strengthening financing of projects that help reduce emissions and enhancing the country's resilience against the effects of climate change.
- Tracking progress toward greenhouse gas emission reduction targets.
- Strengthening coordination across national and international stakeholders to fast-track decisions and interagency collaboration.

Several members of the NDC Partnership have already pledged to support Namibia's ambitions through the Partnership Plan, including the African Development Bank, the Food and Agriculture Organization of the United Nations, the French Development Agency (AfD), the European Commission, the Federal Republic of Germany

[3] (Republic of Namibia, 2015a)
[4] (UNDP, 2018)

(through GIZ and KfW), the United Nations Development Programme, the World Bank and World Resources Institute. Several Namibian banks, including the Namibia Development Bank and NedBank, have shown strong interest in investing in climate-smart projects. A growing community of development partners, private sector and government institutions is pulling together behind for the need to address climate impacts to achieve global climate goals.[5] Namibia has embraced the NDC Partnership's integrated planning process to strengthen coordination, resource mobilisation and transparency on NDC implementation.

1.5 Namibia's Climate Change Mitigation and Adaptation: Policy and Planning

1.5.1 Climate Change Mitigation and Adaptation activities

Namibia developed a national climate change strategy and action plan for the period 2013-2020, with two mitigation themes: sustainable energy and prioritized low carbon development, and transportation. Namibia has placed more focus on adaptation that is currently implemented under four key critical themes, that is, food security and sustainable biological resources; sustainable water resources base; human health and wellbeing; and infrastructure development. Namibia has placed more focus on adaptation that is currently implemented under four key critical themes, that is, *food security and sustainable biological resources*; *sustainable water resources base*; *human health and wellbeing*; and *infrastructure development*.

Awareness-raising efforts are a key feature of reaching the goals of Namibia's climate change policy. As such, cross-sectoral and multi-stakeholder initiatives, such as this collaboration, are significant to support education and public awareness for adapting to and mitigating the impacts of climate change and continuing to oversee the implementation of these activities in line with the Harambee Prosperity Plan.[6]

1.6 Namibia's medium- and long-term development plans

1.6.1 Vison 2030

Namibia's Vision 2030 document adopts a strategic approach for long-term sustainable development. Namibia acknowledges that climate change impacts directly the entire chain of national development and is likely to have negative impacts on efforts to achieve development objectives, including the long-term objectives and targets of Namibia's Vision 2030. The goal of the NPCC has been to contribute to the attainment of sustainable development in line with Namibia's Vision 2030 through the strengthening of national capacities to reduce climate change risk and build resilience for any climate change shocks. Namibia's long-term development vision, Vision 2030 aims to achieve a prosperous and industrialised Namibia.[7] Actions on reducing current and future emissions include using renewable energy sources and energy-efficient technology among many other actions. Mitigation is rooted in the "transition to move toward a low-carbon development path" taking into consideration Namibia's long-term Vision 2030.

1.6.2 Harambe Prosperity Plan

The Harambee Prosperity Plan (HPP) acknowledges climate change is a reality of our time. Although the degree of contribution to global warming varies, Namibia has committed to reducing carbon dioxide emissions into the

[5] (UNDP, 2018)
[6] (Republic of Namibia, 2016a)
[7] (Office of the President, 2004)

atmosphere because our planet is at stake[8]. Namibia fully supports the goals of COP21. That is why, during the Harambee period, Namibia is targeting a primarily renewable energy mix. The International Community is called upon to support Namibia in financing renewable energy[9].

The Plan does not replace but complements the long-term goal of the National Development Plans [NDPs] and Vision 2030. HPP introduces an element of flexibility in the Namibian planning system by fast-tracking development in areas where progress is insufficient. It also incorporates new development opportunities and aims to address challenges that have emerged after the formulation of NDPs.

1.6.3 National Development Plan

For the first time in a National Development Plan (NDP5), Namibia included an intermediate emissions reduction target (Greenhouse gas emissions 30% reduction against Business As Usual projection, by 2022). This target is a carbon budget which the country can "spend" in diverse ways by allocating emission rights and commitments among those sectors most responsible for greenhouse gas emissions. The target is an important signal for private stakeholders and potential investors, giving them the incentive to find mitigation opportunities. NDP5 targets[10] are subject to domestic monitoring and annual reporting: The Government of Namibia will necessarily follow an emission monitoring and reporting system based on the rules of the Paris Agreement (which were agreed at COP24).

The transition to low carbon and climate-resilient economy offers considerable opportunities to address challenges such as energy and water insecurity. Namibia will seek to aggressively mobilize funding for innovation in these areas through multilateral financing mechanisms such as the Green Climate Fund and Global Environment Facility, and through bilateral relationships and partnerships with the private sector.

1.7 NDC alignment with long-term mitigation strategies

Ensuring buy-in and ownership of the final strategy by key ministries, departments and agencies, along with non-governmental stakeholders, is crucial. Their "visible and felt" support and participation are vital if long-term strategies are to be influential in guiding short, medium as well as long-term planning and investment decisions across all societal levels. The overall objective is to initiate an effective and just transition to a low greenhouse gas emission and resilient future.

This will require; involvement of political leadership at the highest level, the creation of institutional arrangements for long-term planning, supportive legal frameworks and stakeholder engagement. It is envisaged that a shared vision will be realised and that all these constituencies will be effectively harmonised in the implementation of the long-term strategy.

[8] (Republic of Namibia, 2016a)
[9] (Republic of Namibia, 2016b)
[10] (NPC, 2017)

2 MITIGATION CONTRIBUTION

The mitigation contribution from Namibia is in the form of a reduction in GHG emissions compared to a business-as-usual (BAU) baseline over the period 2015-2030. This update presents an increase in the ambition of Namibia's[11] commitment to achieving the objective of the Paris Agreement and in line with a path to net-zero emissions by 2050.[12] To drive this ambition over time, the Paris Agreement contains an 'ambition mechanism' or 'ratcheting mechanism'. This requires countries to submit an updated NDC, with a progression from previous submissions (i.e. no backsliding), reflecting the highest possible ambition given their national circumstances.

2.1 Accounting for baseline targets in the NDCs

The preparation of the INDC report focused mainly on existing policies, strategies and action plans developed and currently being implemented. In the preparation of this second update report, the focus is on broadening the existing mitigation and adaptation strategies, on the basis that the new actions will yield positive results in both mitigation and adaptation areas while benefiting other sectors of the economy at large. This NDC update improves the first NDC, on comprehensive scientific review and robust stakeholder involvement. Detailed sector-based modelling for mitigation has now been conducted to evaluate the mitigation potential and to develop quantified conditional and unconditional commitments by 2030.

2.1.1 Mitigation

2.1.1.1 ACCOUNTING FOR NDC MITIGATION TARGETS

Namibia shall account for its nationally determined contributions. In accounting for anthropogenic emissions and removals corresponding to its nationally determined contributions, the country shall promote environmental integrity, transparency, accuracy, completeness, comparability, consistency, and ensure the avoidance of double counting. This is in line with the guidelines adopted by the Conference of the Parties serving as the meeting of the Parties to this Agreement.

2.1.1.2 BASELINE TARGETS IN NDCS

Baseline scenarios defined in this updated NDC are presented as a future projected reference level of emissions against which a goal has been established or progress is to be measured. The mitigation contributions presented in this updated NDC are based on achieving a relative GHG emissions reduction through 2015-2030. Baseline scenarios used in this report demonstrate emissions that would have occurred in the absence of certain mitigation policies. Baselines can also be used as a reference to set a target ("target baselines"); this updated NDC will focus on baseline targets as communicated within Parties'. The baseline scenarios were built on Key Assumptions linked to driving variables such as GDP, industrial output, population, consumption, investment etc.

Namibia's NDC target has been expressed in relation to the baseline scenario. The first NDC for Namibia expressed its baseline target as unconditionally reducing 89% of its GHGs below BAU for 2030. Similarly, in

[11] Namibia is member of Climate Ambition Alliance, brings together countries, businesses, investors, cities, and regions who are working towards achieving net-zero CO2 emissions by 2050.
[12] (NAZCA, 2019)

this updated NDC, a baseline target was used to express Namibia's mitigation response relative to a counterfactual baseline scenario under which certain emissions reductions and associated policies (that could have a direct or indirect effect on emissions) do not take place. Accounting for baseline targets thus depends on a clear understanding of the baseline scenario. Namibia is providing this information to give greater clarity, transparency and understanding of its baseline and thus, the baseline target, which will facilitate greater understanding of its NDCs, and progress towards and achievement of the mitigation target (Table 2.1).

TABLE 2.1. FURTHER INFORMATION FOR CLARITY ON BASELINE TARGET (MITIGATION).

Baseline choice:	The **dynamic baseline** can more easily isolate the level of effort associated with meeting a target since it is recalculated to account for changes in exogenous drivers. It can accommodate unforeseen changes in exogenous factors through recalculation.[13]
Accounting method:	Relative to base year/period emissions. Compares net emissions in the target year(s) with net emissions in the base year/base period. The difference between the two values is applied toward target achievement. Accounting under this approach reflects changes in emissions relative to past performance.
Start year or period:	2015
Emissions drivers, their values and assumptions and data sources:	Key drivers that can affect calculations of baseline scenarios in this updated NDC include drivers of economic activity (GDP, sectoral composition), structural changes in economic sectors, energy prices, supply and demand of fuel type, land-use practices and technology development.
Policies and actions (planned and implemented) to include in the baseline:	The number of actions on policies, plans and strategies are 11. Sector-wise, Energy outnumbered the other three with 31 actions, followed by eight in AFOLU, three in Waste and one in IPPU. Out of these, 24 actions have been completed or implemented in the Energy sector and 7 in the AFOLU sector.
Methodologies, latest available data, emissions factors:	*National objectives and priorities* – data sources: Laws, climate change strategy, economic development strategies and plans, energy planning and policies, transportation plans, water plans, coastal zone plans, agriculture plans, forest protection and management plans, electricity plans, green growth plans, five-year budget documents. *Current GHG emissions profile* – data source: Latest national GHG inventory (based on IPCC Guidelines for National Greenhouse Gas Inventories covering

[13] (Vaidyula & Hood, 2018)

	CO_2 emissions, CH_4 and N_2O emissions, and HFC emissions including PCFs, SFs). If not available, proxies for estimating current GHG emissions profiles, governmental annual estimates. Sources include inventory reports, Biennial Reports and Biennial Update Reports, and National Communications, sector-specific analyses.

2.1.2 Adaptation

TABLE 2.2. TYPES OF INFORMATION USEFUL FOR CONTRIBUTIONS INCLUDING ADAPTATION COMPONENTS.

TYPE OF INFORMATION	PURPOSE OF INFORMATION	EXAMPLES OF DATA SOURCES
Climate change trends, impacts, and vulnerabilities	Identify vulnerable groups and sectors within the country	National Communications to the UNFCCC; reports by national, multinational, and civil society organizations; IPCC Fifth Assessment Report; academic research; national, sub-national or local assessments and studies associated with projects; international databases such as CRED or insurance industry databases
Statement of long-term goals or vision	Help guide further adaptation planning and action, if such a goal or vision exists	National planning documents; records of planning meetings, including stakeholder consultation processes
Statement of current and near-term planning and action	Identify current efforts that an INDC can build upon	National planning documents; national policies, regulations, or procedural guidelines; national or sectoral databases of projects and programs; subnational (for example, city, state, county, province, district) records of activities and investments
Summary of support	Understand existing support that can be used for implementation	National records; national databases or studies such as Climate Public Expenditure and Institutional Reviews (CPEIRs), and numerous international databases
Statement of gaps, barriers, and needs	Understand resources needed to execute near-term action or planning	National assessment; subnational (sector, location, etc.) assessments;

		adaptation project reports or evaluations
Monitoring plans	Identify existing monitoring systems that can be used to track the goals and/or activities that may be included in the INDC	National assessment and/or stakeholder consultation processes; project/program monitoring and evaluation data; national census data or other national statistical bureau resources; environmental monitoring systems, including satellite data.

To inform the NDC update process, the Namibian Ministry of Environment, Forestry and Tourism has compiled existing analysis on the sectoral composition of emissions, projected GHG emissions through 2030, sectoral mitigation actions in the sectoral plans, and possible co-benefits, among other issues. Based on this analysis, Namibia prioritised additional data needs in the agriculture, forestry, and other land uses (AFOLU) sectors. The process used all the data to build an economy-wide business-as-usual scenario as well as to assess various mitigation scenarios and their impacts in the NDC update design process (Table 2.2).

2.2 GHG Inventory

Namibia's GHG inventory data in the base year 2015 are shown in Table 2.3 according to IPCC reporting categories for all GHG emissions sources. Total emissions from all the sectors excluding forestry were estimated at 4.22 $MtCO_2e$ for 2015. Total national emissions increased by 1.7% over the period 2010 - 2015. The AFOLU sector remained the leading emitter throughout this period followed by Energy, for all years under review.

TABLE 2.3. NATIONAL GHG EMISSIONS (MT, CO_2-EQ) BY SECTOR (2010 - 2015).[14]

	2010	2011	2012	2013	2014	2015	Trend
Energy	2.92	2.80	3.00	2.86	3.24	3.54	
IPPU	0.30	0.44	0.52	0.53	0.53	0.52	
AFOLU	17.37	19.33	19.88	16.29	17.27	16.86	
Waste	0.14	0.14	0.15	0.15	0.16	0.16	
Total emissions	**20.73**	**22.71**	**23.55**	**19.84**	**21.19**	**21.08**	

Note: The area graphs show the trend in emissions from 2010 to 2015 for the 4 IPCC sectors and total emissions.

[14] (REPUBLIC OF NAMIBIA, 2015B, 2016C, 2018, 2019)

2.3 Baseline targets in NDCs

In this updated NDC, baseline scenarios are defined as a future projected reference level of emissions against which a goal has been established or progress is to be measured. The mitigation contributions in this updated NDC are based on a relative decrease in GHG emissions from 2015 to 2030. The baseline scenarios included in this report depict emissions that would have occurred if specific mitigation strategies had not been implemented. Baselines can also be used to set an objective ("target baselines").

Namibia's first NDC stated its baseline target as unconditionally reducing its GHGs below BAU by 2030. Similarly, a baseline target was used in this updated NDC to express Namibia's mitigation response relative to a counterfactual baseline scenario in which certain emissions reductions and associated policies (that could have a direct or indirect effect on emissions) do not occur. Namibia is providing this information to improve the clarity, transparency, and understanding of its baseline.

2.4 Mitigation contributions by sector

In the BAU scenario, overall GHG emissions in 2030 are expected to rise by up to 24.167 $MtCO_2e$. The estimated emissions reduction under the NDC scenario will be approximately 21.996 $MtCO_2e$ in 2030 (91% reduction of which 78.7% is from the AFOLU) (Table 2.4).

TABLE 2.4. SUMMARY OF BAU EMISSIONS AND NDC EMISSIONS REDUCTION.

Sector	Mitigation potential (MtCO2e)	% Reduction compared to BAU scenario in 2030
Energy	2.800	11.6%
IPPU & RAC	0.134	0.6%
AFOLU	19.030	78.7%
Waste	0.031	0.1%
Total	**21.996**	**91%**

The total mitigation potential is estimated at around 21.996 $MtCO_2e$ in 2030 compared to BAU emissions in the same year of 24.167 $MtCO_2e$ (Figure 2.1). According to the analysis, mitigation measures identified within the AFOLU sector account for the highest proportion (approximately 79%) (Table 2.4) compared to other sectors.

FIGURE 2.1. MITIGATION CONTRIBUTION AGAINST BUSINESS-AS-USUAL (BAU).

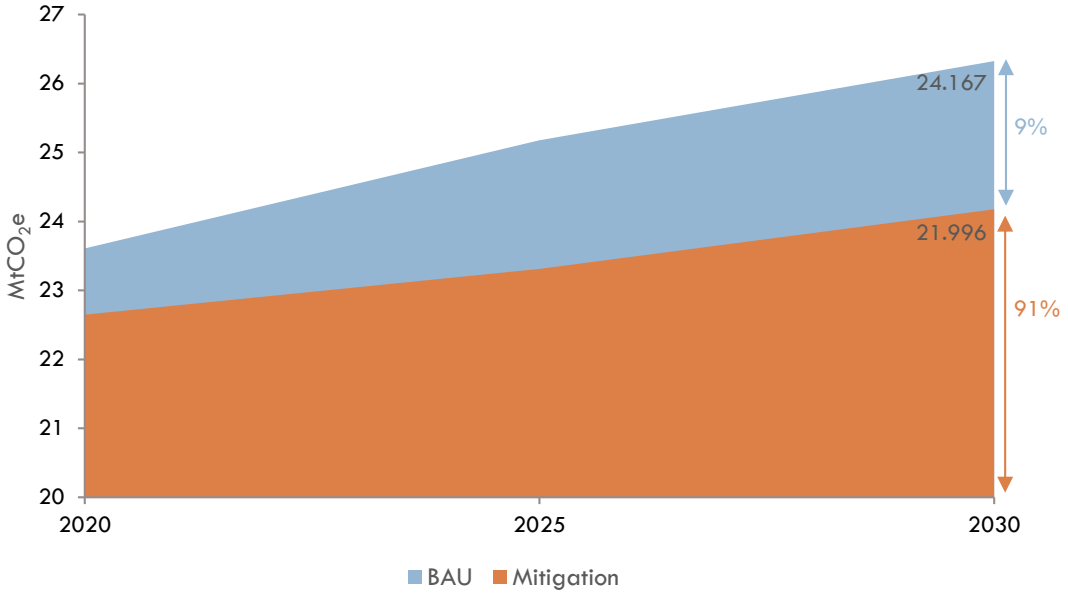


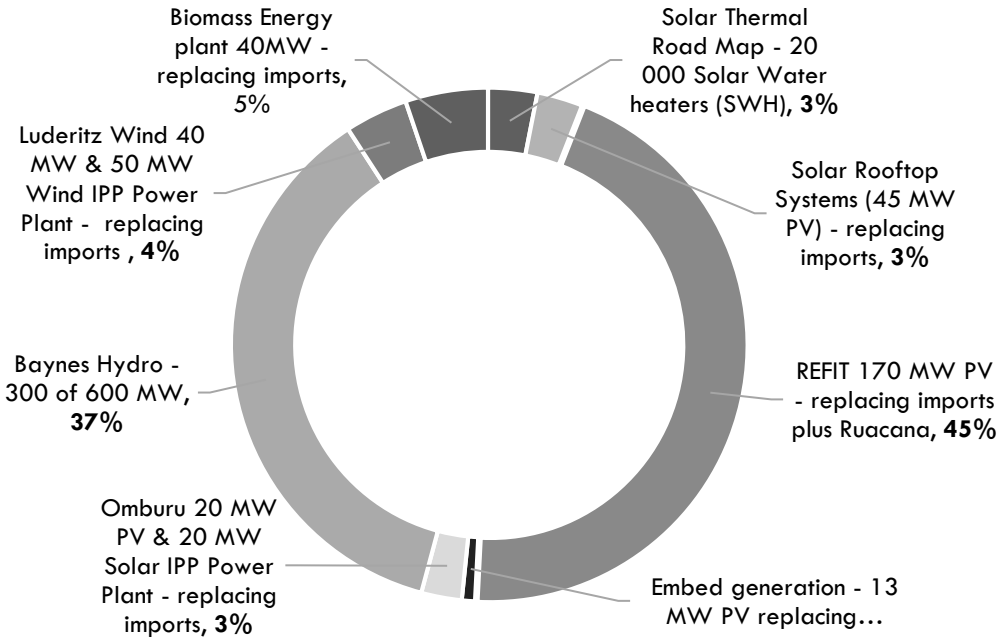
Figure 2.1 illustrates the emission projections for the BAU scenario and Namibia's mitigation contribution for all measures (unconditional and conditional). By 2030 avoided emissions are estimated to be around 21.996 $MtCO_2e$, representing a reduction against BAU of around 91% (figures are given in Table 2.4.). With no measures, emissions are estimated to total around 24.167 $MtCO_2e$, equal to 8% more than the mitigation scenario by 2030.

Figure 2.2 summarises the estimated emissions reduction potential in 2030 for all mitigation measures assessed from the 'long list' of all mitigation measures presented in *appendix 1*. The pie charts indicate the relative contribution made from measures within the key sectors of energy (electricity generation and transport), IPPU (Cement industry and RAC), AFOLU (forestry), waste (solid waste transformation and recycling), against the BAU baseline described above.

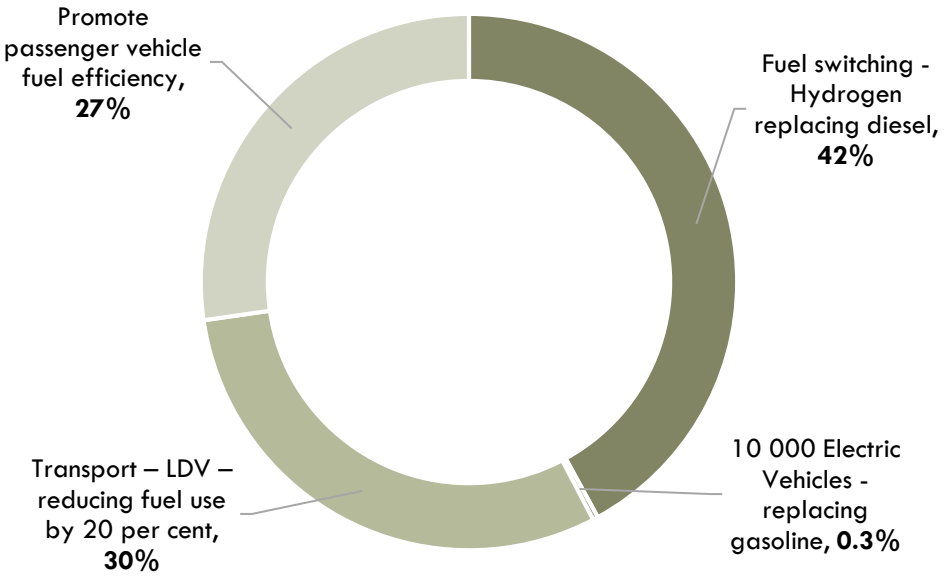
FIGURE 2.2. MITIGATION POTENTIAL FROM ALL MITIGATION MEASURES.

Energy

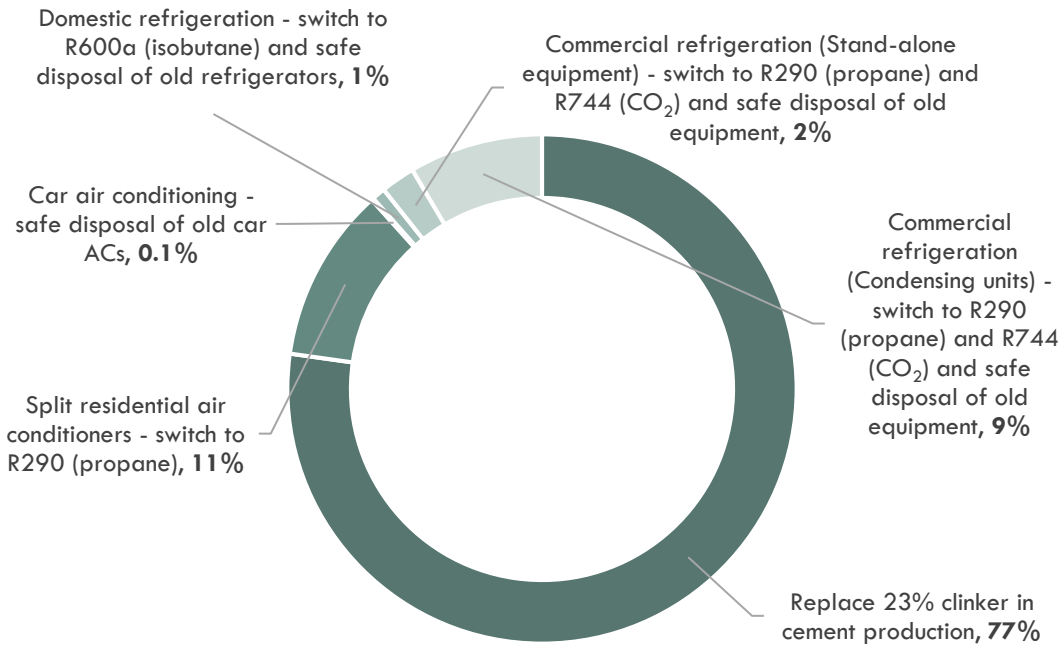
Electricity generation



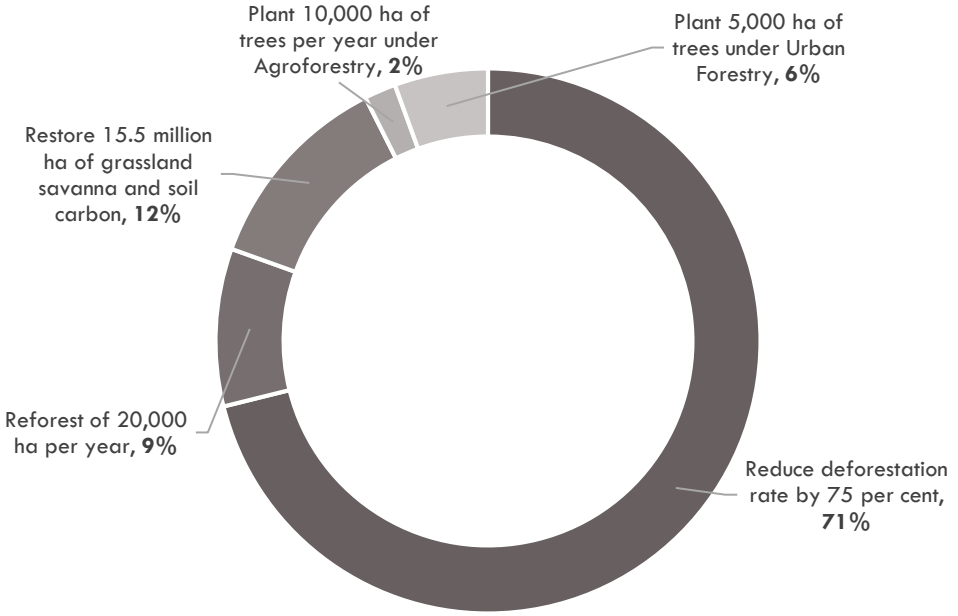
Transport



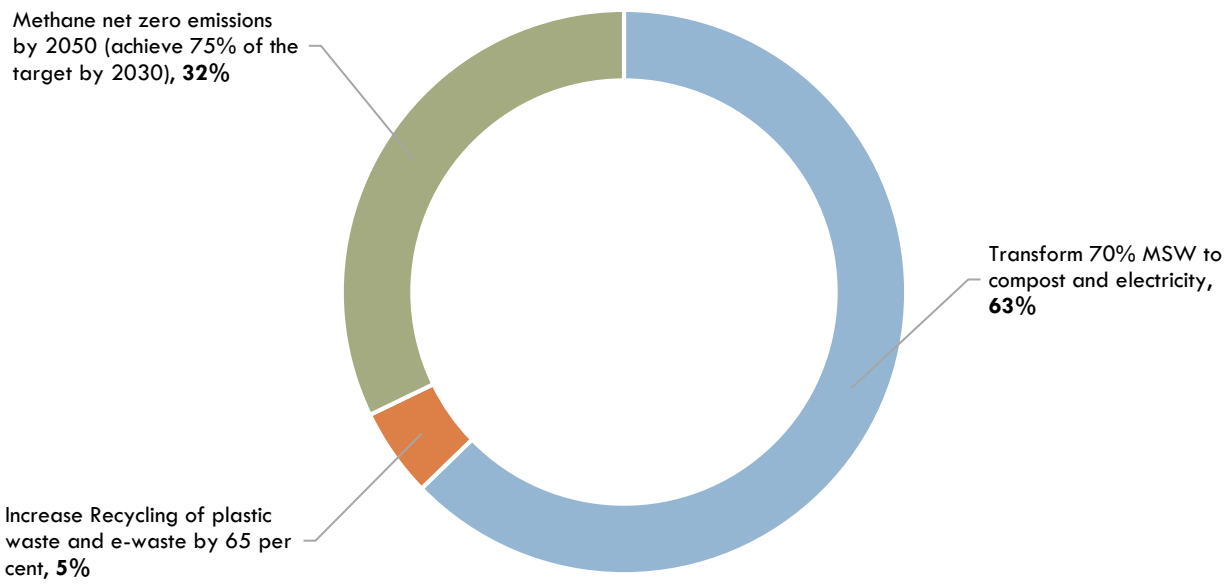
IPPU including RAC



AFOLU



Waste



In the energy sector, Namibia's National Renewable Energy Policy aims to drive emerging technologies that reduce emissions and support cleaner practices. The goal is the substitution of existing higher emission technologies with cleaner, more efficient, and lower-cost technologies. Namibia's efforts in renewables will contribute to a 30% reduction equivalent in the quantity (2.668 TWh) of electricity imported in 2018 which would result in 0.8 TWh (800 GWh) in new RE generation of 330 MW of Solar PV per annum until 2030.

Further measures that will build on Namibia's existing efforts include fuel switching to replace inefficient fuels with cleaner and economical alternatives, such as substituting hydrocarbons for hydrogen or electric energy. Complimented by modern equipment upgrades, fuel switching is a simple approach that Namibia will use in reducing energy consumption and costs for end-users, while also curbing carbon emissions. Fuel economy (FE) and greenhouse gas (GHG) emission standards regulations will be used as one of the main instruments available to Namibia to achieve significant improvements in fuel consumption and GHG emissions from light-duty vehicles (LDVs). These standards through continued development and application of fuel-efficient technologies will reduce carbon emissions by 3% of total GHG emissions. Over the years by 2030, Namibia's adoption of such standards will result in a market transformation towards vehicles that are increasingly fuel-efficient-consuming less fuel per kilometre driven and thus emitting less GHG.

The total mitigation potentials of the RAC sector are essential to Namibia's mitigation options including both direct and indirect emission reductions through climate-friendly refrigeration and air conditioning. Emissions of hydrofluorocarbons (HFCs) used as refrigerants are addressed by the commitments made under the Kigali Amendment of the Montreal Protocol on Substances that Deplete the Ozone Layer which have been ratified by the Republic of Namibia in May 2019. To prevent lock-in of highly climate-damaging HFC refrigerants in the time between now and the first Kigali Amendment phase-down step in 2029, the Republic of Namibia aims to implement early action on the reduction of HFCs and the introduction of climate-friendly alternatives. Low GWP

technology options, particularly natural refrigerant technology options, exist as an alternative to HFCs for almost any RAC appliance. Namibia aims at the introduction of climate-friendly and energy-efficient appliances through the inclusion of a ban on high GWP equipment and the introduction of minimum energy performance standards (MEPS) that generate emission reductions, both from the use of refrigerants (direct emissions) and from low energy consumption (indirect emissions). The measures aim to achieve a penetration of 60% climate-friendly and energy-efficient residential air conditioners, as well as domestic and commercial refrigeration units by 2030. This will be accomplished by switching from inefficient HFC-based equipment to energy-efficient natural refrigerant-based equipment.

These measures are complemented by training technicians on the proper servicing and handling of low GWP refrigerants. They are to be also trained in the safe and proper disposal of old refrigerators as well as car air conditioning equipment. The mitigation potential for HFC emissions is projected to be 0.031 MtCO2e in 2030. Significant indirect (energy-related) mitigation potential exists, i.e. around 0.048 MtCO2e in 2030. However, the resulting emissions will be accounted for under the Energy sectors.

TABLE 2.5. SUMMARY OF ESTIMATED GHG MITIGATION POTENTIAL FROM ALL MEASURES.

Measure	Mitigation potential (MtCO2e)	% of BAU scenario in 2030
Energy		
Electricity generation:		
1) Renewable Energy Feed-in Tariff (REFIT) 70 MW PV - replacing imports plus Ruacana	0.246	1.12
2) Solar Rooftop systems (45 MW PV) - replacing imports	0.016	0.07
3) Embedded generation - 13 MW PV replacing imports	0.005	0.02
4) Solar power - Omburu 20 MW PV - replacing imports & 20 MW Solar IPP Power Plant	0.014	0.06
5) Wind power - Luderitz Wind 40 MW replacing imports & 50 MW Wind IPP Power Plant	0.022	0.05
6) Biomass Energy plant 40MW - replacing imports	0.007	0.11
7) Hydropower - Baynes Hydro 300 of 600 MW	0.201	0.91
8) Solar Thermal Road Map - 20 000 Solar Water heaters (SWH)	0.017	0.08
Transport:		
9) Promote passenger vehicle fuel efficiency standards (in 80 % of total passenger vehicle population)	0.614	2.79
10) 10 000 Electric Vehicles - replacing gasoline	0.007	0.03
11) Fuel switching to low-carbon fuels - Hydrogen replacing diesel	0.946	3.59
12) Light-duty vehicles (LDV) – reducing fuel use by 20%	0.684	3.11
Subtotal	***2.779***	***11.94***
IPPU including RAC		
Industry:		
13) Replace 23% clinker in cement production	0.104	0.47
Refrigeration and Air Conditioning (Climate-friendly and energy-efficient alternatives):		
14) Split residential air conditioners – switch to R290 (propane)	*0.015*	0.07
15) Car air conditioning – safe disposal of old car ACs	*0.0002*	0.001

16) Domestic refrigeration - R600a (isobutane) and safe disposal of old refrigerators	*0.001*	0.005
17) Commercial refrigeration (Stand-alone equipment) – switch to R290 (propane) and R744 (CO_2) and safe disposal of old equipment	*0.003*	0.013
18) Commercial refrigeration (Condensing units) – switch to R290 (propane) and R744 (CO_2) and safe disposal of old equipment	*0.011*	0.052
Subtotal	***0.134***	***0.61***
AFOLU		
19) Reduce deforestation rate by 75 %	13.537	61.54
20) Reforest of 20,000 ha per year	1.779	8.09
21) Restore15.5 million ha of degraded savanna	2.3	10.46
22) Plant 10,000 ha of trees per year under Agroforestry	0.358	1.63
23) Plant 5,000 ha of trees under Urban Forestry	1.056	4.80
Subtotal	***19.030***	***86.52***
Waste		
24) Transform 70% MSW to electricity and compost	0.0197	0.07
25) Increase Recycling of plastic waste and e-waste by 70%	0.0016	0.01
26) Zero waste by 2050 through re-use and recycling (75% of target achieved by 2030)	0.0101	0.04
Subtotal	***0.031***	***0.12***
TOTAL	**21.996**	**91%**

Approximately 8.9% or about 7,290,000 ha of Namibia is forested and reducing the deforestation rate by 75% from 0.9% per year to below 0.25% will be the major drive to achieving the 2030 target (Figure 2.2). More effort and investment are being put in place by Namibia to achieve this goal in Namibia's forest areas. Over 13.5 Mt CO_2 equivalent will be mitigated in the next 10 years. Namibia recognises that reforestation, agroforestry, and urban forestry are key emissions reduction strategies (Table 2.5).

Through the restoration of 15.5 million hectares of degraded savanna, it is expected that 2.3 Mt CO_2 equivalent will be reduced from total emissions in 2030 (Table 2.5). The central parts of the country are covered by thornbush savanna, which is increasingly being encroached by indigenous woody bush species. This is considered a serious form of land degradation, adversely impacting biodiversity, groundwater recharge and land productivity as well as accessibility for eco-tourism activities. In total, it is estimated that in total 45 million hectares are affected by woody encroachment at varying intensities.

Namibia's land sector is reported as a large net sink and will remain so even in the scenario of increased bush biomass harvest. Even the largest upscaling scenarios of bush biomass utilization are not expected to compromise this terrestrial sink. Furthermore, the net impact of bush thinning in combination with the restoration of savanna rangelands is still subject to further research, especially with regards to changes in soil organic carbon. While the mitigation impact of bush thinning and rangeland restoration has not been determined conclusively, the climate change adaptation benefits of these measures are undisputed and manifold. Although Namibia's land sector is very much likely to remain a sink, it may become CO_2 neutral under the scenario of increased harvest and use of the invader bush. The assumptions made when calculating emissions for the BAU scenario for the Land sector which governs mitigation are:

- National programmes for the protection of Forest lands in the north-eastern regions are deemed to reduce deforestation to a strict minimum with a loss of 7500 hectares annually.

- Other wooded land (OWL)[15] will also stabilize as woody encroachment into grassland in the central and southern part of the country is estimated to be not occurring due to rainfall being limiting.
- With no further encroachment of woody species occurring, the Grassland area of 3.8 million ha will remain the same. The utilisation of the encroacher bush in OWL is not expected to affect this land class as it will be primarily bush thinning as opposed to a full clearing.
- Settlement's area will increase marginally by 100 ha on an annual basis from OWL as inclusion from Cropland or Grassland is estimated not to occur.
- The area of Wetlands and Other lands is estimated to remain stable.

The targeted national mitigation contribution from the AFOLU sector is expected to result from the implementation of different strategies that relate mainly to natural forest management (*reforestation and urban forestry*) and agroforestry, either with domestic or international support. The total area of intervention is expected to reach 15,000 ha with merely domestic support and 20,000 ha with international support.

The potential mitigation contribution from Agroforestry, represented by the total C storage of trees outside natural forest lands estimated at 0.358 $MtCO_2e$. However, this figure is a total of ≈10,000 ha of land by 2030. Like any other land use in Namibia urban forestry[16] and its management can have immense potential in mitigating C emissions and performing other environmental services.

The transformation of MSW to compost and electricity is the most significant mitigation potential under the Waste sector. Though mitigation potential from waste sources is, by comparison limited, the potential to expand the actions is high.

Overall, the updated NDC had a significant increment (22%) in mitigation potential across all sectors from 2015 targets (Table 2.6). Efforts under the IPPU sector increased three times more than the first NDC targets. The energy sector's mitigation potential also grew in the period 2020 – 2030 due to more technology-based options being availed to reduce GHG emissions. AFOLU had the least increment (3%) because of the nature of options created which are non-technological and the mitigation potential of the sector is almost saturated. Beyond that limit, AFOLU may shift to being an emitter of GHGs.

[15] Other wooded land, or OWL, is defined by FRA-2000 as land with a tree crown cover (or equivalent stocking level) of 5–10% of trees able to reach a height of 5 meters at maturity, a crown cover of more than 10% of trees not able to reach a height of 5 meters at maturity (such as dwarf or stunted trees), or shrub and bush cover of more than 10%. OWL excludes areas with the tree, shrub, or bush cover just specified but of less than 0.5 hectares and width of 20 meters, as well as land predominantly used for agricultural practices (FAO 2000, 2001).

[16] The term "urban forestry" refers to the management of all trees within a densely populated area, including trees in parks, on streetways, and on private property.

TABLE 2.6. UPDATED MITIGATION CONTRIBUTIONS (MT CO_2E) BY SECTOR.

Sector	INDC (2015)	Updated NDC (2021)	Variance	% Change
Energy	1.30	2.25	1.48	73%
IPPU (including RAC)	0.04	0.13	0.13	225%
AFOLU	18.51	19.03	2.68	3%
Waste	0.21	0.31	0.16	48%
TOTAL	**20.06**	**24.51**	**4.45**	**22%**

Green hydrogen, which uses renewable energy to produce hydrogen from water, is taking off around the globe including Namibia. Green hydrogen will play a crucial role in reaching the emissions neutrality goal, and it would be economically convenient. Opportunities exist today to pilot both green hydrogen for low-emission transport solutions and fuel cells for remote power provision. Meanwhile, in Namibia smaller stationary fuel cell systems have also started to be piloted for residential and tourism consumers [17]

The country's transition to modern fuels in the industry could also be a major area of potential growth for green hydrogen. Namibia is in the process of building the means towards clean energy sources. Currently, a feasibility study to explore whether Namibia can become a leading global contributor to green hydrogen is underway [18]. The study will investigate the costs to produce, process and transport the hydrogen. Namibia expects that the decarbonization plan of the electric matrix by 2030 will bring a significant GHG emissions reduction through green hydrogen.

3 ADAPTATION

3.1 Introduction

Climate change continues to be a real threat to Namibia's development progress. The country already has a harsh desert and a low precipitation climate. Population growth, extreme inequalities, and development trends will further exacerbate and worsen current challenges and other existing vulnerabilities, with changing rainfall patterns and rising temperatures.

The country's climate vulnerability is closely related to its aridity and high-water scarcities. The Namibian land sector is highly vulnerable to the impacts of climate change and is already hard hit. Besides the increasing variability of dry spells and flood events, woody encroachment is having a major impact on this key sector.

[17] (World Bank, 2020)
[18] (Nexentury, 2021)

Among the drivers of woody encroachment is anthropogenic climate change itself. Woody encroachment has adverse impacts on savanna ecosystem services such as groundwater recharge and biodiversity. It further drastically decreases the suitability for eco-tourism and specifically the carrying capacity for both livestock and wildlife in large parts of Namibia, thus adversely affecting the land productivity and rural livelihoods. Bush thinning improves the livestock industry resilience to climate change. This industry accounts for 90% of all agricultural production in Namibia with approximately 60% of households owning cattle, including nearly 40% of poor households. From an adaptation perspective, bush thinning and the sustainable utilisation of bush biomass in line with the restoration of savanna rangelands thus yield significant benefits. Corresponding activities and value chains are supported by the National Rangeland Management Policy and Strategy and the ongoing Bush Control and Biomass Utilization projects/initiatives.

Most of the current climate change adaptation projects, and programs in Namibia tend to focus on capacity building, knowledge communication, field implementation, and policy formation and integration, with all nationally implemented projects supporting community-based adaptation. Regions within Namibia that are particularly targeted for adaptation interventions are the northern parts of the country, including Kavango, Zambezi, Oshikoto, Oshana, Ohangwena, Omusati, and the northern part of Kunene Region.

Most of the adaptation activities are implemented with funding donor and international multilateral institutions such as the Green Climate Fund, Adaptation Fund, Global Environmental Fund (GEF), European Union (EU), United States Agency for International Development (USAID), GIZ, Japan International Cooperation Agency (JICA), etc. However, local institutions such as the Environmental Investment Fund also provide support to climate change adaptation activities.

3.2 Impacts and priorities for adaptation.

For the development of the Fourth National Communication[19], climate change impacts and vulnerability was assessed for the most vulnerable sectors, namely water resources, agriculture, forestry, coastal zones, tourism, human health and disaster risk management.

3.2.1 Water resources

Namibia relies on dams, ephemeral rivers and aquifers for its water supply. These water resources are supplemented to a limited extent by unconventional sources such as reclaimed water and desalination. The absence of perennial rivers in Namibia's interior means that the country is reliant on rainfall as its natural water source. The semi-arid climate over most of the country coupled with high evaporation rates makes the country one with a net water deficit (mean annual rainfall minus potential evaporation), ranging from -4000 mm in the southeast to -1600 mm in the northeast.

[19] (Republic of Namibia, 2020)

To ensure sustainable long-term access to water, and effectively manage and conserve the country's water resources with the uncertainty of climate change, the following adaptation options are pertinent; promote efficient water harvesting techniques, recycling and re-use of water, promote the use of desalination technologies to increase water supply, promote and encourage integrated water resources management, etc.

3.2.2 Agriculture and forestry

Agriculture is a key sector of the Namibian economy. It is not only the largest employer and also critical to livelihoods and food security. Over two-thirds of households practice subsistence cropping and pastoralism, mostly on communally held lands. Agricultural production ranges from the intensive production of horticultural crops) to large-scale production of cereals, mainly maize and millet. Less than 10% of the land surface is used for crop production, while nearly 75% is used for livestock production.

Current/potential adaptation options and issues in the agriculture and forestry sectors include implementation of Climate-Smart Agriculture, bush-thinning and the sustainable utilisation of bush biomass, improved water management, improved monitoring and early warning, the development of knowledge and decision-support systems, and the development of new crop varieties and technologies to support farming. Barriers to adaptation include reduced extension service and slow uptake of Climate Smart Agriculture and Conservation Agriculture techniques.

3.2.3 Coastal zones

Tide gauge records from Lüderitz and other localities on the west coast of southern Africa over the last 30 years have revealed an estimated sea-level rise that is comparable with the global measurements.[20] Given the lack of natural and human-made protective infrastructure to storm surges, the coastal areas are highly vulnerable to sea-level rise. The most significant drivers of climate change risks and vulnerability that are of importance to coastal environments and fisheries are modification of terrestrial climatic and hydrologic processes; change in coastal and oceanic circulation processes; ocean acidification; increased sea surface temperature; sea-level rise; increase in sea storminess and changing wind systems.

The adaptation measures proposed for coastal zones can be classified broadly into "no regrets" and "additional" options that are proactively designed to counter sea-level rise. No regrets options are efforts that are undertaken even if climate change were not happening. In the context of sea-level rise, no regrets options available to Namibia include enforcement of development restrictions within the coastal buffer zone; reduce the degradation of wetlands, estuaries, dune cordons and sandbars; integration of sea-level rise scenarios into future planning decisions; incorporate sea-level rise risks in disaster management strategies and alleviate poverty and improve living conditions.

On the other hand, other options are new interventions or investments, additional to the business as usual and existing efforts, designed to improve wellbeing, maintain the environment, and ultimately counter sea-level rise. These options can be classified into physical, biological, and institutional responses. Physical options are hard engineering techniques such as seawalls, groynes, detached breakwaters, and revetments. Biological options are more natural, less likely to produce adverse consequences and more cost-effective than most physical

[20] ("The Report on 1.5°C Global Warming-Relevant Aspects for Climate Services," 2019)

options. They include dune cordons, estuary and wetland rehabilitation, and kelp beds. Institutional options are policy or decision-making responses. Added options include vulnerability mapping and risk communication, design and implementation of appropriate and effective legislation, the establishment of early warning systems, research and monitoring and design of appropriate insurance products to address sea-level rise.

3.2.4 Health

Based on the 2016/17 Namibia Intercensal Demographic Survey and the 2006/07 National Demographic and Health survey, the main causes of death in children under five years (diarrhoea (42%), undernutrition (40%), malaria (32%), acute respiratory infections (30%)) have a strong environmental component linked to climate. The main causes of adult mortality are AIDS, tuberculosis, and malaria. Since these diseases often co-occur, it is difficult to establish the exact cause of death. Climate change is already exacerbating the causes of infant and adult mortality, and this will likely worsen in the future.

Adaptation needs and barriers in the Namibian health sector include cross-sectoral cooperation and collaboration, accessibility, and effectiveness of health care infrastructure, especially among the poor segments of the population, a lack of understanding of the linkages between climate and health in Namibia.

3.2.5 Tourism

Namibia's tourism industry has undergone rapid growth in the past three decades, with an average increase in international arrivals of 16% per year on average. This growth rate has made tourism the fastest-growing sector of the Namibian economy. Tourism in Namibia relies largely on the wildlife sector. Changes in the quality of wildlife viewing, wildlife numbers and vegetation because of climate change are expected to affect the demand for wildlife tourism, which is estimated to be as much as a 15 % reduction in tourism demand.

3.2.6 Disaster risk management

With climate change contributing to an increase in disaster risk, disaster risk management becomes a vital and urgent component of any climate change adaptation program. As part of climate change adaptation policies and investments, Namibia needs to focus on reducing its vulnerability and planning for measures to mitigate natural disaster risks.

Adaptation measures proposed in this updated NDC cover the following aspects; minimise the loss of human life, property and damage to the environment from hazards of natural and ecological origin, advocate an approach to disaster risk management that focuses on reducing risks especially to those sections of the population who are most vulnerable due to poverty and a general lack of resources (both urban and rural communities), advocate for a shared awareness and responsibility to reduce disaster risk in communities, and in society generally, and to facilitate partnerships in this regard between organs of state, the private sector, non-governmental organisations and communities.

The current updated NDC seeks to accelerate Namibia's socio-economic growth by a holistic approach to addressing sector-specific vulnerabilities and directing funding to adaptation for effective climate action. This NDC will seek to foster new jobs and lead to resilient communities across the country. The Government listed seven sectors as being especially vulnerable: water resources; agriculture; forestry; coastal zones; tourism; health; and disaster risk management. The government has prioritized action on climate change and introduced a national climate change policy; however, the success in the implementation of these actions is closely related to donor engagement and financing.

3.3 Prioritised measures

Mitigation and adaptation often coexist together and quite a few adaptation actions do have mitigation co-benefits. The Namibian Government is currently formulating the National Adaptation Plan (NAP). The NAP will serve as the guiding document to implement adaptation actions in Namibia. Namibia's first NDC in 2015 did not identify blue carbon ecosystem strategies or plans to leverage this potential. As Namibia works to enhance its climate commitments and revise its NDC, there is an opportunity to explore blue carbon potential. In this update, Namibia seeks to highlight the integration of blue carbon in its future NDC revision process. Namibia expects to include these ecosystems in NDCs to benefit from the additional services they provide, including coastal protection, wildlife habitat and water filtration.

Table 3.1 provides a summary description of prioritised adaptation actions, timelines for adoption, accountable lead ministries, and the link with Sustainable Development Goals (SDGs). More details on adaptation measures are outlined in *appendix 2*. Furthermore, blue economy opportunities are highlighted in Table 3.2.

TABLE 3.1. ADAPTATION ACTIONS.

Adaptation action	Lead Ministry	Timeline	SDG link
Water resources			
1. Provide full support for integrated water resources management in Namibia	MAWLR	2020 - 2025	   
2. Establish best practice systems for improving the efficiency of water use particularly in irrigation	MAWLR	2020 - 2025	
3. Coordinate use of surface and groundwater resources and artificially increase the recharge rate of groundwater aquifers to reduce evaporation	MAWLR	2020 - 2025	
4. Improve water demand management, particularly at the local level and in the agricultural, industrial, mining and tourism sectors	MAWLR	2020 - 2030	
5. Establish nation-wide monitoring and control of groundwater use more strictly	MAWLR	2020 - 2030	
6. Prioritize seawater desalination	MAWLR	2020 - 2030	
Agriculture			  
7. Promoting diversification of crops to hedge against erratic rainfall and shorter seasons (Climate Smart Agriculture)	MAWLR	2020 - 2025	
8. Development of improved crop varieties that adapt to climate change (Climate Resilient Agriculture)	MAWLR	2020 - 2025	
9. Enhancing access to farming inputs (i.e. seed and fertilizer) availability and maintain consistency in yields (Climate Resilient Agriculture)	MAWLR	2020 - 2025	
10. Promote protected cultivation and improved planting methods for enhancing water use efficiency and crop productivity (e.g., greenhouses net houses, mulching, spot	MAWLR	2020 - 2025	

Adaptation action	Lead Ministry	Timeline	SDG link
planting/zero tillage) (Climate Resilient Agriculture)			
11. Promote the use of water targeting only irrigation of high-value crops (Climate Resilient Agriculture)	MAWLR	2020 - 2025	
12. Promoting climate resilience in livestock management through strategies such as the creation of fall-back grazing areas and mixing small and large stock herds of various breeds (Climate Smart Agriculture)	MAWLR	2020 - 2025	
13. Enhance integrated pest management as an ecosystem approach to crop production and protection (Climate Resilient Agriculture)	MAWLR	2020 - 2025	
14. Improvement of support services and capacity building to crop production resilient to climate change by promoting research, trials and up-scaling climate-smart farming systems that increase resilience to climate change.	MAWLR	2020 - 2025	
Forestry			
15. Restoration of the savanna through bush thinning for increased land productivity, improved food security, improved groundwater recharge and increased biodiversity.	MEFT	2020 - 2030	
16. Bush biomass utilisation and value addition (Bush based animal feed production, biochar application, drought resilience, improved food security, bush-to-energy, employment & income creation)	MEFT	2020 - 2025	 

Adaptation action	Lead Ministry	Timeline	SDG link
17. Support agroforestry interventions to ensure food security (bush-based livestock feed, other biomass for fodder, meat, and Non-Timber Forest Produces (NTFPs)) in Namibia's most vulnerable communities.	MEFT	2020 - 2025	
Coastal zones			
18. Introduce legislation to reduce property and infrastructure development in environmentally sensitive areas and areas at risk of sea-level rise	MFMR	2020 - 2025	
19. Research and monitor sea-level rise	MFMR	2020 - 2030	
20. Undertake vulnerability mapping	MFMR	2020 - 2025	
21. Collaborate with the insurance market to guide investment in coastal areas	MFMR	2020 - 2025	
22. Develop an early warning system	MFMR	2020 - 2025	
23. Rehabilitate wetlands and estuaries	MFMR	2020 - 2025	
24. Install sea walls barriers and barrages	MFMR	2020 - 2030	
Tourism			
25. Promote sustainable tourism and provide capacity building for climate change innovation in Namibia's tourism sector.	MEFT	2020 - 2030	
26. Implement conservancies, tourism and adaptation programs based on community-based natural resource management (CBNRM)	MEFT	2020 - 2030	
27. Promote community-based natural resource management data collection and archiving	MEFT	2020 - 2030	
28. Diversify livelihoods in communities dependent on CBNRM initiatives such as the Namibian Conservancy programme and Community Forests.	MEFT	2020 - 2030	

Adaptation action	Lead Ministry	Timeline	SDG link
Health			
29. Strengthen the capacity of health professionals in epidemic preparedness and response	MHSS	2020 - 2030	
30. Recruit and train community health workers to provide emergency first aid	MHSS	2020 - 2030	
31. Improve staff training on prevention and treatment of malnutrition	MHSS	2020 - 2030	
32. Enhance and further mainstream climate-related awareness	MHSS	2020 - 2030	
33. Improve access to timely and relevant information	MHSS	2020 - 2030	
34. Strengthen the policies required to effectively address both slow-onset and catastrophic events	MHSS	2020 - 2030	
35. Develop health-centred adaptation strategies	MHSS	2020 - 2025	
36. Climate-proof the public health system	MHSS	2020 - 2030	
37. Strengthen and provide capacity building for water and sanitation systems	MHSS	2020 - 2030	
Disaster risk management			
38. Strengthen capacities for disaster risk preparedness, contingency planning and risk reduction	MURD	2020 - 2025	
39. Implement vulnerability and risk mapping	MURD	2020 - 2025	
40. Improve information flow and communications between formal structures at the national regional and community levels	MURD	2020 - 2025	
41. Support community-based adaptation practices in both rural and urban areas	MURD	2020 - 2025	
42. Improve monitoring and documentation of extreme events	MURD	2020 - 2025	

Adaptation action	Lead Ministry	Timeline	SDG link
43. Develop pro-poor disaster insurance schemes	MURD	2020 - 2025	

3.4 Cross-cutting areas

In this update, crucial areas of climate change policy and implementation are adequately addressed, specifically 1) Gender; 2) Youth involvement; and 3) Private sector engagement.

It is also important to highlight an additional area related to Youth. During the NDC implementation and particularly for mitigation measures in the AFOLU, Namibia will seek to promote youth participation in climate change projects and awareness campaigns. Since young people and future generations will inherit the worst impacts of the climate crisis and bear the future costs of the decisions made today[21], Namibia recognises that the youth are a driving force for higher climate ambition. The NDC implementation is set to provide employment opportunities and providing support for youth entrepreneurship.

Climate change impacts do not discriminate between men and women; however, the level of resilience differs within the gender stream. According to the Agricultural Survey by the Namibia Statistics Agency[22], the greatest percentage of subsistence farming households in the country is headed by women. However, women are also said to have limited access to capital, productive land, knowledge and services and these factors, in turn, decrease the resilience and adaptive capacities of women. As part of this NDC update, Namibia acknowledges the importance of addressing gender issues, particularly women's participation in climate action. Most priority actions have a specific target for women's participation.

In the implementation phase of this NDC, detailed baseline gender/youth climate assessments and evaluations which include just transition strategies are to be conducted. These are to include priority sectors of AFOLU, agriculture, energy, waste and IPPU. Consequently, informed capacity building and planning for gender/youth-oriented climate actions and just transition training will be carried out in defined focal points.

Considerations are to be given to the following:

- Establishment of a gender/youth climate and risk management working group.
- Review of gender/review climate legal framework and policy.
- Develop and incorporate into NDCs gender/youth climate strategy.
- Development of a just transition strategy and a green job assessment model for Namibia.

To measure the impact of climate measures on key development indicators, such as GDP, jobs, skills, revenue distribution and inequalities and gender inequality, a national Green Jobs Assessment Model will be developed. The assessment's findings and process of multi-stakeholder dialogues will help Namibia foster evidence-based NDC policymaking and a just transition.

[21] NDCPartnership, "Youth Engagement | NDC Partnership," https://ndcpartnership.org/action-areas/youth.
[22] (Namibia Statistics Agency, 2019)

3.5 Blue carbon opportunities in adaptation

Namibia has an abundance of blue carbon waiting to be discovered and reported. Our challenge is to figure out how and where to act to strengthen blue carbon opportunities. With the tenth longest coastline (1572 km) in Africa [23], Namibia's Blue Carbon ecosystems hold great potential as Nature-based Solutions to mitigate climate change. They also play a unique role in protecting coastlines from the increasing impacts of climate change by absorbing incoming wave energy, providing storm surge protection, and preventing erosion [24]. Namibia has therefore, proposed future blue economy adaptation activities (Table 3.2).

TABLE 3.2. PROPOSED FUTURE ADAPTATION ACTIVITIES IN NAMIBIA'S BLUE ECONOMY.

Industry	Adaptation Objectives
1. Renewable Energy, Engineering and Built Environment	• Enhance the use of renewable energy potential across the ocean and coastal environments (hydro, desalination, fogging, solar, wind, biomass and geothermal) • Improve climate-resilient engineering and building standards for infrastructure in housing, rail, transport, coastal, waste management, telecoms, refrigeration, and energy.
2. Coastal Land Use Planning	• Protect the 1500 km coastline beaches against erosion, which will include the prioritization of EBSAs (islands, wetlands, and riverine basins). • Update the agro-ecological zones to include ocean industries and areas and strengthen coastal beach erosion management systems. • Establish a Coastal Vulnerability Index to sea-level rise.
3. Services (Technology, Weather, Health, Research)	• Expand and modernize the coastal weather observation network with technological systems such as the oceanographic and meteorological buoys to ensure adequate climate information service for adaptation. • Improve research on understanding impacts and responses to sea-level rise at some of the vulnerable coastal areas, and through data exchange between Benguela countries and ocean-based economies. • Establish comprehensive early warning and disaster prevention systems specific to areas in the ocean and coastal environments.
4. Eco-Tourism and Wildlife	• Support conservation and technological development to enable the tourism sector to deal properly with climate change.
5. Marine Fisheries and Aquaculture	• Implement effective environmental monitoring systems including environmental and sanitary surveillance and warning system along the coastline. • Establish partnerships to facilitate the generation of knowledge (basic and applied) through the alliance of research institutions, public regulators, and ocean and marine industries. • Identify and proclaim marine protected areas to conserve biologically sensitive sites.

[23] (Kirui, 2018)
[24] (WWF, 2020)

6. Marine Mining	• Ensure that exploration and mining within the Protected Areas comply with the environmental and economic regulatory frameworks. • Enact a legal framework benchmarked against environmental global best practices to facilitate sound marine exploration and environmentally sustainable mining activities.
7. Value-Addition and Food Manufacturing	• Reduce fish meal-based by-products emanating from fresh fish. • Promote innovations in food processing, food losses and waste.
8. Coastal Agriculture	• Scale-up climate-smart technologies to increase the crop, livestock, and fisheries productivity. • Adapt conservation agriculture approach as the basis for sustainable coastal farming and improved food security. • Use irrigation water-saving technologies and organic soil nutrient sources.
9. Water Use Efficiency and Management	• Promote integrated water resources development and management practices including artificial replenishment of groundwater tables. • Attract investments for desalinization of seawater for human use, blue forestry and urban greening, and food security interventions. • Advance wastewater reuse and recycling technologies at the municipal and industry level.

4 MEANS OF IMPLEMENTATION

Namibia would need funding, capacity development and technology transfer to fully implement the mitigation and adaptation measures found in this NDC. This section presents an overview of the means of implementation across finance, capacity building, and technology.

Costing each action involved identifying the cost for sub-actions, including upfront capital costs (e.g., infrastructure), ongoing maintenance costs, capacity-building or training, and the human resources needed to implement the action. A further desk review included an assessment of similar actions previously completed within the country, at national and/or subnational levels.

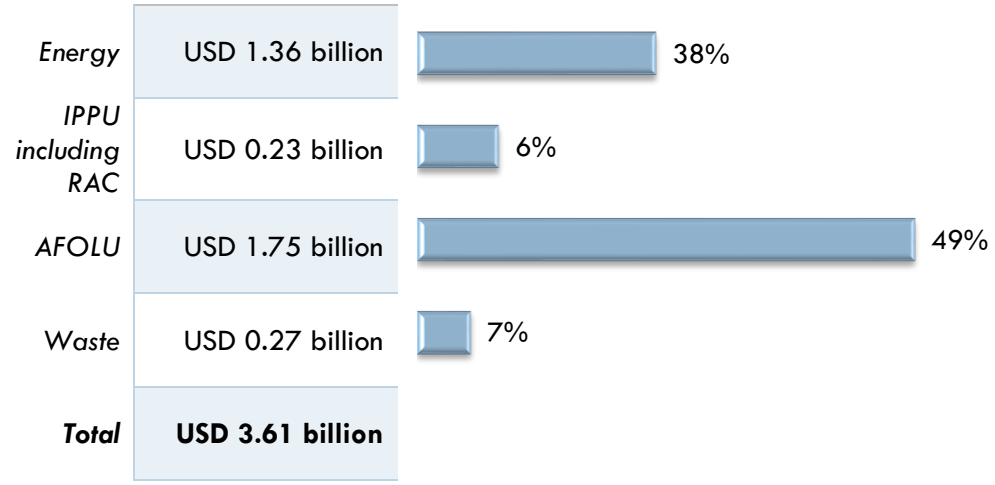
It is important to note that costs for some actions may change over time; it may be necessary to reconsider cost estimates as new information comes to light. For example, costs may decrease over time due to falling technology costs or barriers being removed by relevant policies.

4.1 Mitigation Funding requirements

Figure 4.1 provides an estimated $3.61 billion in funding required for any identified mitigation options by 2030. These represent the requisite capital investment costs for equipment and infrastructural resources. Investment levels for each sector are roughly equal to the projected mitigation shares for each emitting sector. AFOLU accounts for 49% of the total funding requirements for the 2020-2030 timeline. Investments in energy

facilities account for the bulk of the remaining requirement. The AFOLU (49%) and energy sector (38%) mitigation actions require the most funds and these are mostly conditional upon international support.

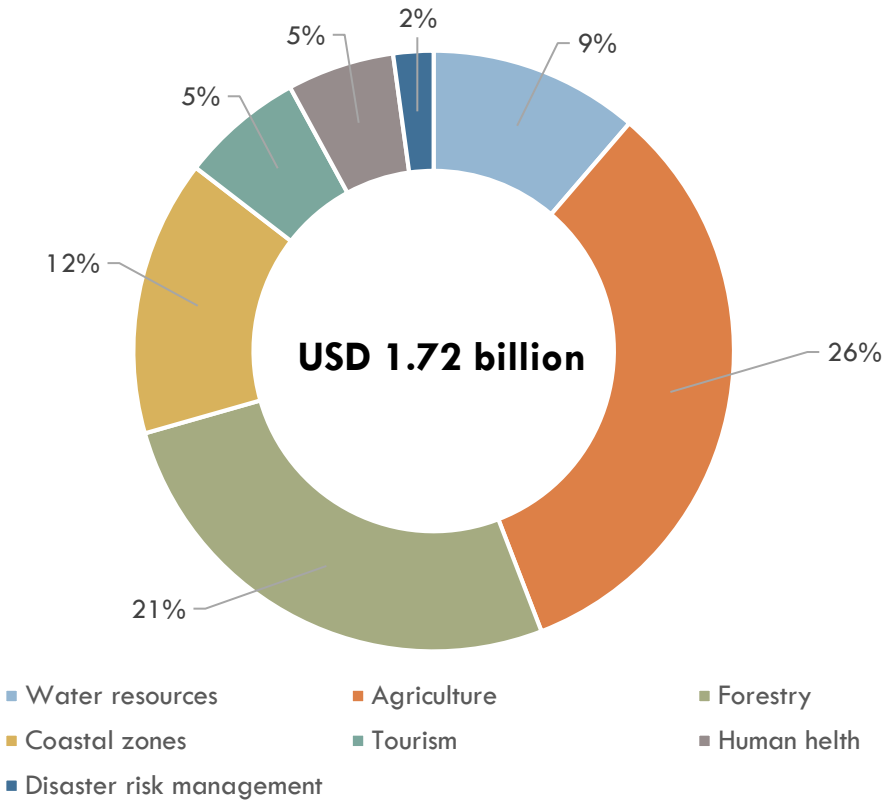
FIGURE 4.1. MITIGATION INVESTMENT REQUIREMENTS FOR ALL MEASURES.



4.2 Adaptation funding requirements

The following figure 4.2 summarises the financial needs by sector in the adaptation as reported by each Ministry. The total financing needed for adaptation actions is just over USD 1.72 billion. The largest funding is required for agriculture (26%, USD 564 million), forestry (21%, USD 454 million), and coastal zones (12%, USD 255 million). Most of the requested funding depends on international support.

FIGURE 4.2. SUMMARY NEEDS FOR ADAPTATION ACTIONS.



4.3 Finance

Financial needs remain high amid ongoing efforts. Most actions that need financing and mobilisation of future resources will be a fair blend of national and foreign funds. The estimated net cost for the established NDC mitigation measures is expected to be about 3.61 USD billion and more than USD 1.72 billion for adaptation goals, reflecting a combined requirement of about USD 5.33 billion in financing. Table 4.1 summarises the approximate worth of the finance needed over the next ten years. The unconditional measures make up 10 per cent of the overall projected support and for the conditional measures 90%.

TABLE 4.1. ESTIMATED MITIGATION AND ADAPTATION FINANCE NEEDED.

	Mitigation measures (USD)	*Adaptation measures (USD)*	*Total (USD)*
Unconditional	0.36 billion	0.17 billion	0.53 billion
Conditional	3.25 billion	1.55 billion	4.80 billion
Total (USD)	**3.61 billion**	**1.72 billion**	**5.33 billion**

Extensive research and consultations with sectoral leads were conducted as part of the NDC revision phase to generate conditional and unconditional cost forecasts for mitigation and adaptation steps from 2020 through 2030. The overall expected cost of the NDC mitigation defined by Namibia by 2030 is estimated to be about USD 3.61 billion and USD 1.72 billion for adaptation goals, reflecting a total finance need of about USD 5.33 billion (*approximately* ***77 billion Namibia dollars***) (Table 4.1).

4.4 NDC financing strategy

Finance is critical for the implementation of the mitigation and adaptation actions set out in Namibia's updated NDC. International public financing sources will provide the large-scale investment needed. Strengthening finance from domestic and external sources will also be key in supporting the implementation of the mitigation and adaptation actions.

Similarly, this NDC update includes conditions for their full implementation, such as additional or enhanced international support in the form of finance, technology transfer, technical assistance and capacity-building. Improving access to public and private financing sources is, therefore, a high priority for Namibia.

Meeting the additional investment and financial flows would require a combination of:

- commitments by developed countries to provide additional financial assistance to developing countries under the Convention;
- appropriate national policies to encourage private investment and domestic government investment in mitigation and adaptation measures;
- optimal use of the funds available under the Convention and from other sources to spread the risk across public and private sources;
- expansion of the carbon market through more stringent commitments by Annex I Parties to increase demand and possible additional mechanisms to increase supply; and
- new sources of predictable funds to provide additional external financial flows to developing countries for adaptation and mitigation.

If the funding available under the financial mechanism of the UNFCCC remains at its current level and continues to rely mainly on voluntary contributions, it would not be sufficient to address the estimated future financial flows needed for mitigation and adaptation. However, with the right policies and/or incentives, a substantial part of the required additional investment and financial flows could be covered by currently available sources. National policies can assist in shifting investments and financial flows made by private and public investors into more climate-friendly alternatives and optimizing the use of available funds by spreading the risk across private and public investors. Improvement in, and an optimal combination of mechanisms, such as the carbon markets, financial mechanism of the Convention, ODA, national policies and, in some cases, new and additional resources– will be needed to mobilize the necessary investment and financial flows to address climate change.

4.5 Barriers and Opportunities towards the NDCs implementation

The implementation of mitigation actions faces multiple barriers in various areas such as institutional, organisational, financial and technology technological issues. There is an urgent need to improve the enabling environment for tracking climate change activities. Many barriers have been removed in recent years to speed up the implementation of mitigation projects. The existing challenges cannot be addressed alone, and coordinated and concerted efforts of all partners are needed. It is for this reason that Namibia has joined the NDC Partnership, and we believe that it will be a valuable partnership to assist the country to achieve NDC targets and contribute to the overall goals outlined in the Paris Agreement.

Investment in climate mitigation activities will be associated with high perceived and actual risks related to environmental, technological, financial, and regulatory uncertainties. Namibia will explore various de-risking instruments that include insurance, guarantees and derivative-based products, as tools that can directly improve the risk-return profile in favour of low carbon technologies.

It is also expected that the technical and financial support provided by the NDC Partnership will facilitate the closure of information gaps in areas that are critical to determining the status and effectiveness of the NDCs. Assessment and evaluation of essential baseline data and variables, such as GDP, industrial production, population, consumption, expenditure, land-use, soil quality, water quality, precipitation and evaporation are critical fields. In essence, the NDC partnership plan is to make provision for the collection of baseline data as well as the expansion of tracking and monitoring data related to the various aspects of the NDC implementation process.

4.5.1 Energy

Namibia has significant renewable energy potential and has taken steps to direct investment and creating an enabling environment for private sector investment in renewables. Namibia's transport is dominated by the road component for both passengers and goods. Taking into consideration the extended geographic nature of the country with low population densities outside its urban areas, there is little prospect for the transport landscape to change in the short or medium term.

4.5.2 IPPU including RAC.

In the cement industry use of extenders and other materials to replace GHG-intensive clinker has been one way of reducing the GHG intensity of cementitious products. The challenge is that the long-term properties of these products are not known. This makes it difficult to find an appropriate "properties" metric to use as the denominator.

For the RAC sector the main barriers hindering the uptake of highly efficient, low-GWP RAC appliances include 1) The absence of market guidance and/or incentives for investment in energy-efficient and climate-friendly products, 2) Standardised technician training regarding maximisation of energy efficiency and safe-handling and installation of climate-friendly (natural) refrigerants which are flammable and/or toxic limited and requires

strengthening and expansion, 3) Lack of a standardised MRV system, 4) Lack of public awareness of climate-friendly refrigerant alternatives, such as natural refrigerants, 5) Current lack of financial mechanisms to support the replacement of high-GWP and inefficient units.

4.5.3 AFOLU

Implementing mitigation actions in the AFOLU sector is challenging given a lack of data and complexities associated with multiple stakeholders at multiple scales. Land ownership coupled with high financial costs, a harsh arid climate, lack of technology and capacity are some of the challenges facing Namibia.

4.5.4 Waste

Limited waste is generated in Namibia (due to a small population). There are long distances between the municipalities making it expensive to transport waste. There is also inadequate waste characterisation. Viable waste to energy projects requires access to reliable and suitable feedstock which, given the current system, presents may present a potential barrier. Finally, administrative, and technical capacity requirements tend to be quite high.

Namibia is aware that the implementation of our NDC presents several challenges, particularly in terms of financial and technological resources. Substantial funding is required to enable Namibia to meet its pledges. Namibia, as a developing country, faces numerous difficult challenges to maintain the welfare of its population. As such, the country will not be able to allocate adequate funding to meet the climate change agenda, even if this is of prime importance to it. Efforts, including incentives to attract private investors, have been deployed to bring in the funds needed.

5 MONITORING, REPORTING AND VERIFICATION FOR NDC TRACKING

5.1 MRV systems in Namibia

Namibia's efforts will undoubtedly contribute to the global efforts to mitigate the adverse impacts of climate change. In this context, the country is strengthening the existing institutional arrangements, to ensure a robust and transparent climate action that would enable to build a vibrant national Measurement, Reporting and Verification system (MRV). The system is expected to harmonize and track all data needs of the relevant local and international stakeholders. It is to comprise of the following components: mitigation, adaptation, GHG inventory, support received, and support needed.

5.1.1 Barriers and Opportunities to MRV

Namibia presented conceptual MRV systems in its BUR1 and BUR2, with the intent of implementing the same. To date, some progress has been recorded but this is still insufficient to meet the reporting requirements. Recognising this gap in the reporting framework, this is a very urgent item on the agenda of the country and is considered of utmost importance in the near future, in line with the revision of the NDC and its implementation post-2020.

Based on the collection of data and other information for producing the last 3 GHG inventories and mitigation and needs chapters of the 3 BURs, it is evident that the present institutional arrangements for the MRV of Emissions (GHG inventory) are still weak and need strengthening while the MRV for Mitigation and Support are still in their infancies. Further work, brainstorming and consultation with stakeholders has led to the design of an improved MRV concept which will take on board objectively performing institutional arrangements to make the systems functional in the coming years, after appropriate capacity building. The proposed new concepts for the 3 MRV systems are presented in the BUR3, the intent being to meet the requirements of the Paris Agreement (PA).

Efforts have been deployed to develop the MRV systems and build capacity domestically to sustainably assess and report emissions, mitigation actions, including emissions reductions and support needed and received within the framework of the UNFCCC. Progress has been made but there remain challenges relating to:

- Systematic availability of all data required for the UNFCCC reports;
- Sufficiency of resources to implement the MRV components exhaustively;
- Adequate capacity to undertake mitigation assessments; and
- Formalised roles and responsibilities of institutions and individuals for accountability.

5.1.2 MRV Capacity Needs

A major gap identified is the inability of the system to effectively aggregate the cumulative effects of individual mitigations and adaptation actions as well as evaluating policy measures. The following capacity building needs were identified:

- Training on the latest IPCC, UNFCCC guidelines, data processing.
- Capacity-building on GHG data management and institutional arrangements.
- Continuous training of GHG experts, especially new experts on GHGs at the international level; and
- Assessment and monitoring of the effects of GHGs on the policy level for mitigation and adaptation actions.

5.2 Institutional arrangements to track NDC implementation.

An effective MRV system is necessary to successfully implement Namibia's NDC, which enables the country to monitor the effectiveness of its mitigation and adaptation measures and facilitates access to climate finance. Following the national institutional framework for climate change management, the climate change unit in the Ministry of Environment, Forestry and Tourism is responsible for tracking progress. The Project Management Unit coordinates the day-to-day issues related to the development of reports. Sector leads have been identified for each of the IPCC sectors, see Figure 5.1. The working group members are currently responsible for collecting and providing activity data from their sectors. Namibia Statistics Agency (NSA) has played a key role in providing key national statistics, especially on imports and exports of commodities. Currently, data archiving is done by the MEFT, however, discussions have started to have this task under the NSA. Current existing institutional arrangements are depicted in Figure 5.1.

FIGURE 5.1. INSTITUTIONAL ARRANGEMENTS FOR NDC TRACKING.

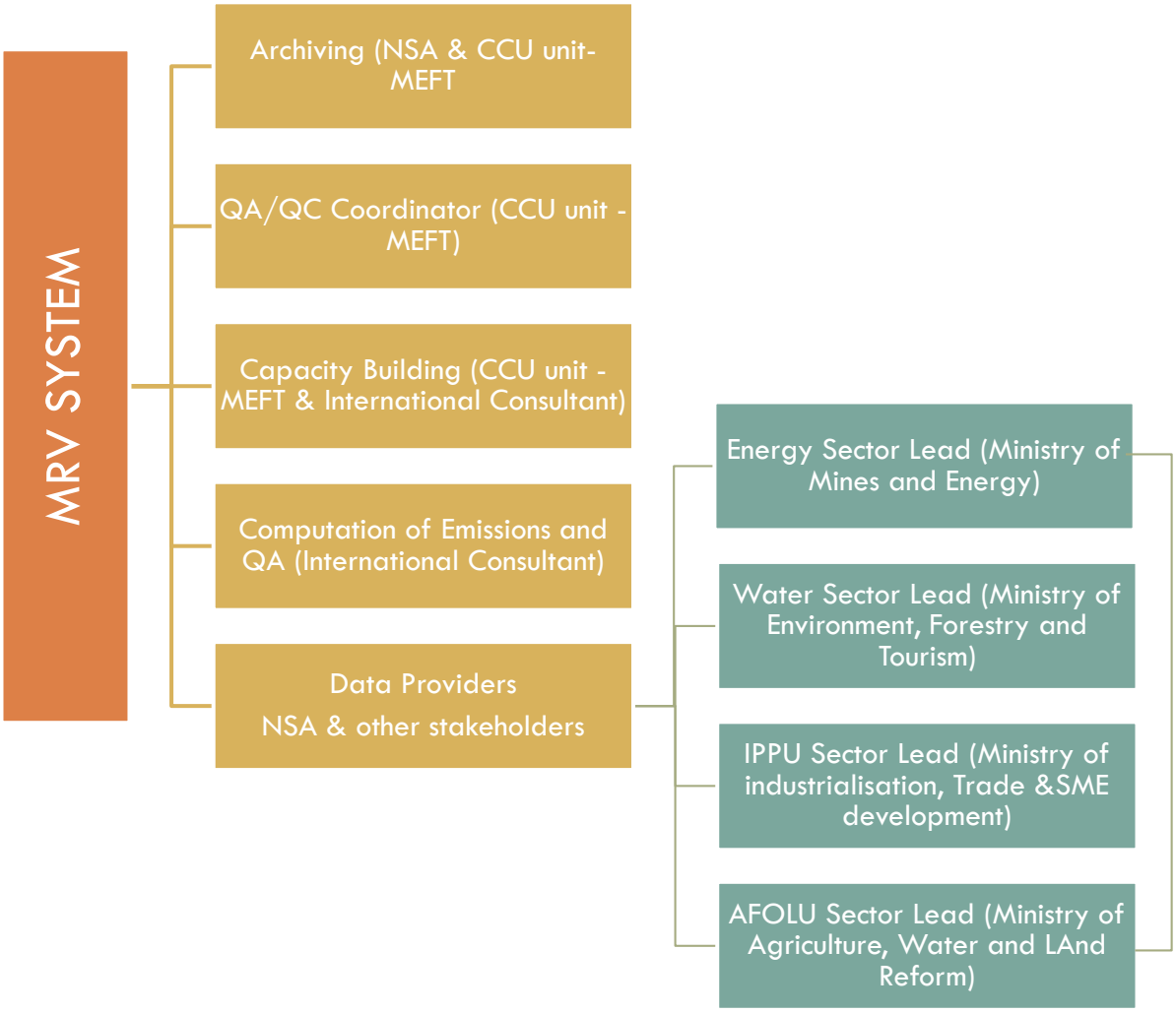


Table 5.1 summarises Namibia's framework for tracking and reporting on the progress of implementing the mitigation and adaptation goals outlined in this NDC. It summarises the institutions' roles and responsibilities to guide and support the implementation of NDC MRV at the national level including policy and strategic decision levels.

TABLE 5.1. INSTITUTIONAL ARRANGEMENTS FOR NAMIBIA'S NDC MRV MANAGEMENT: RESPONSIBILITIES AND ROLES IN CLIMATE CHANGE MANAGEMENT.

Name of Stakeholder	Current role in climate change management
Ministry of Environment, Forestry and Tourism (MEFT)	Responsible for coordinating, managing climate change issues in the country and implementation of the UNFCCC. The MEFT is also responsible for the coordination of the transposition and implementation of environmental laws in the field of environmental and climate change. The MEFT is the coordinator of the GHG emissions Inventory and is the lead for the estimates of the Waste Sector.
National Climate Change Committee (NCCC)	The multi-sectoral National Climate Change Committee (NCCC) consisting of representatives from relevant ministries and other stakeholders including the private sector, NGOs, academia and implementing partners, oversees the implementation of the climate change policy, including the preparation of National Communications (NC) and Biennial Update Reports (BUR)
Ministry of Mines and Energy (MME)	The ministry is in charge of monitoring and reporting in the key sectors relevant to climate change mitigation including energy management, energy efficiency and renewable energy. GHG inventory lead for the Energy sector, including mitigation. Involved in data collection and transmission activities
Ministry of Water, Agriculture and Land Reform (MAWLR)	It oversees monitoring and reporting in key sectors of climate change mitigation (AFOLU) and adaptation in agriculture, forestry, and water management. GHG inventory lead for AFOLU Sector, including mitigation. Already involved in data collection and transmission activities.
Ministry of Industrialisation Trade and SME Development (MITSMED)	It oversees monitoring and reporting on IPPU adaptation and mitigation. GHG inventory lead for IPPU Sector. Already involved in data collection and transmission activities.
Office of the Prime Minister	Member of NCCC and technical working groups.

Name of Stakeholder	Current role in climate change management
Environmental Investment Fund (EIF)	Fund supporting the protection of the environment, its biological diversity and ecological life-support functions; and the promotion of sustainable natural resources use for economic development by supporting green and environmental enterprises. Expertise in gender. Its gender policy is aimed at contributing to better health for both women and men, through health research, policies and programmes which give due attention to gender considerations and promote equity and equality between women and men. Member of NCCC and responsible for resource mobilization for NCCC.
National Planning Commission (NPC)	Responsible for all national planning activities.
Namibia Statistics Agency (NSA)	Has the national legal mandate to collect and archive all national data; hence they will be a crucial stakeholder for sex-disaggregated data collection in the project. Key data provider of the GHG emissions inventory, archiving and socio-economics scenarios. Already involved in data collection and transmission activities.
Namibia Agronomic Board (NAB)	AD and info on agriculture, fertilizer and practices. Already involved in data collection and transmission activities.
Civil aviation office	Data provider of the GHG emissions inventory on LTOs and bunkering Already involved in data collection and transmission activities.
Ministry of Mines and Energy (MME)	Data provider for mitigation and adaptation policies, specifically responsible for information on energy policies and electricity generation.
Namibia Roads Authority (NRA)	Data provider of the GHG emissions inventory on vehicles and road transport. Already involved in data collection and transmission activities.
Namibia Airports Authority (NAA)	Data provider of the GHG emissions inventory on civil aviation. Already involved in data collection and transmission activities.
Agribank of Namibia	Loan provider

Name of Stakeholder	Current role in climate change management
Meat Cooperation of Namibia (Meatco) (Parastatal)	Data provider of the GHG emissions inventory on the livestock sector. Already involved in data collection and transmission activities.
National Commission on Research Science and Technology	Research clearance
Namibia Meteorological Services	Data provider on adaptation. Promotes the application of meteorology to aviation, maritime operations, water resources, agriculture, health, energy, tourism, environment and other sectors of the national economy. To acquire and preserve Namibia's national climate data for use by the present and future generations and posterity.
City Council of Windhoek	Data provider of the GHG emissions inventory and mitigation on the waste sector. Already involved in data collection and transmission activities.
TransNamib	Data provider of the GHG emissions inventory on rail transport. Not involved in data collection and transmission activities.
Nampower	Data provider of the GHG emissions inventory on electricity generation. Already involved in data collection and transmission activities.
Namibian Dairies	Data provider of the GHG emissions inventory on information on cattle feeds. Already involved in data collection and transmission activities.
Ohorongo	Information on carbon emissions related to Portland clinker production. Already involved in data collection and transmission activities.
Ohlthaver & List Group of Companies	Data provider of the GHG emissions inventory on the IPPU sector. Already involved in data collection and transmission activities.

Name of Stakeholder	Current role in climate change management
Development Bank of Namibia	Provides finance for larger enterprises in key economic sectors that are expected to deliver development impact, economic activity and employment. The Bank finances previously disadvantaged Namibians and women entrepreneurs. The DBN has been instrumental in availing climate mitigation funding to non-state actors.
University of Namibia	Develop national emission factors. Already involved in data collection and transmission activities.
Namibia University of Science & Technology	Develop national emission factors. Already involved in data collection and transmission activities.
Namibia Energy Institute	Serves as a national information resource base for sustainable energy use and management. Already involved in data collection and transmission activities.
International University of Management (IUM)	Already involved in data collection and transmission activities.
Desert Research Foundation	Studies and surveys for GHG inventory and EFs
Namibia Medical Society	Works towards cost-effective and efficient health service provision to the people of Namibia through the existing medical capacity and capability.
Red Cross Society	Support gender-responsive disaster management and humanitarian action related to climate change.
The Namibian Association of Community Based Natural Resource Management (CBNRM) Support Organisations (NACSO)	As an association comprising 8 Non-Government Organisations (NGOs) and the University of Namibia, NACSO provides services to rural communities seeking to manage and utilise their natural resources in a sustainable manner. Could provide support on the linkages between gender and climate change.
Integrated Rural Development and Nature Conservation	Works towards improving the lives of rural people by diversifying the socio-economy in Namibia's communal areas to include wildlife and other valuable natural resources. Provides capacity building training with a focus on building women's leadership skills.
Namibian Development Trust	Seeks to ensure improved livelihoods and empower rural communities
Media Institute of Southern Africa (NAMIBIA)	MISA is a media institute, providing media and literacy training and access to information.

Name of Stakeholder	Current role in climate change management
NBC	As the public broadcaster of Namibia, NBC is uniquely positioned to increase the awareness of the public on climate change mitigation, adaptation and reporting.
FAO	Supports strengthened capacity for disaster risk reduction, resilience building and climate change adaptation and mitigation in Namibia
IOM	IOM is the leading inter-governmental organization in the field of migration, and works on climate change-induced migration.
UNIDO	Specialized agency of the United Nations promoting industrial development for poverty reduction, inclusive globalisation, and environmental sustainability.
GIZ	Specialized agency of the German cooperation for supporting climate action in developing countries.
Friedrich-Ebert Stiftung	Promotes democracy, development, social justice and peace through capacity-building, policy research, public dialogue, and international exchange. Commissioned research on youth and climate change in Namibia.

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7 APPENDICES

Appendix 1: Detailed Mitigation Measures

No.	Mitigation action	Baseline and targets	Sector	GHG mitigation potential - Mt CO2e	% of BAU scenario in 2030	Finance costs (USD)	Conditionality
1	**Renewable Energy Feed-in Tariff (REFIT)**	170 MW PV - replacing imports plus Ruacana	Energy	0.24621	1.01878	USD 100,000,000	Unconditional
2	**Solar Rooftop systems**	45 MW PV - replacing imports	Energy	0.01575	0.06517	USD 130,000,000	Unconditional
3	**Embedded generation**	13 MW PV replacing imports	Energy	0.00455	0.01883	USD 168,000,000	Unconditional
4	**Solar power generation**	Omburu 20 MW PV - replacing imports & 20 MW Solar IPP Power Plant	Energy	0.01400	0.05793	USD 185,000,000	Unconditional
5	**Wind power generation**	Luderitz Wind 40 MW replacing imports & 50 MW Wind IPP Power Plant	Energy	0.02178	0.09012	USD 70,000,000	Unconditional
6	**Biomass Energy plant**	40MW - replacing imports	Energy	0.02854	0.11809	USD 50,000,000	Conditional
7	**Hydropower generation**	Baynes Hydro 300 of 600 MW	Energy	0.20125	0.83274	USD 69,000,000	Unconditional
8	**Solar water heaters**	Through the Solar Thermal Road Map install 20 000 SWH	Energy	0.01700	0.07034	USD 250,000,000	Unconditional
9	**Passenger vehicle fuel efficiency standards**	Promote passenger vehicle fuel efficiency standards in 80 % of total passenger vehicle	Transport	0.61400	2.54063	USD 40,000,000	Unconditional

No.	Mitigation action	Baseline and targets	Sector	GHG mitigation potential - Mt CO2e	% of BAU scenario in 2030	Finance costs (USD)	Conditionality
		population by 2030					
10	**Electric Vehicles**	10 000 Electric Vehicles - replacing gasoline	Transport	0.00700	0.02896	USD 50,000,000	Conditional
11	**Fuel switching**	Hydrogen replacing diesel	Transport	0.94600	3.91440	USD 42,000,000	Conditional
12	**Light-duty vehicles (LDV)**	Reducing fuel use by 20%	Transport	0.6840	2.83028	USD 150,000,000	Unconditional
13	**Replace clinker**	Replace 23% clinker in cement production	Industry	0.10400	0.43034	USD 50,000,000	Unconditional
14	**Split residential air conditioners**	Switch to R290 (propane)	RAC	0.01497	0.06194	USD 16,000,000	Conditional
15	**Car air conditioning**	Safe disposal of old car ACs	RAC	0.00018	0.00074	USD 35,000,000	Conditional
16	**Domestic refrigeration**	Switch to R600a (isobutane) and safe disposal of old refrigerators	RAC	0.00115	0.00476	USD 90,000,000	Conditional
17	**Commercial refrigeration (Stand-alone equipment)**	Switch to R290 (propane) and R744 (CO_2) and safe disposal of old equipment	RAC	0.00293	0.01212	USD 20,000,000	Conditional
18	**Commercial refrigeration (Condensing units)**	Switch to R290 (propane) and R744 (CO_2) and safe disposal of old equipment	RAC	0.01145	0.04738	USD 15,000,000	Conditional
19	**Reduce deforestation**	By 2030 reduce deforestation rate by 75 %	Forestry	13.53700	56.01394	USD 250,000,000	Conditional
20	**Reforestation**	Reforest of 20,000 ha per year	Forestry	1.77900	7.36122	USD 300,000,000	Conditional

No.	Mitigation action	Baseline and targets	Sector	GHG mitigation potential - Mt CO2e	% of BAU scenario in 2030	Finance costs (USD)	Conditionality
21	**Savanna grassland restoration**	Restore 15.5 million ha of grassland savanna and soil carbo	Restoration	2.30000	9.51703	USD 400,000,000	Conditional
22	**Agroforestry practice**	Plant 10,000 ha of trees per year under Agroforestry	Forestry	0.35800	1.48135	USD 600,000,000	Unconditional
23	**Urban Forestry**	Plant 5,000 ha of trees under Urban Forestry	Forestry	1.05600	4.36956	USD 260,000,000	Unconditional
24	**Municipal Solid Waste (MSW) transformation**	Transform 70% MSW to electricity and compost	Waste	0.01970	0.08152	USD 120,000,000	Conditional
25	**Waste recycling**	Increase Recycling of plastic waste and e-waste by 70%	Waste	0.00160	0.00662	USD 50,000,000	Conditional
26	**Methane net zero emissions**	Methane net zero emissions by 2050 (achieve 75% of the target by 2030)	Waste	0.01010	0.04179	USD 100,000,000	Conditional

TOTAL MITIGATION FUNDING REQUIREMENT: **USD 3, 610, 000, 000** (approximately 3.61 billion US dollars)

Appendix 2: Detailed Adaptation Measures

No.	Adaptation action	Ministry	Co-benefits (mitigation, environmental, social)	Finance costs (USD)	Conditional/ Unconditional	Gender	Youth	Private sector	SDGs
Water resources									
1	**Provide full support for integrated water resources management**	Ministry of Agriculture, Water and Land Reform.	• Sustainable management of water resources • More positive and water conservative attitudes and practices • Cross-sectoral use of water monitoring and management data	USD 17,600,000	Unconditional	• Establishment of well-defined gender-inclusive mandates with responsibilities for the implementation of many of the elements of the IWRM Framework.	• Empower youth and define mechanisms to enable their engagement and integration of different water resources management processes	• Partner with the government on investment for key water infrastructure projects, including rehabilitation and modernization of existing infrastructure.	2, 5, 12, 13
2	**Establish best practice systems for improving the efficiency of water use**	Ministry of Agriculture, Water and Land Reform.	• Decrease in water losses and wastages • Decrease in water costs	USD 15,000,000	Unconditional				
3	**Coordinate use of surface and groundwater resources and artificially increase the recharge rate of groundwater aquifers to reduce evaporation**	Ministry of Agriculture, Water and Land Reform.	• Improved allocation between users and uses; • Decrease in pressure and treatment of other water resources • Stimulation of water-saving and use efficiency	USD 7,200,000	Unconditional				

No.	Adaptation action	Ministry	Co-benefits (mitigation, environmental, social)	Finance costs (USD)	Conditional/ Unconditional	Gender	Youth	Private sector	SDGs
4	**Improve water demand management, particularly at the local level and in the agricultural, industrial, mining and tourism sectors**	Ministry of Agriculture, Water and Land Reform.	• Improvement in synergy and engagement between/among water users • Improved water allocation and abstraction limits • Improved productivity	USD 17,400,000	Conditional				
5	**Monitor and control groundwater use more strictly**	Ministry of Agriculture, Water and Land Reform.	• Reduced losses and wastages • Improved productivity	USD 58,275,000	Unconditional				
6	**Prioritize seawater desalination**	Ministry of Agriculture, Water and Land Reform.	• Diversification of water supply. • Increased resilience to reduce per capita freshwater availability. • Provision of safe drinking water due to the high quality of output water. • Decrease in pressure and treatment on other water resources	USD 78,650,000	Conditional				
Agriculture									
7	**Promoting diversification of crops to hedge against erratic rainfall and shorter seasons**	Ministry of Agriculture, Water and Land Reform.	• Increased resilience to climate change and natural disasters • Promotion of climate-friendly agriculture business value chain	USD 19,500,000	Conditional	• Inclusion of gender considerations in climate agriculture initiatives	• Engagements and investments in climate-smart agriculture targeting youths both in		2, 5, 12, 13, 14,15

No.	Adaptation action	Ministry	Co-benefits (mitigation, environmental, social)	Finance costs (USD)	Conditional/ Unconditional	Gender	Youth	Private sector	SDGs
	(Climate Smart Agriculture)		• Sustained/increased productivity and profitability				urban and rural areas.		
8	**Development of improved crop varieties that adapt to climate change (Climate Resilient Agriculture)**	Ministry of Agriculture, Water and Land Reform.	• Improved plant genetics • Increased resilience to climate change and natural disasters • Improved food production	USD 24,750,000	Conditional				
9	**Enhancing access to farming inputs (i.e. seed and fertilizer) availability and maintain consistency in yields (Climate Resilient Agriculture)**	Ministry of Agriculture, Water and Land Reform.	• Increased productivity facilitates reduced deforestation and helps the integrity of forests which are important carbon sinks • increase the carbon sequestration potential of agricultural soils by contributing to their building up of soil organic matter (SOM).	USD 26,250,000	Conditional				

No.	Adaptation action	Ministry	Co-benefits (mitigation, environmental, social)	Finance costs (USD)	Conditional/ Unconditional	Gender	Youth	Private sector	SDGs
10	**Promote protected cultivation and improved planting methods for enhancing water use efficiency and crop productivity (e.g. greenhouses, net houses, mulching, spot planting/zero tillage) (Climate Resilient Agriculture)**	Ministry of Agriculture, Water and Land Reform.	• Increased productivity facilitates reduced deforestation and helps the integrity of forests which are important carbon sinks	USD 9,817,500	Conditional				
11	**Promote the use of water targeting only irrigation of high-value crops (Climate Resilient Agriculture)**	Ministry of Agriculture, Water and Land Reform.	Water conservation and increased availability in other sectors	USD 12,925,000	Conditional				

No.	Adaptation action	Ministry	Co-benefits (mitigation, environmental, social)	Finance costs (USD)	Conditional/ Unconditional	Gender	Youth	Private sector	SDGs
12	**Promoting climate resilience in livestock management through strategies such as the creation of fallback grazing areas and mixing small and large stock herds of various breeds (Climate Smart Agriculture)**	Ministry of Agriculture, Water and Land Reform.	• Reduced land degradation • Improved pasture and agroforestry practices	USD 283,306,375	Conditional				
13	**Enhance integrated pest management as an ecosystem approach to crop production and protection (Climate Resilient Agriculture)**		• Decreases negative impacts on the broader ecosystem, making farming systems more resilient to climate change. • Revitalises the important role of extension, research and the public and private sectors for pest forecasting, surveillance, detection and control, as these are vital services to increase resilience.	USD 120,000,000	Conditional				

No.	Adaptation action	Ministry	Co-benefits (mitigation, environmental, social)	Finance costs (USD)	Conditional/ Unconditional	Gender	Youth	Private sector	SDGs
14	**Improvement of support services and capacity building to crop production resilient to climate change by promoting research, trials and up-scaling climate-smart farming systems that increase resilience to climate change.**		• Improved knowledge, capacity and buy-in by other agricultural sector players • Job creation and improved capacity of youth involved in the agriculture business	USD 3,784,600	Unconditional				
Forestry									
15	**Promote savanna restoration through bush thinning for increased land productivity, improved food security, improved groundwater recharge and increased biodiversity**		• Improved food security and water management; • Conservation of biodiversity	USD 240,000,000	Conditional	• Facilitate affected women's participation in decision making, thereby assuring that their points of view on forest use are taken into account. • Promote and increase women's equal participation via gender goals or affirmative action.	Engagements and active participation of youth in sustainable forestry initiatives, adaptation, and policy reforms.	• Promote and engage the private sector to monitor rates of deforestation and share with affected and interested stakeholders (e.g., scientists, land managers, traditional	

No.	Adaptation action	Ministry	Co-benefits (mitigation, environmental, social)	Finance costs (USD)	Conditional/ Unconditional	Gender	Youth	Private sector	SDGs
16	**Bush biomass utilization and value addition (Bush based animal feed production, biochar application, drought resilience, improved food security, bush-to-energy, employment & income creation)**		Biodiversity conservation	USD116,000,000	Conditional	• Include gender indicators in forestry management monitoring and evaluation.		authorities, policymakers, general public, etc)	
17	**Support agroforestry interventions to ensure food security (biomass of fodder, meat and Non-Timber Forest Produces (NTPs)) in Namibia's most vulnerable communities.**		Shade provision, soil fertilization, fruit production, or timber value, because they provide diversified habitats, income sources, and allow alternative adaptation	USD 98,000,000	Unconditional				
Coastal zone and fisheries									

No.	Adaptation action	Ministry	Co-benefits (mitigation, environmental, social)	Finance costs (USD)	Conditional/ Unconditional	Gender	Youth	Private sector	SDGs
18	**Introduce legislation to reduce property and infrastructure development in environmentally sensitive areas and areas at risk of sea-level rise**	Ministry of Fisheries and Marine Resources	• Reduced pollution • Conservation of marine ecosystems	USD 14,962,500	Conditional	1. Enhancement of understanding of gender differences and addressing inequities. These are critical for improving the effectiveness and sustainability of marines and fisheries. 2. Gender engagement in addressing constraints to improving gender equity and equality in coastal zones and fisheries • Engagement and active involvement of women in potential adaptation actions including building adaptive capacity through education and information, protecting property or land, increasing awareness of impacts, maintaining well-being, sustaining economic growth, or taking advantage of new opportunities.		2. Comprehensive regulatory framework for environmental protection and sustainable development is in place. Most of the country's coastal areas are protected, national parks and significant areas of the EEZ have restrictions in place regarding access to and the use of natural marine resources. There are existing structures and procedures to monitor industry activities and the exploitation of natural marine and coastal resources. • The National	1, 4, 5, 13
19	**Research and monitor sea-level rise**	Ministry of Fisheries and Marine Resources	• Keeping track of ocean and coastal areas—monitoring and assessing how these areas are changing—will facilitate keeping coastal communities, economies, and ecosystems healthy. • Environmental observations and forecasts • Early detection of water pollution and rapid response • Risk assessment data for pollution impact	USD 33,000,000	Conditional				
20	**Undertake vulnerability mapping**	Ministry of Fisheries and Marine Resources	Guidance on climate change planning and support of resilience to anticipated climate change by enhancing understanding of planners of the nature	USD 8,662,500	Conditional				

No.	Adaptation action	Ministry	Co-benefits (mitigation, environmental, social)	Finance costs (USD)	Conditional/ Unconditional	Gender	Youth	Private sector	SDGs
			of vulnerability to climate change			• Monitoring gender balance in fisheries and aquaculture production • Timely decision-making processes for mitigation and adaptation to climate change. These are crucial to avoid the costs of inaction and to ensure environmental, social and economic sustainability of seafood production.		Policy on Coastal Management for Namibia, states that one of the policy implementation strategies is to improve the resilience of coastal systems to climate and environmental change. • Develop a blue economy strategy or policy. • Ensure clear roles and responsibilities in government administration and management of coastal areas • Investment in crucial infrastructure and research as well as research and development	
21	**Collaborate with the insurance market to guide investment in coastal areas**	Ministry of Fisheries and Marine Resources	• Adequate risk assessment and eventuality planning and adaptation • Better understanding of climate change property risks and appropriate cover	USD 11,134,600	Unconditional				
22	**Develop an early warning system**	Ministry of Fisheries and Marine Resources	• Preparation of diverse sectors and communities for climate-related events • Protection of human lives, biodiversity, infrastructure and property, land, jobs and supports long term sustainability • Facilitate public and private sectors in planning, protecting economies and saving money in the long run.	USD 30,250,000	Conditional				
23	**Rehabilitate wetlands and estuaries**	Ministry of Fisheries and Marine Resources	• Restoration of ecosystems and conservation of biodiversity • Water pollution remediation and reduction	USD 48,000,000	Conditional				

No.	Adaptation action	Ministry	Co-benefits (mitigation, environmental, social)	Finance costs (USD)	Conditional/ Unconditional	Gender	Youth	Private sector	SDGs
24	**Install sea walls barriers and barrages**	Ministry of Fisheries and Marine Resources	• Protection of infrastructure and property • Reduced replacement, maintenance and insurance costs	USD 113,300,000	Conditional				
Tourism									
25	**Promote sustainable tourism and provide capacity building for climate change innovation in Namibia's tourism sector.**	Ministry of Environment, Forestry and Tourism (MEFT)	• Lower Ecological Impact • Conservation of biodiversity • Reduction of land, air and water pollution • Support of local communities by direct engagement and stimulating their economies • Environmentally aware and conscious tourists	USD 57,435,000	Conditional	Engage and ensure active participation of women in • discussing policy development, decision-making, and strategies for climate change adaptation and mitigation at all levels of action. • addressing tourism climate change-related issues such as women's employment in tourism, working conditions, women's participation in planning and management, gender roles, women's rights.	Possibility for youth awareness raising engagement and active involvement in tourism-related issues and adaptation in a changing climate. This also includes issues such as assessment of the vulnerability of World Heritage sites to climate change impacts and the potential implications		1,4,5, 13
26	**Implement conservancies, tourism, and adaptation programs based on community-based natural resource management (CBNRM)**	Ministry of Environment, Forestry and Tourism (MEFT)		USD 4,129400	Conditional				

No.	Adaptation action	Ministry	Co-benefits (mitigation, environmental, social)	Finance costs (USD)	Conditional/ Unconditional	Gender	Youth	Private sector	SDGs
27	**Promote community-based natural resource management data collection and archiving**	Ministry of Environment, Forestry and Tourism (MEFT)		USD 3,580,500	Unconditional		for and of tourism. Tourism's positive role in helping to secure the future of many World Heritage sites in a changing climate is to be taken into account.		
28	**Diversify livelihoods in communities dependent on CBNRM initiatives such as Namibian Conservancy Programme and Community Forests.**	Ministry of Environment, Forestry and Tourism (MEFT)		USD 112,640,000	Conditional				
Health									
29	**Strengthen the capacity of health professionals in epidemic preparedness and response**	Ministry of Health and Social Services	• Established mechanisms for developing and implementing an Emergency Risk Management Programme • Competence in the management of the risks of internal and external emergencies, including epidemics; • Adaptation to the specific challenges of an epidemic, whatever the nature of the disease and	USD 15,960,000	Conditional	• Provision for a climate change sensitive gender dimensions of health care (including mental) and health-seeking behaviours. • Consideration of women's and men's relative and different capacities, power, social resilience, vulnerabilities and resources in climate change adaptation strategies. It is	• Awareness raising and conscientisation of the youth of various health-related issues that may arise as a result of climate change. This includes consideration of psychological vulnerabilities such as mental illness,		1, 4, 5, 13

No.	Adaptation action	Ministry	Co-benefits (mitigation, environmental, social)	Finance costs (USD)	Conditional/ Unconditional	Gender	Youth	Private sector	SDGs
			the resources needed, and even in the event of a concurrent emergency			important to note that gender roles and relations can either enable or constrain adaptive capacities. • Identify gender-oriented opportunities to adapt to climate change and to enhance health equity. In addition to putting in place gender-friendly infrastructure, adaptation measures are to address the underlying causes of vulnerability, such as poverty, lack of empowerment, and weaknesses in health care, education, social safety nets and gender equity. • Undertake gender-sensitive assessments and gender-responsive interventions that enhance health and health equity. • Conduct gender-sensitive research,	depression, etc and the need to prepare and build resilience in the face of extreme events due to the changing climate. This also includes climate change effects on physical health and building capacity in the resiliency of communities, families, and young people to climate impacts. • Engagement of youth on adaptation strategies of possible ways communities, youths included, can address anticipated, current, and future climate threats to public health.		
30	**Recruit and train community health workers to provide emergency first aid**	Ministry of Health and Social Services	Personnel are fully aware of their roles in preparing for, and responding to, an emergency, improving community well-being and confidence in the health care system	USD 9,450,000	Unconditional				
31	**Improve staff training on prevention and treatment of malnutrition**	Ministry of Health and Social Services	• Improved local community being wellbeing • Early detection of malnutrition • Greater awareness in the local community in nutrition planning and supplementation • Improved health care system	USD 11,550,000	Conditional				
32	**Enhance and further mainstream climate-related awareness**	Ministry of Health and Social Services	• Better understanding by the local community on health and other impacts of global warming and measures to address climate change	USD 4,830,000	Unconditional				

No.	Adaptation action	Ministry	Co-benefits (mitigation, environmental, social)	Finance costs (USD)	Conditional/ Unconditional	Gender	Youth	Private sector	SDGs
			• Increase in literacy encourages change in attitudes and behaviour. It also enables the local community to adapt to climate change trends			including collection, analysis and reporting of gender data, to better understand the health implications of climate change and climate policies.			
33	**Improve access to timely and relevant information**	Ministry of Health and Social Services		USD 9,450,000	Unconditional				
34	**Strengthen the policies required to effectively address both slow-onset and catastrophic events**	Ministry of Health and Social Services	• Improved health and reduced resources use, • Increased resource efficiency, • Economic security, • Sustainability of ecosystems • Increased economic dynamism	USD 8,610,000	Conditional				
35	**Develop health-centred adaptation strategies**	Ministry of Health and Social Services	• Enhance and further mainstream climate-related awareness • Mitigation of slow onset and catastrophic events (e.g., increase the patient to medical health ratio) • Establishment of a climate-proof the public health system • Strengthened water and sanitation systems	USD 3,025,000	Unconditional				

No.	Adaptation action	Ministry	Co-benefits (mitigation, environmental, social)	Finance costs (USD)	Conditional/ Unconditional	Gender	Youth	Private sector	SDGs
			• Decrease in vector and water-borne diseases (malaria, cholera)						
36	**Climate-proof the public health system**	Ministry of Health and Social Services		USD 13,200,000	Conditional				
37	**Strengthen and provide capacity building for water and sanitation systems**	Ministry of Health and Social Services		USD 23,100,000	Conditional				
Disaster risk management									
38	**Strengthen capacities for disaster risk preparedness, contingency planning and risk reduction**	Ministry of Urban and Rural Development (MURD)	• Establishment of necessary regulatory quality for disaster risk standards to be applied effectively. • Achievement of critical development objectives • Reduced poverty • New partnerships between smallholder farmers and agribusiness. There is potential for more resilient agriculture. Through partnerships, businesses can reduce their losses as well as support the public	USD 577,500	Unconditional	Integrate into the vulnerability and risk assessment gender analysis to establish the different ways in which disasters affect men and women. A full understanding of gender roles and norms is decisive for all vulnerability and risk assessments. Social roles and a gender-specific division of labour lead to different and specific degrees	Through innovative youth-centred approach engagement of youth on the forms of emergency and disaster situations that can occur because of climate change a various preparedness and response actions.		1, 4, 5, 13

No.	Adaptation action	Ministry	Co-benefits (mitigation, environmental, social)	Finance costs (USD)	Conditional/ Unconditional	Gender	Youth	Private sector	SDGs
			sector to more effectively build capacity and reduce disaster risks. • Continual development of institutions, political awareness, financial resources, technology systems, and the wider social and cultural enabling environment • Establishment of early warning systems, designing evacuation strategies			of exposure and vulnerability for women and girls concerning men and boys. Ensure adaptation and risk management policies and practices take into account the dynamic nature of vulnerability and exposure, and directly address the drivers of vulnerability, in particular those related to gender. Ensure women equal participation and capacity-building of women and men are the cornerstones of effective intervention. Resource management capacities of women are an important basis for designing meaningful responses to climate change and disaster prevention, response			
39	**Implement vulnerability and risk mapping**	Ministry of Urban and Rural Development (MURD)	Identification of other vulnerable groups that would otherwise be missed and incorporated into the planning and mitigation/adaptation process	USD 1,102,500	Unconditional				
40	**Improve information flow and communications between formal structures at the national regional and community levels**	Ministry of Urban and Rural Development (MURD)	Increased awareness and effective regulation and dedicated investments in disaster management	USD 1,102,500	Unconditional				

No.	Adaptation action	Ministry	Co-benefits (mitigation, environmental, social)	Finance costs (USD)	Conditional/ Unconditional	Gender	Youth	Private sector	SDGs
41	**Support community-based adaptation practices in both rural and urban areas**	Ministry of Urban and Rural Development (MURD)	• Establishment of alternative means of income i.e. diverse livelihoods, networks, social protection, etc. • Development of leadership and other managerial/functional capacities in areas such as stakeholder engagement, situation assessment and vision definition, formulation of policies and strategies, etc • Training in first aid for community members and survival skills in adverse conditions	USD 1,680,000	Unconditional	and recovery. Efficient programming requires a balance between the liabilities and capabilities of both women and men. Ensure participation of women on an equal footing in the green economy, notably in regard to their access to clean energy and technology as users and providers of services as well as in subnational, national and multilateral processes related to climate change and disasters/emergency situations.			
42	**Improve monitoring and documentation of extreme events**	Ministry of Urban and Rural Development (MURD)	• Improvement in monitoring and evaluation • Improved disaster management and response efforts	USD 24,750,000	Conditional				
43	**Develop pro-poor disaster insurance schemes**	Ministry of Urban and Rural Development (MURD)	1. Poverty alleviation and enhanced resilience to climate change impacts. 2. Insurance promotes opportunities by helping to lessen financial repercussions of volatility and, in the longer term,	USD 7,975,000	Unconditional				

No.	Adaptation action	Ministry	Co-benefits (mitigation, environmental, social)	Finance costs (USD)	Conditional/ Unconditional	Gender	Youth	Private sector	SDGs
			create a space of certainty within which investments, planning and development activities can be undertaken. 3. Safety net and buffer for people shortly after a catastrophic event 4. Insurance can spur transformation by incentivizing risk reduction behaviour and fostering a culture of prevention-focused risk management.						

TOTAL ADAPTATION FUNDING REQUIREMENT: USD 1, 718, 130, 875 (approximately 1.72 billion US dollars)

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