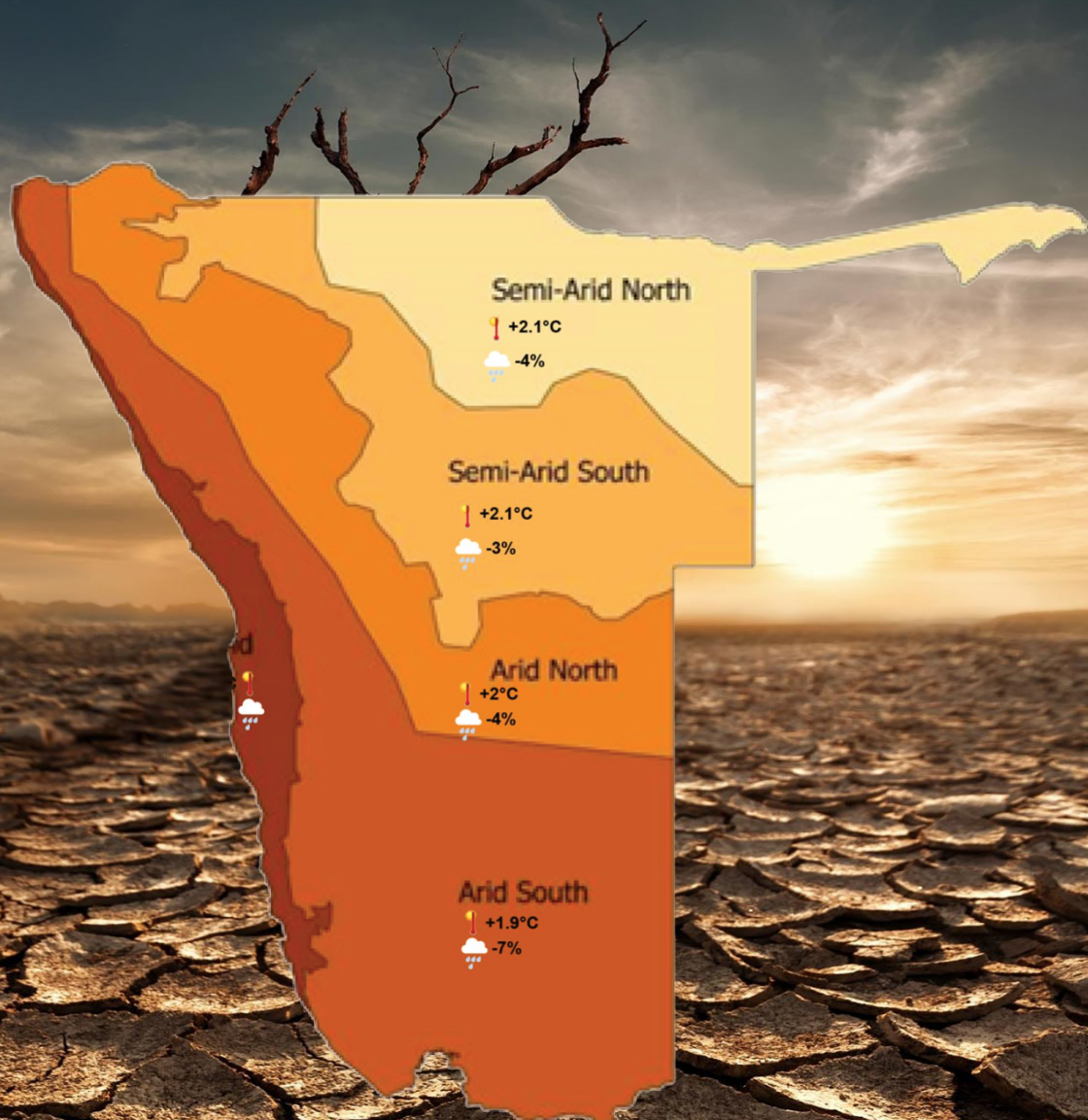


# NAMIBIA IS HEATING UP: WHAT DOES GLOBAL WARMING OF 1.5°C MEAN FOR US?

Short course on climate change for Parliamentarians



REPUBLIC OF NAMIBIA  
MINISTRY OF ENVIRONMENT, FORESTRY AND TOURISM



# FRAMEWORK FOR SHORT COURSE ON CLIMATE CHANGE

## COURSE OVERVIEW

Interactive learning will support participants' understanding of key issues in climate change, such as the Paris Agreement (PA), the United Nations Framework Convention on Climate Change (UNFCCC) and the Nationally Determined Contributions (NDC's). By applying strategic tools throughout the training, participants will leave equipped to contribute to long-term trends in climate action planning.

This course will provide a clear understanding of the challenging dynamics of climate change, trends and projections as well as the associated impacts on key economic sectors as well as the adaptation options to enhance communities resilience to the impacts of climate change. It will explore the various climate financing modalities that are available to Namibia.

### **Subjects to be discussed include:**

- International commitments made by Namibia
- National policy framework on climate change
- Climate change, the science
- Climate change, the linkages
- Climate financing
- Climate Action

Experts in the field will lead this training through interactive workshops, lectures and best practice case studies, fostering innovation, creating learning and networking amongst peers.

## LEARNING OUTCOMES

By the end of the course the Parliamentarians will be able to:

- Apply key principles of climate change to allow for informed decision making
- Use influential strategies to advocate for climate action
- Comprehend how climate financing works
- Understand how best to build communities resilience to the impacts of climate change
- Be in a better position to advise climate negotiators

## HOW WILL YOU BENEFIT?

- Hear the latest insights, research and developments in climate change from leading experts
- Network and share ideas between the standing committees on natural resources and
- Economics and public administration
- Enhance your knowledge and skills in climate change
- The opportunity to become a climate change maker
- The opportunity to gain a certificate of completion



# COURSE CONTENT

## MODULE 1

- Introduction to terminologies.
- What is the UNFCCC and the significance thereof
- The Paris Agreement and its implications
- The Intergovernmental Panel on Climate Change
- What are the 1.5 and 2 degrees projections all about?

## MODULE 2

- Namibia's climate change policy framework
- What Global Warming of 1.5 degrees and higher mean for Namibia
- Namibia's vulnerability to climate change
- Climate change impacts on key economic sectors
- Namibia's responses for climate change
- Legal implications of the revised NDC

## MODULE 3

- Climate Compatible development framework
- Climate Change and the Economy
- Climate Change and Society
- Climate Change and Politics

## MODULE 4

- Climate Financing
- Climate Action, Influencing and advocacy
- Where we stand, the way forward

## MODULE 5

- Site visits and tours (Within the vicinity of Windhoek)
- Networking dinner and awarding of certificates

# MODULE 1

## LIST OF ABBREVIATIONS

AF	-	<i>Adaptation Fund</i>
BURs	-	<i>Biennial Update Reports</i>
CCU	-	<i>Climate Change Unit</i>
CDKN	-	<i>Climate and Development Knowledge Network</i>
COVID	-	<i>CoronaVirus Disease</i>
COP	-	<i>Conference of the Parties</i>
CLARE	-	<i>Climate and Resilience Research Programme</i>
DEAF	-	<i>Directorate of Environmental Affairs and Tourism</i>
DRFN	-	<i>Desert Research Foundation of Namibia</i>
ETF	-	<i>Enhanced Transparency Framework</i>
GCF	-	<i>Green Climate Fund</i>
GEF	-	<i>Global Environment Facility</i>
GDP	-	<i>Gross Domestic Product</i>
IDRC	-	<i>International Development and Research Centre</i>
IPCC	-	<i>Intergovernmental Panel on Climate Change</i>
MEFT	-	<i>Ministry of Environment, Forestry and Tourism</i>
NCCC	-	<i>National Climate Change Committee</i>
NCCSAP	-	<i>National Climate Change Strategy and Action Plan</i>
NDC	-	<i>Nationally Determined Contributions</i>
NDPs	-	<i>National Development Plans</i>
NGOs	-	<i>Non-Governmental Organisations</i>
NPCC	-	<i>National Policy on Climate Change</i>
OECD	-	<i>Organization for Economic Cooperation and Development</i>
OPM	-	<i>Office of the Prime Minister</i>
SDG	-	<i>Sustainable development goals</i>
UNFCCC	-	<i>United Nations Framework Convention on Climate Change</i>
UNAM	-	<i>University of Namibia</i>
WMO	-	<i>World Meteorological Organization</i>



# INTRODUCTION OF TERMINOLOGIES

**ADAPTATION:** The process of adjustment to actual or expected climate and its effects. In human systems, adaptation seeks to moderate or avoid harm or exploit beneficial opportunities. In some natural systems, human intervention may facilitate adjustment to expected climate and its effects.

**CLIMATE:** Climate in a narrow sense is usually defined as the average weather, or more rigorously, as the statistical description in terms of the mean and variability of relevant quantities over a period of time ranging from months to thousands or millions of years.

**CLIMATE CHANGE:** Climate change refers to a change in the state of the climate that can be identified (e.g., by using statistical tests) by changes in the mean and/or the variability of its properties, and that persists for an extended period, typically decades or longer.

**GLOBAL WARMING:** Global warming is an average increase in the temperature of the atmosphere near the Earth's surface and in the troposphere, which can contribute to changes in global climate patterns. Global warming can occur from a variety of causes, both natural and human-induced.

**SUSTAINABLE DEVELOPMENT:** Development that meets the needs of the present without compromising the ability of future generations to meet their own needs.

**RESILIENCE:** The capacity of social, economic, and environmental systems to cope with a hazardous event or trend or disturbance, responding or reorganizing in ways that maintain their essential function, identity, and structure, while also maintaining the capacity for adaptation, learning, and transformation.

**MITIGATION (of climate change):** A human intervention to reduce the sources or enhance the sinks of greenhouse gases.

**MITIGATION (of disaster risk and disaster):** The lessening of the potential adverse impacts of physical hazards (including those that are human-induced) through actions that reduce hazard, exposure, and vulnerability.

**NATIONALLY DETERMINED CONTRIBUTIONS:** NDCs are national climate plans highlighting climate actions, including climate-related targets, policies and measures governments aim to implement in response to climate change and as a contribution to global climate action. Central to the NDCs is the concept of national determination.

**VULNERABILITY:** The propensity or predisposition to be adversely affected. Vulnerability encompasses a variety of concepts and elements including sensitivity or susceptibility to harm and lack of capacity to cope and adapt.

## WHAT IS THE UNFCCC AND THE SIGNIFICANCE THEREOF?

The Ministry of Environment, Forestry and Tourism (MEFT) is the focal point of the United Nations Framework Convention on Climate Change (UNFCCC) in Namibia. The Namibian government ratified the UNFCCC in May 1995. The objective of the UNFCCC is to stabilize concentrations of Greenhouse Gas Emissions (GHG) in the atmosphere at a level that would prevent man-made interference with the climate system.

Namibia is an active Party and the Ministry is the focal point institution to the UNFCCC. To transfer and accelerate the actions on implementing the climate change adaptation and mitigation initiatives, there is a need to ensure that key thematic areas of negotiation that are of importance to Namibia including finance, adaptation, mitigation, technology transfer and capacity building are fully represented.

### 1.3.1 OBJECTIVES OF THE UNFCCC

The ultimate objective of the Convention is to stabilize greenhouse gas concentrations "at a level that would prevent dangerous anthropogenic (human-induced) interference with the climate system. Furthermore:

#### **The UNFCCC puts the onus on developed countries to lead the way.**

The idea is that, as they are the source of most past and current greenhouse gas emissions, industrialized countries are expected to do the most to cut emissions on home ground. They are called Annex I countries and belong to the Organization for Economic Cooperation and Development (OECD).

#### **The UNFCCC directs new funds to climate change activities in developing countries.**

Industrialized nations agree under the Convention to support climate change activities in developing countries by providing financial support for action on climate change- above and beyond any financial assistance they already provide to these countries. A system of grants and loans has been set up through the Convention and is managed by the Global Environment Facility. Industrialized countries also agree to share technology with less advanced nations.

#### **Keeps tabs on the problem and what's being done about it.**

Industrialized countries (Annex I) have to report regularly on their climate change policies and measures, including issues governed by the Kyoto Protocol (for countries that have ratified it).

They must also submit an annual inventory of their greenhouse gas emissions, including data for their base year (1990) and all the years since.

Developing countries (Non-Annex I Parties) report in more general terms on their actions both to address climate change and to adapt to its impacts - but less regularly than Annex I Parties do, and their reporting is contingent on their getting funding for the preparation of the reports, particularly in the case of the Least Developed Countries.



**Charts the beginnings of a path to strike a delicate balance.**

Economic development is particularly vital to the world's poorer countries. Such progress is difficult to achieve even without the complications added by climate change. The Convention takes this into consideration by accepting that the share of greenhouse gas emissions produced by developing nations will grow in the coming years. Nonetheless, in the interests of fulfilling its ultimate goal, it seeks to help such countries limit emissions in ways that will not hinder their economic progress. One such win-win solution was to emerge later when the Kyoto Protocol to the Convention was conceived.

**Kicks off formal consideration of adaptation to climate change.**

The Convention acknowledges the vulnerability of all countries to the effects of climate change and calls for special efforts to ease the consequences, especially in developing countries that lack the resources to do so on their own. In the early years of the Convention, adaptation received less attention than mitigation, as Parties wanted more certainty on impacts of and vulnerability to climate change. When IPCC's Third Assessment Report was released, adaptation gained traction, and Parties agreed on a process to address adverse effects and to establish funding arrangements for adaptation.

**1.3.2 NAMIBIA'S EFFORTS AS A MEMBER OF UNFCCC**

**(i) Ratification of the UNFCCC in 1995**

Parties to the UNFCCC are committed to taking actions to address and adapt to climate change. All parties are required to report their initiatives for implementing the convention.

**(ii) The National Climate Change Committee (NCCC)**

Under the Directorate of Environmental Affairs and Forestry (DEAF), a broad-based multi-stakeholder committee was established in 2001. NCCC is tasked to advise the government with respect to its roles and responsibilities under the UNFCCC as well as to coordinate the overall national climate change program. The committee is chaired by the Deputy Director of the Climate Change Unit.

**(iii) National Policy on Climate Change (NPCC) for Namibia**

The *National Policy on Climate Change for Namibia*, 2011 aims to manage climate change responses in a way that recognises the national developmental goals and promotes integration and coordination of programmes of various sector organizations, so that benefits to the country as a whole are maximised, and negative impacts minimized.

**(iv) National Climate Change Strategy and Action Plan (NCCSAP), 2013-2020**

The NCCSAP has been developed as a result of the growing concern and discourse focusing on climate variability, and climate risks and impacts affecting Namibia's social, environmental and economic developmental potential. The strategy and action plan is a key instrument to operationalise the NPCC over a period of 8 years, as a comprehensive and practical tool that offers guidance on mechanisms, means and manner in which implementation can happen.

**(v) National Communications**

Parties to the UNFCCC are required to report their initiatives for implementing the Convention, in the form of the National Communications reports. Thus far Namibia has submitted three reports to the UNFCCC which are the initial communication, the second communication, the third communication and the fourth communication which was submitted in 2020.

**(vi) Biennial Update Reports (BUR's)**

BURs are reports, containing updates of national Greenhouse Gas (GHG) inventories, including a national inventory report and information on mitigation actions, needs and support received. Such reports provide updates on actions undertaken by a Party to implement the Convention, including the status of its GHG emissions and removals by sinks, as well as on the actions to reduce emissions or enhance sinks. These are the reports submitted to date: the first biennial report, the second biennial report, the third biennial report and the fourth biennial report.

**(vii) Nationally Determined Contributions (NDC's)**

The Paris Agreement requests each country to outline and communicate their post-2020 climate actions, known as their NDCs. Each climate plan reflects the country's ambition for reducing emissions, taking into account its domestic circumstances and capabilities. NDCs are at the heart of the Paris Agreement and the achievement of these long-term goals.

NDCs embody efforts by each country to reduce their national emissions and adapt to the impacts of climate change. The Paris Agreement (Article 4, paragraph 2) requires each Party to prepare, communicate and maintain successive Nationally Determined Contributions (NDCs) that it intends to achieve. Namibia's initial NDC was submitted in 2015, and efforts are currently underway to review these targets in the updated NDC which is due for submission to the UNFCCC before the next Conference of Parties (COP), COP26.



### 1.3.3. WHAT IS THE CONFERENCE OF PARTIES (COP)?

The COP is the supreme decision-making body of the United Nations Framework Convention on Climate Change (UNFCCC). All States that are Parties to the Convention are represented at the COP, at which they review the implementation of the Convention and any other legal instruments that the COP adopts and takes decisions necessary to promote the effective implementation of the Convention, including institutional and administrative arrangements.

A key task for the COP is to review the national communications and emission inventories submitted by the Parties. Based on this information, the COP assesses the effects of the measures taken by Parties and the progress made in achieving the ultimate objective of the Convention.

The COP meets every year, unless the Parties decide otherwise. The first COP meeting was held in Berlin, Germany in March 1995. The COP meets in Bonn, the seat of the secretariat, unless a Party offers to host the session. Just as the COP Presidency rotates among the five recognized UN regions - that is, Africa, Asia, Latin America and the Caribbean, Central and Eastern Europe and Western Europe and Others – there is a tendency for the venue of the COP to also shift among these groups.

#### History of COP since the UNFCCC treaty entered into force:

COP 1	-	1995: Berlin	COP15	-	2009: Copenhagen
COP 2	-	1996: Geneva	COP16	-	2010: Cancun
COP 3	-	1997: Kyoto	COP17	-	2011: Durban
COP 4	-	1998: Buenos Aires	COP18	-	2012: Doha
COP 5	-	1999: Bonn	COP19	-	2013: Warsaw
COP 6	-	2001: The Hague	COP20	-	2014: Lima
COP 7	-	2001: Marrakesh	COP21	-	2015: Paris
COP 8	-	2002: Delhi	COP22	-	2016: Marrakesh
COP 9	-	2003: Milan	COP23	-	2017: Fiji/Bonn
COP 10	-	2004: Buenos Aires	COP24	-	2018: Katowice
COP 11	-	2005: Montreal	COP25	-	2019: Madrid
COP 12	-	2006: Nairobi	COP26	-	2020: Glasgow UK, was moved to 2021 due to the outbreak of the COVID-19 pandemic.
COP 13	-	2007: Bali			
COP 14	-	2008: Poznan			

### 1.3.4 THE PARIS AGREEMENT

The Paris Agreement is a legally binding international treaty on climate change. It was adopted by 196 Parties at COP 21 in Paris, on 12 December 2015 and entered into force on 4 November 2016. Its goal is to limit global warming to well below 2, preferably to 1.5 degrees Celsius, compared to pre-industrial levels.

#### TRACKING PROGRESS

With the Paris Agreement, countries established an enhanced transparency framework (ETF). Under the ETF, starting in 2024, countries will report transparently on actions taken and progress in climate change mitigation, adaptation measures and support provided or received. It also provides for international procedures for the review of the submitted reports. The information gathered through the ETF will feed into the Global stock-take which will assess the collective progress towards the long-term climate goals. This will lead to recommendations for countries to set more ambitious plans in the next round.

#### PROGRESS TO DATE

Although climate change action needs to be massively increased to achieve the goals of the Paris Agreement, the years since its entry into force have already sparked low-carbon solutions and new markets. More and more countries, regions, cities and companies are establishing carbon neutrality targets. Zero-carbon solutions are becoming competitive across economic sectors representing 25% of emissions. This trend is most noticeable in the power and transport sectors and has created many new business opportunities for early movers.

#### OBLIGATIONS OF COUNTRIES THAT RECTIFIED THIS AGREEMENT

Under the Agreement, countries are responsible for acting on interventions for both mitigation and adaptation. Countries do this by officially submitting their own nationally determined climate actions also known as the NDC's. Countries have the obligation to implement these plans, and if they do, it will bend the curve downward in the projected global temperature rise.

### 1.3.5 THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE (IPCC)

The **IPCC** was created to provide policymakers with regular scientific assessments on climate change, its implications and potential future risks, as well as to put forward adaptation and mitigation options.

Through its assessments, the IPCC determines the state of knowledge on climate change. It identifies where there is an agreement in the scientific community on topics related to climate change, and where further research is needed. The reports are drafted and reviewed in several stages, thus guaranteeing objectivity and transparency. The IPCC does not conduct its own research. IPCC reports are neutral, policy-relevant but not policy-prescriptive.

The assessment reports are a key input into the international negotiations to tackle climate change. Created by the **United Nations Environment Programme** (UN Environment) and the **World Meteorological Organization** (WMO) in 1988, the IPCC has 195 Member countries. In the same year, the UN General Assembly endorsed the action by WMO and UNEP in jointly establishing the IPCC.



### 1.3.6 WHAT ARE THE 1.5 AND 2 DEGREES CLIMATE CHANGE PROJECTIONS?

In 2018, the Special Report on Global Warming of 1.5°C was approved by the IPCC. Ninety-one authors and review editors from 40 countries prepared the IPCC report in response to an invitation from the United Nations Framework Convention on Climate Change (UNFCCC) when it adopted the Paris Agreement in 2015.

The report's full name is ***Global Warming of 1.5°C, an IPCC special report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty.***

## KEY POINTS FROM THE SUMMARY FOR POLICYMAKERS REPORT

### Understanding Global Warming of 1.5°C

Human activities are estimated to have caused approximately 1.0°C of global warming above pre-industrial levels, with a likely range of 0.8°C to 1.2°C. Global warming is likely to reach 1.5°C between 2030 and 2052 if it continues to increase at the current rate. (high confidence)

### Projected Climate Change, Potential Impacts and Associated Risks

Climate-related risks to health, livelihoods, food security, water supply, human security, and economic growth are projected to increase with global warming of 1.5°C and increase further with 2°C.

Most adaptation needs will be lower for global warming of 1.5°C compared to 2°C (high confidence). There are a wide range of adaptation options that can reduce the risks of climate change (high confidence). There are limits to adaptation and adaptive capacity for some human and natural systems at global warming of 1.5°C, with associated losses (medium confidence). The number and availability of adaptation options vary by sector (medium confidence).

### Emission Pathways and System Transitions Consistent with 1.5°C Global Warming

Pathways limiting global warming to 1.5°C with no or limited overshoot would require rapid and far-reaching transitions in energy, land, urban and infrastructure (including transport and buildings), and industrial systems (high confidence). These systems transitions are unprecedented in terms of scale, but not necessarily in terms of speed, and imply deep emissions reductions in all sectors, a wide portfolio of mitigation options and a significant upscaling of investments in those options (medium confidence).

### Strengthening the Global Response in the Context of Sustainable Development and Efforts to Eradicate Poverty

The avoided climate change impacts on sustainable development, eradication of poverty and reducing inequalities would be greater if global warming were limited to 1.5°C rather than 2°C, if mitigation and adaptation synergies are maximized while trade-offs are minimized (high confidence).

Limiting the risks from global warming of 1.5°C in the context of sustainable development and poverty eradication implies system transitions that can be enabled by an increase of adaptation and mitigation investments, policy instruments, the acceleration of technological innovation and behaviour changes (high confidence).

Sustainable development supports, and often enables, the fundamental societal and systems transitions and transformations that help limit global warming to 1.5°C. Such changes facilitate the pursuit of climate-resilient development pathways that achieve ambitious mitigation and adaptation in conjunction with poverty eradication and efforts to reduce inequalities (high confidence).

Strengthening the capacities for climate action of national and sub-national authorities, civil society, the private sector, indigenous peoples and local communities can support the implementation of ambitious actions implied by limiting global warming to 1.5°C (high confidence). International cooperation can provide an enabling environment for this to be achieved in all countries and for all people, in the context of sustainable development. International cooperation is a critical enabler for developing countries and vulnerable regions (high confidence).





### 1.3.7 WHAT DOES GLOBAL WARMING OF 1.5 DEGREES AND HIGHER MEAN FOR NAMIBIA?

Namibia is an arid country. Its climate ranges from semi-arid in the north-east to hyper-arid in the south and west. The [Adaptation at Scale in Semi-Arid Regions](#) (ASSAR) report on the projections for Namibia, assessed the impacts of exceeding different global warming targets across five geo-climatic zones: hyper-arid, arid south, arid north, semi-arid south and semi-arid north zones.

With its dry and hot climate, Namibia is already vulnerable to climate variability, and without adaptation, climate change will heighten this vulnerability. As global temperature increases by 1.5°C and more, climate models project that Namibia will experience increasing frequency and intensity of climate extremes.

The Paris Agreement has a goal of limiting global warming well below 2°C, ideally 1.5°C. Understanding the local-level impacts of these global temperature targets is crucial for informing climate change adaptation needs and actions. To date, mitigation pledges by nations fall far short of what is needed, with the world on track to warm by 3.2°C by the end of the century.

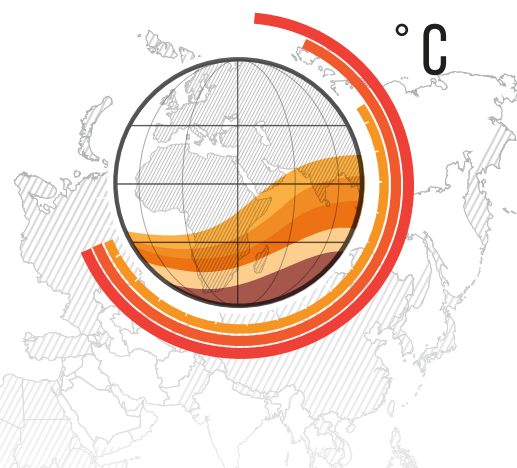
For Namibia, local warming and drying will be greater than the global average. So, even a 1.5°C increase in global temperature will have severe local impacts, negatively affecting water supply, agriculture, health, and other vulnerable sectors. The 1.5°C threshold could be breached within the next decade, and the 2°C threshold the decade after. This means there is an urgent need to accelerate Namibia's adaptation responses.



# WHAT GLOBAL WARMING OF 1.5°C AND HIGHER MEANS FOR NAMIBIA

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## GLOBAL WARMING ABOVE PRE-INDUSTRIAL LEVELS

1.5°C VS 2°C VS 2.5°C VS 3°C

### LOCAL IMPACTS IN NAMIBIA

Projected climate changes<sup>3</sup>



CLIMATE

Mean temperature (°C)

▲ 2      ▲ 2.7      ▲ 3.3      ▲ 4

Heat waves (days)

▲ 50      ▲ 78      ▲ 114      ▲ 148

Annual rainfall

▼ 4%      ▼ 7%      ▼ 11%      ▼ 14%

Heavy rainfall (days)

▼ 1      ▼ 1      ▼ 2      ▼ 2

Dry days

▲ 12      ▲ 17      ▲ 22      ▲ 27

WATER



Evapotranspiration rates<sup>5</sup>

▲ 10%      ▲ 14%<sup>6</sup>      ▲ 17%<sup>6</sup>      ▲ 20%<sup>6</sup>

Surface runoff<sup>7</sup>

▼ 19%<sup>6</sup>      ▼ 30%<sup>6</sup>      ▼ 40%<sup>6</sup>      ▼ 50%<sup>6</sup>

Groundwater recharge rates<sup>8</sup>

▼ 33%<sup>6</sup>      ▼ 49%<sup>6</sup>      ▼ 66%<sup>6</sup>      ▼ 82%<sup>6</sup>

AGRICULTURE



Cereal crops<sup>5</sup>  
(productivity)

▼ 5%<sup>6</sup>      ▼ 10%      ▼ 15%<sup>6</sup>      ▼ 20%

Livestock<sup>5</sup>  
(productivity)

▼ 5%      ▼ 20%      ▼ 35%      ▼ 50%

HEALTH



Malaria<sup>9</sup>  
(months of risk)

▼ 23%<sup>6</sup>      ▼ 34%<sup>6</sup>      ▼ 44%      ▼ 56%<sup>6</sup>

Heat stress<sup>10</sup>  
(number of days of exposure)

▲ 21      ▲ 41      ▲ 41      ▲ 188

BIODIVERSITY



Desert encroachment<sup>5</sup>

▲ 11%<sup>6</sup>      ▲ 18%<sup>6</sup>      ▲ 18%      ▲ 43%

Species loss<sup>11</sup>

▲ 30%<sup>6</sup>      ▲ 40%      ▲ 50%      ▲ 60%

Estimated impacts<sup>4</sup>

<sup>1</sup> Climate Action Tracker. <https://climateactiontracker.org/global/cat-thermometer>.

<sup>2</sup> Nkemelang, T. et al. 2018. Determining what global warming of 1.5°C and higher means for the semi-arid regions of Botswana, Namibia, Ghana, Mali, Kenya and Ethiopia: A description of ASSAR's methods of analysis. <https://bit.ly/2yHbWPF>.

<sup>3</sup> Based on climate modelling by T. Nkemelang. University of Cape Town, South Africa.

<sup>4</sup> Based on data analysis by R. Bouwer. University of Cape Town, South Africa.

<sup>5</sup> Reid, H., Sahlén, L., Stage, J. and MacGregor, J. 2008. Climate change impacts on Namibia's natural resources and economy. *Climate Policy*. <https://doi.org/10.3763/cpol.2008.0521>.

<sup>6</sup> Extrapolated assuming a linear progression with no threshold being reached.

<sup>7</sup> Arnell, N.W., Hudson, D.A. and Jones, R.G. 2003. Climate change scenarios from a regional climate model: Estimating change in runoff in southern Africa. *Journal of Geophysical Research: Atmospheres*. <https://doi.org/10.1029/2002JD002782>.

<sup>8</sup> Döll, P. and Flörke, M. 2005. Global-scale estimation of diffuse groundwater recharge. Frankfurt Hydrology Paper 03. Institute of Physical Geography, Frankfurt University.

<sup>9</sup> Tanser, F.C., Sharp, B. and le Sueur, D., 2003. Potential effect of climate change on malaria transmission in Africa. *The Lancet*. [https://doi.org/10.1016/S0140-6736\(03\)14898-2](https://doi.org/10.1016/S0140-6736(03)14898-2).

<sup>10</sup> Garland, R.M., Matooane, M., Engelbrecht, F.A., Bopape, M.J.M., Landman, W.A., Naidoo, M., Merwe, J.V.D. and Wright, C.Y. 2015. Regional projections of extreme apparent temperature days in Africa and the related potential risk to human health. *International Journal of Environmental Research and Public Health*. <https://dx.doi.org/10.3390%2Fijerph121012577>.

<sup>11</sup> Midgley, G., Hughes, G., Thuiller, W., Drew, G. & Foden, W. 2005. Assessment of potential climate change impacts on Namibia's floristic diversity, ecosystem structure and function. Climate Change Research Group: South African National Biodiversity Institute. Cape Town.



### 1.3.8 NAMIBIA'S VULNERABILITY TO CLIMATE CHANGE

Namibia is one of the climate change vulnerability 'hotspots' in the southern Africa region (ASSAR, 2019). The country's vulnerability stems from its climate, landscapes, socioeconomic and environmental characteristics (i.e., its geography). From a socioeconomic perspective, the colonial legacy of apartheid has created persistent structural inequalities as well as skewed access to productive assets such as land. These inequalities and skewed access to productive assets coupled with poverty and unemployment levels reduces the ability/capacity of most Namibians to cope and mitigate the adverse impacts of climate change. Drought is common given Namibia's hot, dry climate and erratic rainfall. Localized water scarcity, desertification, and land degradation are all key drivers of climate change from an environmental perspective. Threats to the country's biodiversity include habitat destruction and uncontrolled development, forest clearing, overstocking, unsustainable harvesting of wild plants and animals, unequal resource distribution, fencing, and the fragmentation of protected areas (MEFT, 2020).

### 1.3.9 CLIMATE CHANGE IMPACTS ON KEY ECONOMIC SECTORS

Water: **Increasing pressure on an already-challenged system**

Namibia is exposed to large variability in rainfall between seasons and years, making the country prone to water scarcity, drought and flooding. At a 1.5°C and above increase in global temperature, the step changes in local temperature and rainfall will drive further water scarcity.



Source: ASSAR Namibia, 2014-2018

#### INCREASED EVAPOTRANSPIRATION:

Temperature increases will lead to an increase in evapotranspiration in Namibia placing considerable strain on water by reducing soil water, groundwater and surface water availability. Global temperature increases of 1.5°C and 2°C will result in 10-14% more evaporation in the country, with further increases of up to 20% by 3°C.

#### SURFACE RUNOFF:

Increased temperatures and evaporation, as well as decreased rainfall, will have significant impacts on surface water sources. Surface runoff will decrease by approximately 19% and 30% at 1.5 and 2°C respectively. Runoff will decrease by approximately 50% at 3°C.

#### STREAMFLOWS:

The local impacts of 1.5°C and above are likely to result in further water scarcity, as water resources decline. Stream flows across Namibia are expected to decrease by 10% and 20% respectively at 1.5°C and 2°C.

#### GROUNDWATER RECHARGE:

Groundwater recharge is extremely variable in Namibia. Less rainfall, more evaporation, and more intense droughts are expected to significantly affect groundwater recharge in the country. At 1.5°C and 2°C, recharge is projected to decrease by approximately 33% and 49% respectively. This decrease could be as much as 82% with a 3°C increase in global temperature.



# AGRICULTURE: DECREASES IN CROP AND LIVESTOCK PRODUCTIVITY

Namibia's agricultural sector is extremely vulnerable to the impacts of 1.5°C warming and higher. For example, prolonged drought conditions in 2018 led to the death of 300 cattle and the relocation of 17,000 animals in the Omaheke zone in the arid north (ASSAR, 2018). The largely arid climate does not allow for extensive agricultural activities, with livestock rearing making up the majority of the sector. Continued warming and drying will most likely lead to increasing losses in crop and livestock activities.

**Decreasing area of agricultural land:** Increased drying will result in Namibia's already marginal agricultural lands shrinking. Desert encroachment will result in the loss of grasslands and rangelands vital for pastoralism. It is expected that land in the arid south will lose as much as 15% of its carrying capacity for livestock at 1.5°C (ASSAR,2018).

**Crop productivity:** Increases of 1.5°C and above will have severe impacts on crops. Crop productivity is expected to drop by 5-10% at 1.5°C and 2°C, with a decrease of 20% at 3°C. This loss will be even larger for subsistence farmers with expected decreases of 20-80% between 1.5°C and 3°C (ASSAR,2018).

## LIVESTOCK PRODUCTIVITY:

Increasing temperatures negatively impact livestock productivity because of lower feed intake, milk production, fertility and longevity (ASSAR, 2018). Livestock productivity is expected to drop by 5-20% at 1.5°C and 2°C, with further decreases of 50% at 3°C (ASSAR,2018).

Source: ASSAR Namibia,2014-2018



# HUMAN HEALTH: ADDED RISKS

The increasing temperatures and changing rainfall patterns projected to occur at warming of 1.5°C and above are set to alter the prevalence of disease. Health risks (with climate components) such as malnutrition, malaria, respiratory infections, and diarrhea, which affect children and adults are major concerns for Namibia. Global temperature increases of 1.5°C and above will result in increasing water scarcity and malnutrition resulting in an increased burden of disease in the country (ASSAR, 2018).

**Heat stress:** High temperatures will expose the population to dangerously high temperatures which will make people vulnerable to heat stroke and heat exhaustion. People living with pre-existing conditions and rural populations without access to health services will be adversely affected (ASSAR, 2018).

• At 1.5°C most of the country will experience an increase of 11-30 days of 'caution' exposure to heat stress, with part of the arid zones increasing by 31-50 days. At 3°C these days will increase by 80-296 (ASSAR, 2018).

• At 3°C there will also be significant increases in 'extreme caution' and 'danger' exposure days (particularly in the semi-arid zones) of 82-138 and 104-164 days respectively (ASSAR,2018).

Table 5: Changes to Namibia's heat risks		
	Exposure to heat stress (days)	Malaria exposure (months of risk)
1.5°C	+ 11-30	-23%
2°C	+ 31-50	-34%
2.5°C	+ 31-50	-44%
3°C	+ 80-296	-56%

**Malaria exposure:** Global temperature rise of 1.5°C and above will likely result in faster breeding of mosquitoes. The development of the malaria parasite and vector, however, is slow and requires wet conditions. In hot climates, a rainfall season of three months is sufficient to support a malaria season while in milder climates at least five months of rainfall are needed (ASSAR, 2018).

Increasing temperatures may increase the prevalence of mosquitoes in Namibia and result in outbreaks in new areas. However, decreasing rainfall and intense rainfall may disrupt mosquito breeding resulting in overall declines in malaria in the country.

At 1.5°C and 2°C global temperature increases, the number of persons exposed to malaria per month is expected to decrease by 23% and 34% respectively. At 3°C this decline will be a further 56% drop in exposure (ASSAR, 2018).

## BIODIVERSITY: INCREASED LOSS OF ENDEMIC VEGETATION AND ANIMALS

Namibia is home to a diversity of endemic vegetation and wildlife. Global temperature rise of 1.5°C and above is expected to negatively affect the distribution of biodiversity within the country. The endemic vegetation in the Karoo Biome (arid south zone) is particularly vulnerable to the effects of reduced rainfall (ASSAR, 2018). The impacts on biodiversity will affect livestock production (due to reduced grazing), malnutrition, and the tourism industry (ASSAR, 2018).

**Desert and bush encroachment:** Global warming of 1.5°C and above will have significant impacts on Namibia's landscape, with the savannah grasslands losing their dominance to desert and shrublands. The arid south is particularly vulnerable to desert encroachment, with significant decreases in rainfall. It is expected that desert encroachment will increase by 11 and 18% respectively at 1.5°C and 2°C. This increase could be as much as 43% by 3°C (ASSAR, 2018).

**Endangered and extinct species:** A 1.5°C increase in global temperature will result in a decline in Namibia's rich biodiversity as areas become unsuitable for certain species. Overall, species loss is expected to increase by 30% and 40% respectively at 1.5°C and 2°C. At 3°C this loss will increase to 60% (ASSAR, 2018). Endemic species will be slightly more adapted to the environment but will still suffer losses, with 6-9% of endemic species expected to go extinct and 4-6% of endemic species being classified as critically endangered at 1.5°C and 2°C respectively. At 3°C the number of endemic species classified as extinct or critically endangered will increase to 15% and 9% respectively (ASSAR, 2018).



Source: ASSAR Namibia, 2014-2018

## FISHERIES: SIGNIFICANT IMPACT ON THE ECONOMY

Namibia's coastal zone is important for the economy, playing a vital role in trade, fisheries and tourism. Global temperature increases of 1.5°C and above are expected to have significant impacts on the country's marine and coastal areas. Sea surface temperatures along the coast of Namibia have been observed to have cooled by 0.2 - 0.4°C between 1950-2011 (ASSAR, 2018). Changing wind speeds and directions are also expected to increase upwelling along the coast. Changes in the Benguela current will have uncertain impacts on marine ecosystems. Some predictions suggest increased reproduction of fish species, and possible migration of new species into Namibian waters (ASSAR, 2018).

## TOURISM: RISK OF SEA-LEVEL RISE

Coastal towns such as Walvis Bay, Luderitz, Swakopmund and Henties Bay are important for tourism, fisheries and trade. Walvis Bay's deep-water port is a vital trade centre for the country and its neighbours. For each increment in global temperature, these coastal areas will experience increasing sea-level rise. Walvis Bay will be particularly vulnerable due to the low height above sea level and erodible coastline.

Between 1.5°C and 2°C, sea-level rise in Walvis Bay will be between 14-26cm (ASSAR, 2018). It should be noted that sea-level rise lags behind temperature increases, and the impacts related to each increment of temperature will only be experienced in later years. The Namibian government estimates that 30cm of sea-level rise will result in flooding of significant areas of Walvis Bay (ASSAR, 2018).

This means that warming of 1.5-2°C will have significant impacts on coastal areas in Walvis Bay. While the sea-level rise in Luderitz will be slightly higher than in Walvis Bay, the steep and rocky shoreline makes the town less vulnerable to the impacts of 1.5°C and above.



# MODULE 2

## 2.1 NAMIBIA'S CLIMATE CHANGE POLICY FRAMEWORK

Namibia's development is guided by its 5-year periods National Development Plans within its long-term National Policy Framework, Vision 2030, and recently by the Harambee Prosperity Plan (HPP). The country is currently in its Fifth National Development Plan (NDP5) that outlines a development strategy aiming at improving the living conditions of every Namibian through sustainable development and a low carbon economy.

Namibia ratified the United Nations Framework Convention on Climate Change (UNFCCC) in 1995 as a Non-Annex 1 Party, and as such, is obliged to report certain elements of information in accordance with Article 4, paragraph 1 of the Convention. In order to meet its reporting obligations, Namibia has submitted three national communications (NCs), three Biennial Update Reports (BURs), including three stand-alone National Inventory Reports (NIRs) and its Intended Nationally Determined Contributions (INDC), now NDC, making Namibia one of the most compliant non-Annex 1 parties to the convention. The multi-sectoral National Climate Change Committee (NCCC), chaired by the Ministry of Environment, Forestry and Tourism (MEFT), provides oversight and an advisory role on the implementation of all climate change projects.

The Cabinet of Namibia is the Government entity entrusted with the overall responsibility for the development of Policies. The NCCC, comprising representatives of the various ministries and other stakeholders, was established in 1999 by a Cabinet directive to advise Cabinet on climate change issues, including reporting obligations. MEFT, the official government agency acting as the national focal point of the Convention, is responsible for coordinating and implementing climate change activities, including the preparation of National Reports to enable the country to meet its reporting obligations. This is done through the Climate Change Unit (CCU) established within the Directorate of Environmental Affairs and Forestry (DEAF). Being a formalized and multi-sectoral committee, the NCCC provides the necessary support to the CCU by advising and guiding it.

Namibia's current adaptation and mitigation pathways are identified in the National Policy on Climate Change (NPCC) and National Climate Change Strategy and Action Plan (NCCSAP).

## 2.2 NATIONALLY DETERMINED CONTRIBUTIONS (NDC)

Leading up to the adoption of the PA in 2015, Parties were requested to prepare and submit their climate change plan to reduce national emissions and adapt to the impacts of climate change known as the Intended Nationally Determined Contributions (INDC). In 2015, the Government of the Republic of Namibia submitted its ambitious Intended NDC, with pledges to reduce its national GreenHouse Gases (GHG) emissions by 89% by 2030.

The Paris Agreement works on a 5- year cycle of increasingly ambitious climate action carried out by countries. By 2020, countries submit their plans for climate action known as nationally determined contributions (ttt In 2020 Namibia started the process to revise its NDC and in its revised NDC the country has pledged to further reduce its emissions by 92% from the initial 89% by the year 2030.

## 2.3 LEGAL IMPLICATIONS OF THE REVISED NDC

The analysis below considers or contextualises the proposed targets as set by the MEFT in the four IPCC sectors, namely; a) Energy, b) IPPU, c) AFOLU, and d) Waste.

In the Energy sector, the targets of electric vehicles and Light Delivery Vehicles (LDV) transport are not regulated in Namibia. Therefore, implementation of such targets might not be fully implemented due to a lack of legislation. Furthermore, the electricity generation targets need the support of the list bill to be made into laws. Some of the Industrial Processes and Product Use (IPPU) targets were also found to have some legal implications as the absence of legislation that regulates the sector to implement the targets. Adequate waste management practices include the reduction and prevention of waste, as well as waste treatment, disposal and recycling. Proper waste disposal and management as referred to in the existing legislation. Although legislation is limited to implement the Waste sector targets, the little existing were found sufficient to support the implementations (modalities of legal regulations) of the targets and which can improve by considering the legal recommendations for that sector. Furthermore, the targets in the Agriculture, Forestry and Other Land Uses (AFOLU) sector are all directly or indirectly, save for the restoration of 15.5 million ha of Savannah grassland, supported by instruments that enjoy the force of law. The aforesaid results in there being mechanisms that can be utilised towards the achievement of the same in a shrewd manner with minimal litigious risk.

Thus, integrating adaptation and mitigation strategies and the promulgation of impending bills to become legislation is critical for the legal framework. The aforesaid is particularly important in light of the interaction between policy and legislation, whilst the two abstracts are interrelated they are without a shadow of a doubt distinct in nature and application. A policy can broadly be defined as a course or principle of action adopted or proposed by an organization or individual. Legislation on the other hand sets out the binding and enforceable dictates related to procedure and standards that all persons within a country must follow.

Naturally the aforesaid means that legislation is the mechanism in terms of which one enforces and thus ensures the desired outcome of political policy. That said policy can also be utilised to fulfil legislative commitments. In as much as it is commendable that comprehensive policy is formulated to give effect to an organisation's goals the reality is that at a national level, policy without the appropriate statutory support is a toothless dog and as such acts as nothing more than a guiding light. The temptation by regulators and other authorities to implement policy as if it is law can quite realistically result in several complex and convoluted administrative law issues that hamstring a particular objective rather than promote it. If and where reasonably possible, it is recommended that one exploits any opportunity to convert policy objectives to concretised laws that provide certainty and enforceability. The table below summarizes the proposed targets and recommendations from the legal implications of the NDC:

	ENERGY	IPPU AND RAC	AFOLU	WASTE
Targets/Goals	<ul style="list-style-type: none"> <li>- REFIT 170 MW PV - replacing imports plus Ruacana</li> <li>- Rooftop systems (45 MW PV) - replacing imports</li> <li>- Embed generation - 13 MW PV replacing imports</li> <li>- Omburu 20 MW PV - replacing imports</li> <li>- Lüderitz Wind 40 MW - replacing imports</li> <li>- Biomass Energy plant 40MW - replacing imports</li> <li>- Fuel switching: Hydrogen replacing diesel</li> <li>- 10 000 Electric Vehicles: replacing gasoline</li> <li>- Baynes Hydro: 300 of 600 MW</li> <li>- Solar Thermal Road Map - 20 000 SWH</li> <li>- Transport – LDV: reducing fuel use by 20%</li> </ul>	<ul style="list-style-type: none"> <li>- Split residential air conditioners</li> <li>- Car air conditioning</li> <li>- Domestic refrigeration</li> <li>- Commercial refrigeration (Stand-alone equipment)</li> <li>- Commercial refrigeration (Condensing units)</li> <li>- Replace 23% clinker in cement production</li> </ul>	<ul style="list-style-type: none"> <li>- Reduce deforestation rate by 75 %</li> <li>- Reforest of 20,000 ha per year</li> <li>- Restore 15.5 million ha of grassland savannah and soil carbon</li> <li>- Reduce the removal of wood by 60 %</li> <li>- Afforest 5,000 ha per year</li> <li>- Plant 1,000 ha of trees per year under Agroforestry</li> <li>- Fatten 250,000 cattle heads in feedlots</li> </ul>	<ul style="list-style-type: none"> <li>- Transform 70% MSW to electricity and compost</li> <li>- Increase Recycling of plastic waste by 70%</li> <li>- Increase Recycling of e-waste by 70%</li> </ul>

	ENERGY	IPPU AND RAC	AFOLU	WASTE
Legal findings and recommendations	<p>a) Promulgation of the Energy Bill of 2016 and Electricity Bill of 2016</p> <p>b) Extensive roll out of the Modified Single Buyer Model</p> <p>c) National Energy Efficiency Policy</p> <p>d) Electric vehicles and Transport LDV</p>	<p>a) The introduction of mandatory reporting by the Ministry of Trade and Industry (MTI) on an annual basis is conducted. This being in terms of the use of refrigerants and the operation of systems and appliances.</p> <p>b) The government ensures the development of legal, regulatory, and technical instruments such as a Carbon Tax Bill and/or a Climate Change Bill which necessary to advance the application of thermal energy applications.</p> <p>c) MEFT and MME promote the broad uptake of modern thermal energy technologies in households, commerce, industry through a policy.</p> <p>d) Government replaces inefficient electric and other appliances.</p> <p>e) A national policy is developed that would promote the local assembly and/or manufacturing of thermal energy appliances.</p> <p>f) In terms of the Cement Regulations as discussed in the Standards Act of 2005, there were no strengths identified insofar, as it relates to climate adaptation and change. The aforementioned regulations set out the standards in respect of the quality of cement to be produced. It is silent on the replacement of clinker by 23% in the production of Portland cement. It is silent in terms of the impact of the manufacturing of cement on the environment or climate change.</p> <p>g) It is therefore advised that stakeholders are consulted prior to the imposition of such a regulation within the legal framework.</p>	<p>a) The review further identified that the following target, despite not being the object of industry specific legislation, may to a reasonable extent be promote through the use of statutory instruments that indirectly have a bearing on it: Fatten 250,000 cattle heads in feedlots</p> <p>b) Due to the absence of national legislation, the following target were found to have legal implications: Restore 15.5 million ha of grassland savannah and soil carbon</p> <p>The primary strength of the AFOLU sector is that the majority of the mechanisms' primarily in the area of Forestry are already entrenched in legal instruments that carry the force of law. Not only are the mechanisms envisaged represented as provisions of the Forestry Act of 2001 the aforesaid act goes a step further by establishing a body responsible for the drafting, execution and monitoring of policy as well as the provisions of the act.</p>	<p>a) To Promulgate the Pollution Control and Waste Management Bill.</p> <p>b) To develop the National Solid Waste Management Strategy of 2018 into a national policy.</p> <p>c) To develop a universal adoption by local authorities of the Model Sewerage and Drainage Regulations to ensure consistency in waste management.</p> <p>d) A review into Hazardous Waste in respect of the sea-based disposal for waste management activities of local authorities.</p>



# MODULE 3

## 3.1 CLIMATE COMPATIBLE DEVELOPMENT

As countries move forward to deliver their NDCs and associated programmes and policies for climate compatible development, it is not just about getting the right finance in place. It is also about getting the right 'people skills' in place and the right institutional structures. This is the case whether a government wants to implement a nationwide climate compatible development policy, or whether it is about expanding a successful local pilot initiative to deliver at greater scale.

Deepening people's capacity and skills is important because climate change and its impacts on development are evolving fast – and so, too, is our understanding of how we should respond. Good flows of information and appropriate institutional structures and mandates are also vital because climate change cuts across geographies and sectors, affecting many facets of development and its delivery. The graphic below illustrates what it takes to deliver results in climate compatible development and to build upon success:



To read more:

<https://mainstreaming.cdkn.org/book/climate-compatible-development/delivering-and-scaling-up-climate-compatible-development/>

# SUSTAINABLE DEVELOPMENT GOALS



## SUSTAINABLE DEVELOPMENT GOALS

17 GOALS TO TRANSFORM OUR WORLD



**GOAL 1.** End poverty in all its forms everywhere

**GOAL 2.** End hunger, achieve food security and improved nutrition and promote sustainable agriculture

**GOAL 3.** Ensure healthy lives and promote wellbeing for all at all ages

**GOAL 4.** Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

**GOAL 5.** Achieve gender equality and empower all women and girls

**GOAL 6.** Ensure availability and sustainable management of water and sanitation for all

**GOAL 7.** Ensure access to affordable, reliable, sustainable and modern energy for all

**GOAL 8.** Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all.

**GOAL 9.** Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation

**GOAL 10.** Reduce inequality within and among countries

**GOAL 11.** Make cities and human settlements inclusive, safe, resilient and sustainable

**GOAL 12.** Ensure sustainable consumption and production patterns

**GOAL 13.** Take urgent action to combat climate change and its impacts

**GOAL 14.** Conserve and sustainably use the oceans, seas and marine resources for sustainable development

**GOAL 15.** Protect restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, halt and reverse land degradation and halt biodiversity loss

**GOAL 16.** Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels

**GOAL 17.** Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development

More details on these SDGs can be found on the following website:

<https://sustainabledevelopment.un.org/content/documents/21252030%20Agenda%20for%20Sustainable%20Development%20web.pdf>



## SPHERES OF SUSTAINABLE DEVELOPMENT

### 3.2.1 CLIMATE CHANGE AND THE ENVIRONMENT

Namibia is one of the driest countries in Southern Africa with an average rainfall ranging between 25 mm to 700mm per annum. The cold Benguela current along the western coast of Namibia produces cold and dry winds from the Atlantic Ocean. Vulnerability to climate change differs across socio-economic groups in Namibia and they respond to shock differently and with considerable variability (DRFN and Climate Systems and Analysis Group, 2008). The vulnerability of the environment to climate change depends not only on the change of frequency or duration of a climatic condition but also on the country's capacity to respond appropriately to climatic changes.

"It is a certain fact that human beings' life will always be shaped by prevailing climatic conditions" (Midgley G., 2004). Midgley et al further stated that climate is regarded as one global variable which has a direct and reflective impact on every aspect of human existence. Most of the domains from which human beings retrieve their livelihood such as the natural environment, economies, political and power structures, cultural, special interactions and developments are shaped by climate. Improvements in development and human technological advancement, therefore, have an intense and lasting impact on natural environments and climate as a whole.

Climate change presents significant threats to the achievement of Namibia's high-level statements such as the National Development Plans and Vision 2030; in particular, statements geared towards the elimination of poverty, hunger, promoting environmental sustainability and Millennium Development Goals numbers 1 and 7. Additional evidence (Stern, 2006) points to the persistent negative impact climate change will have on the poorest nations especially those who contribute less to the causes of climate change. Namibia contributes very little to the causative adverse effects of climate change which threaten the country's efforts to improve the lives of its citizens and to meet intended developmental goals.

### 3.2.2 CLIMATE CHANGE AND THE ECONOMY

Namibia is one of the driest countries in sub-Saharan Africa and is highly dependent on climate-sensitive sectors. Primary sectors, consisting of natural resource-based production like agriculture, fisheries and mining account for about 30 percent of the total Gross Domestic Product (GDP) (Lange, 2003). Income distribution in Namibia is unusually inequitable (with an estimated Gini coefficient of 0.65 (UNDP, 2020), Namibia may have the most inequitable income distribution in the world) and over half of the population depends on subsistence agriculture. Namibia is therefore potentially one of the most vulnerable countries to climate change.

According to the National Accounts estimates, compiled by NSA in 2017 the domestic economy is estimated to have registered a contraction in real value-added of 0.9% compared to a growth of 0.6% recorded in 2016. This is the lowest rate recorded over the last 10 years. The drop was attributed to a weak performance in the secondary and tertiary industries that recorded declines in real value-added of 6.7% and 1.4% respectively. However, on the backdrop of good rainfall and an increase in the production of major export commodities, the primary industries in 2017 registered a strong growth of 10.6% in real value-added.

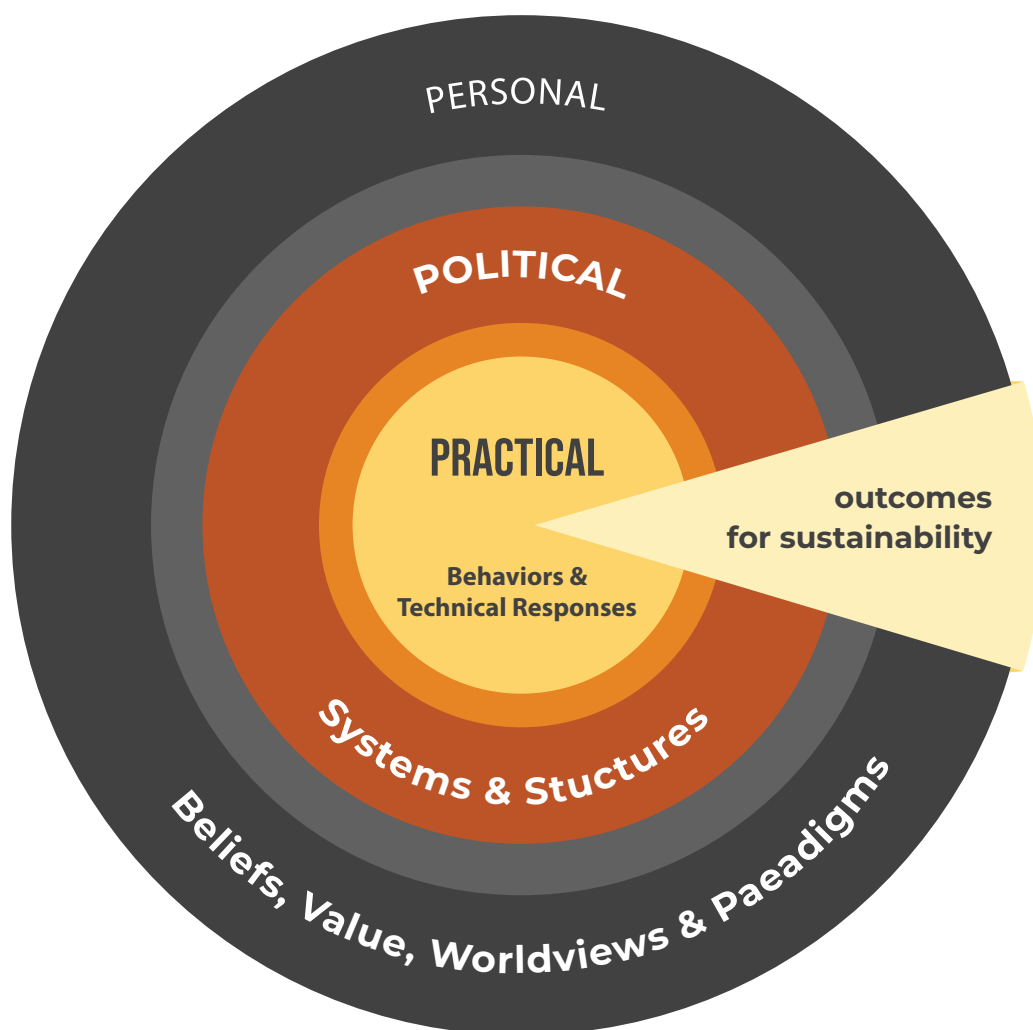
Gross National Income (GNI) measures national income generated by the Namibian factors of production, which are labour, land and capital, both inside and outside of Namibia. Over the period 2007 to 2017, Gross National Disposable Income (GNDI) has been consistently higher than the GNI because of net inflows in current transfers that have been influenced mainly by high SACU receipts. Gross National Income stood at N\$ 173.88 billion in 2017 as compared to N\$ 162.18 billion recorded in 2016, representing an increase of 7.2 percent in nominal terms. GNDI improved to N\$ 191.95 billion in 2017 from N\$ 178.79 billion in the preceding year (UNFCCC, 2020).

### 3.3.3 CLIMATE CHANGE AND SOCIETY

As a society, we have structured our day-to-day lives around historical and current climate conditions. We are accustomed to a normal range of conditions and may be sensitive to extremes that fall outside of this range (EPA, 2017).

Climate change could affect our society through impacts on a number of different social, cultural, and natural resources. For example, climate change could affect human health, infrastructure, and transportation systems, as well as energy, food, and water supplies (EPA, 2017).

Some groups of people will likely face greater challenges than others. Climate change may especially impact people who live in areas that are vulnerable to coastal storms, drought, and sea-level rise or people who live in poverty, older adults, and immigrant communities. Similarly, some types of professions and industries may face considerable challenges from climate change. Professions that are closely linked to weather and climate, such as outdoor tourism, commerce, and agriculture, will likely be especially affected (EPA, 2017).



## 3 SPHERES OF TRANSFORMATION

### 3.3.4 CLIMATE CHANGE AND POLITICS

The government of Namibia has many legal and policy instruments. Examples include the Constitution of Namibia, NDP5, the National Land Policy, the National Drought Policy and Strategy, the Agriculture Policy, the Poverty Reduction Strategy and Action Plan of Namibia, National Action Programme (NAP) to combat desertification and the National Policy and Strategy for Malaria control, to mention a few. Most of these sector specific policies were developed without due consideration of climate change because, at that time, climate change was not regarded as a serious issue. However, it is now known that climate change will affect some of these sectors and therefore it should be considered. For instance, climate change is expected to severely affect the agriculture sector and so the Agriculture Policy needs to integrate climate change issues in order to address predicted impacts of climate change. While some sector policies may address elements of climate change, there is a need to identify issues of climate change commonality amongst sector policies in order to enhance synergies, facilitate cost effectiveness and avoid duplications of effort. In addition, new policies may need to be developed to address climate change. Furthermore, the National Climate Change Policy shall make room for climate change policy review (NCCP, 2010).



# MODULE 4

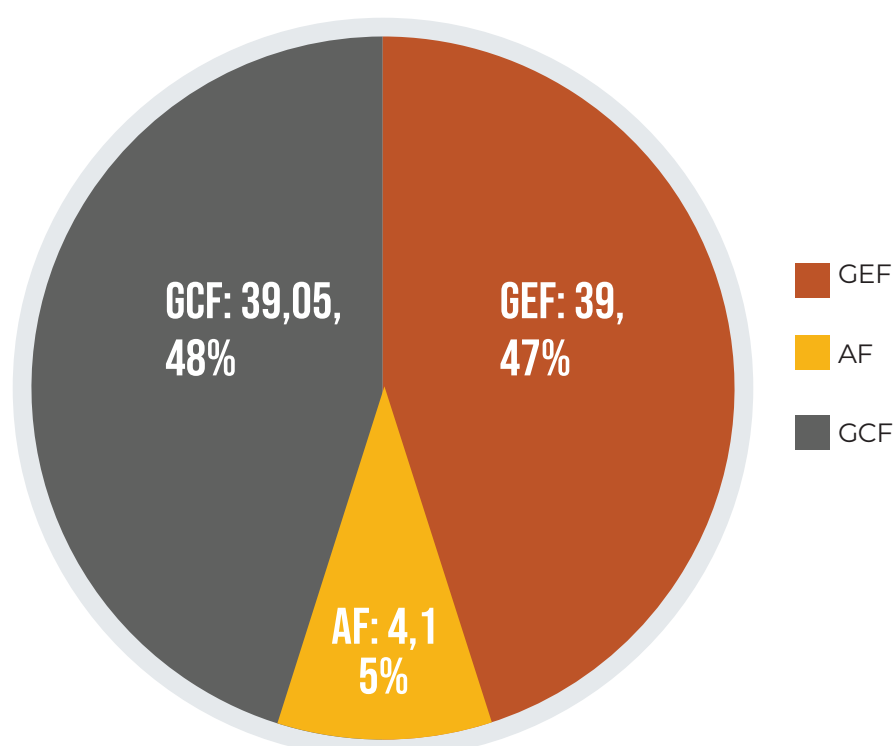
## 4.1 CLIMATE FINANCING

Objective 5 of the National Policy on Climate Change aims to provide secure and adequate funding resources for effective adaptation and mitigation investments on climate change. As a signatory to the UNFCCC, Namibia through the Ministry of Environment and Tourism continues to work closely with different multilateral and development partners to secure climate financing to enable the implementation of the climate change agenda in the country.

In summary, a total of 12 projects have been mobilized from multilateral sources over the past 5 years (2014-2019) with an overall value of N\$1.21 billion at the 2019 exchange rate. The Ministry of Environment, Forestry and Tourism has mobilized seven of these projects worth a total of N\$568.6 million while the Environmental Investment Fund has mobilized four of these projects funded through the Green Climate Fund and worth a total of approximately N\$575.1 million (MEFT. 2020). These projects are summarized in the table below:

FINANCING MECHANISM	NO. OF PROJECTS	VALUE US MILLION	VALUE NAD MILLION
Global Environment Facility (GEF)	7	39.05	574.40
Green Climate Fund (GCF)	4	39.01	575.1
Adaptation Fund (AF)	1	4.1	60.3
Total	11	77.75	1.21 (BILLION)

### CLIMATE FINANCING 2014 -2019 (USD)





## INTERNATIONAL FUNDING MECHANISMS



**The Global Environmental Facility (GEF)** was established in 1992 and assists developing countries in protecting the global environment in the areas of biodiversity, climate change, international waters and ozone layer as well as land degradation, when it is linked to climate change or biodiversity loss. It provides grants and financing to countries to undertake sustainable development activities that generate global benefits, where the cost of doing so exceeds the national benefits.

Since 1998, Namibia has attracted 32 national projects funded through the GEF worth approximately U\$70,0 million of which U\$22 million was specifically for climate change interventions. The GEF has played an important role in catalysing innovations and best practice approaches for improved environmental management in a wide range of areas such as the management of our protected areas, promotion of climate-smart agriculture, sustainable land management and integrated coastal zone governance.



**The Green Climate Fund (GCF)** is a new global fund established in 2010 to support the efforts of developing countries to respond to the challenge of climate change. The GCF helps developing countries limit or reduce their greenhouse gas (GHG) emissions and adapt to climate change. It seeks to promote a paradigm shift towards low-emission and climate-resilient development, taking into account the needs of nations that are particularly vulnerable to climate change impacts. In achieving the Paris Agreement, the GCF supports the implementation and ambition cycle of Nationally Determined Contributions (NDCs) by mobilising the necessary resources and building an investment environment that can help developing countries identify, design and implement transformational climate interventions.



Other smaller financing mechanisms include the **Adaptation Fund** established under the Kyoto Protocol of the UN Framework Convention on Climate Change to help vulnerable communities adapt to climate change and the Global Mechanism established under the Convention to Combat Desertification, which aims to promote the mobilization and channelling of financial resources to countries affected by desertification.

### *Programmes/projects financed.*

As the National Designated Authority and focal Ministry to the multilateral funding windows, such as the Green Climate Fund (GCF), the Adaptation Fund (AF) and the Global Environment Facility (GEF), the Ministry of Environment, Forestry and Tourism has played a major role in coordinating the development and submission of project proposals to access funding from these multilateral windows. The **Environmental Investment Fund** also became one of the first accredited entities to the Green Climate Fund in 2016 and is playing a major role in mobilizing funding from this window.

## Some of the latest projects that have been funded in Namibia through the GEF include:

Funding for all of Namibia's Biennial Update reports to the UNFCCC, as well as Namibia's Fourth National Communication Report to the UNFCCC, for a total grant amount of U\$1,9 million.

Namibia Integrated Landscape Approach for Enhancing Livelihoods and Environmental Governance to Eradicate Poverty (**NILALEG**) project, for a grant of U\$10.8 million. The project aims to promote an integrated landscape management approach in key agricultural and forest landscapes, reducing poverty through sustainable nature-based livelihoods, protecting and restoring forests as carbon sinks, and promoting land degradation neutrality.

Scaling Up Community Resilience to Climate Variability and Climate Change in Northern Namibia, with a Special Focus on Women and Children (SCORE) project, which aimed to strengthen the adaptive capacity to reduce vulnerability of rural communities in responding to droughts and floods in Northern Namibia, with a special focus on women and children. GEF awarded the project a grant of U\$3,1 million.

***In terms of the GCF, four projects, each worth US\$10 million, are currently under implementation through the EIF. These are the:***

**FP023-CRAVE:** Climate Resilient Agriculture in three of the Vulnerable Extreme northern crop-growing regions project aims to increase climate-resilience and reduce the food insecurity of subsistence farmers in Namibia.

**FP024-CBNRM:** Empower to Adapt: Creating Climate-Change Resilient Livelihoods through Community-Based Natural Resource Management in Namibia (EDA) Project. This Enhance Direct Access (EDA) Pilot is built on the strong institutional foundation of the Namibian Community-based Natural Resource Management (CBNRM) network, which consists of communal conservancies and community forests in the rural communal areas of Namibia.

**SAP001-IREMA:** Reducing the vulnerability of smallholder farmers from the effects of climate change by safeguarding natural capital in order to sustain the agricultural production system. Climate change adaptation Project in Kunene Region, which is aimed at improving rangeland and ecosystem management practices of smallholder farmers under the condition of climate change in Sesfontein, Fransfontein and Warmquelle areas in the Kunene Region.

**SAP006-EBA:** project on building the resilience of communities living in landscape threatened under climate change through an Ecosystems-based Adaptation approach in Namibia (EBA) project, also developed by the EIF, was approved by the Board of the Green Climate Fund in March 2019.

For the Adaptation Fund (AF), a pilot project on underground water desalination using renewable power and membrane technology at the Grunau settlement and the Bethanie village, located in the //Karas Region, was approved in 2018. This US\$4.3 million project, being implemented through Namwater, aims to treat local groundwater and bring it to a level that complies with the national standards for drinking water using sun and wind energy to power the desalination process known as reverse osmosis. This technology has a major potential to enhance water security in Namibia. This project is being managed by the AF's accredited entity, the Desert Research Foundation of Namibia (DRFN).

More details of these projects can be found on the following websites:

Green Climate Fund: <https://www.greenclimate.fund/entities/environmental-investment-fund>

Global Environment Facility: <https://www.thegef.org/country/namibia>

Adaptation Fund: <https://www.adaptation-fund.org/ie/desert-research-foundation-of-namibia-drfn/>

## More details on some of these projects is available in the following report:

Improving Livelihoods in Pursuit of Environmental Sustainability. 2019. Ministry of Environment, Forestry and Tourism.

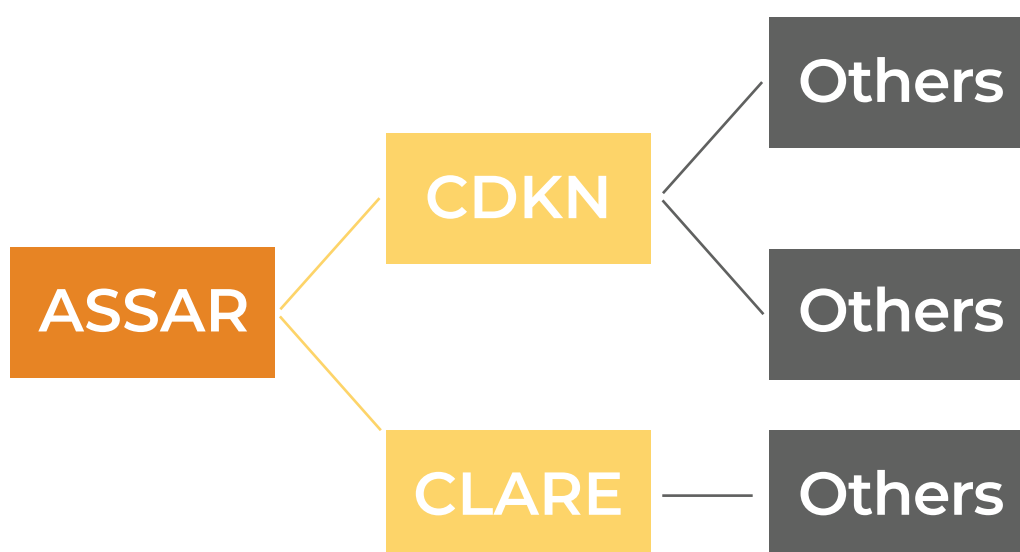
## Examples of other climate change projects:

The Adaptation at Scale in Semi-Arid regions (ASSAR) project, worked over a five-year period (2014-2018) combined interdisciplinary scientific research (at regional and thematic levels), capacity building, and stakeholder engagement to improve understanding of the barriers and enablers to effective climate adaptation. Our work centred on informing climate adaptation policy and practice in ways that advance the agency and long-term wellbeing of the most vulnerable. ASSAR was a project within the CARIAA (Collaborative Adaptation Research Initiative in Africa and Asia) programme, funded by the International Development Research Centre (IDRC) and the then Department of International Development (DFID). In Namibia, this project was being co-implemented by the University of Namibia (UNAM) and the DRFN.

The ASSAR project identified factors that are constraining adaptation planning and implementation in Namibia. Related to (i) ineffective decentralisation characterised by a mismatch in the governance system; (ii) Patriarchy, cultural barriers and limited institutional and individual capacity that is hindering socially inclusive rural development; and (iii) the blanked view of seeing local communities as homogenous people and not as socially differentiated communities.

Building onto the results of the ASSAR project, the Namibian project partners responded to another call for proposals by the Climate and Development Knowledge Network (CDKN), and developed the project titled: Strengthening regional climate change governance through integration of gender responsive climate action into regional development plans and projects. The aim of this project is to strengthen the horizontal relationship among government departments at the sub-national level, support the mainstreaming of gender and climate change into national rural development strategy and enhance local participation of vulnerable people on income-generating activities as livelihood strategies. The project duration is from July 2019 until May 2021. This project is funded by the Ministry of Foreign Affairs of the Netherlands and the IDRC.

The IDRC released another call for proposals in 2019 and the team developed the project proposal aimed at creating urgency and agency on the 1.5 degrees projections released by the IPCC in 2018. This project is part of the Climate and Resilience (CLARE) research program to further develop and scale their results for greater impact and is co-funded by IDRC and the UK's Department for International Development. The CLARE-Namibia component aims to create awareness on the 1.5 °C climate change projections made for Namibia by creating urgency and agency on climate action through collective action, which will be achieved through the vertical and horizontal integration of key actors from the national, regional and local levels. The project also builds onto the research results from the ASSAR project and has a project timeframe from 1 April 2020 until December 2021.





The implementation of the many donor-funded projects has not only contributed towards national development objectives but also employed and groomed a large number of Namibian graduates in the environment sector. Good quality project proposals are now being routinely developed by Namibian experts, while there is now a considerable pool of Namibian experts in fields such as project management, monitoring and evaluation and project administration. The Ministry of Environment and Tourism will continue to ensure that all donor-funded projects are managed and implemented by Namibians and create opportunities to employ interns, young professionals and graduate youth.

There is a continued need to coordinate the development and submission of transformative project proposals, particularly in the fields of water, energy and food security as these can make a significant contribution towards national development objectives. With Namibia now being an upper-middle-income country, there is now a need to engage with non-traditional partners including the local private sector, NGOs and bi-lateral partners to ensure that resources continue to be mobilized for environmental conservation, poverty reduction and employment creation.

## 4.2 CLIMATE ACTION

The Paris Agreement has a goal of limiting global warming to below 2°C (and ideally below 1.5°C) above pre-industrial levels. Current emissions reduction promises by nations fall short of what is needed to meet this target. Instead, global average temperatures could exceed the 1.5°C warming mark by as early as the next decade and the 2°C threshold the decade after (ASSAR, 2018).

For vulnerable countries like Namibia, these seemingly small increments in global temperature can lead to distinct local climate conditions, which can interact with, and worsen, existing vulnerabilities. Many communities in Namibia have little capacity to adapt to the impacts of the changes projected at 1.5°C and above, and government-led adaptation often tends to focus on immediate development needs.

There is thus an urgent need for Namibia to adopt extensive adaptive and transformative responses in order to deal with the increasing risks associated with global temperature rise of 1.5°C and above (Spear et al., 2018). Namibia needs to anticipate and plan for rapid changes in local weather and climate.

To adapt to a 1.5°C+ world, Namibia will need to accelerate the implementation of its National Policy on Climate Change through identified adaptation options outlined in the Climate Change Strategy and Action Plan as well as the Nationally Determined Contributions (NDC's). With these instruments in place, and aware of the near-term risks of 1.5°C warming and above, Namibia will be in a far better position to respond to the impacts associated with 1.5°C and above.

The Paris Agreement requests each country to outline and communicate their post-2020 climate actions, known as their NDCs. Beyond 2020, there needs to be stronger action on the climate targets of the Paris Agreement driven nationally through the NDC.

Together, these climate actions determine whether the world achieves the long-term goals of the Paris Agreement and to reach global peaking of greenhouse gas (GHG) emissions as soon as possible and to undertake rapid reductions thereafter in accordance with the best available science, so as to achieve a balance between anthropogenic emissions by sources and removals by sinks of GHGs in the second half of this century. It is understood that the peaking of emissions will take longer for developing country Parties, and that emission reductions are undertaken on the basis of equity, and in the context of sustainable development and efforts to eradicate poverty, which are critical development priorities for many developing countries.

Each climate plan reflects the country's ambition for reducing emissions, taking into account its domestic circumstances and capabilities. For Namibia, local warming and drying will be greater than the global average. So, even a 1.5°C increase in global temperature will have severe local impacts, negatively affecting water supply, agriculture, health, and other vulnerable sectors. The 1.5°C threshold could be breached within the next decade, and the 2°C threshold the decade after. This means there is an urgent need to accelerate Namibia's adaptation and mitigation responses.

## BENCHMARKING AND CASE STUDIES FROM OTHER COUNTRIES



**RWANDA:** Was the first least developed country in Africa to submit its updated NDC in May 2020. It committed to a reduction in greenhouse gas (GHG) emissions of up to 38% compared to business-as-usual (BAU) in 2030. The NDC2 also expanded coverage of GHGs by adding hydrofluorocarbons and increased the scope of adaptation actions in key sectors such as human settlements, health, transport and mining. It is better aligned with the country's National Adaptation Plan (NAP) and other national policies, and incorporates sector-specific implementation plans, costing and funding mechanisms, as well as links to the Sustainable Development Goals (SDGs).



**SOUTH AFRICA:** The updated draft NDC, the cornerstone of South Africa's climate change response, was approved by Cabinet on 24 March 2021 to be released for public comment. South Africa remains committed to addressing climate change based on science, equity and sustainable development. Similarly, the present draft updated NDC seeks to balance the three structural components of mitigation, adaptation and means of implementation/support requirements. The 2030 target range (398 - 440 Mt CO<sub>2</sub> e q) is consistent with South Africa's fair share, and also an ambitious improvement on our current NDC target. The upper range of the proposed 2030 target range represents a 28% reduction in GHG emissions from the 2015 NDC targets.



**BOTSWANA:** In its initial NDC the country intends to achieve an overall emissions reduction of 15% by 2030, taking 2010 as the base year. Base year emission estimation is 8307 Gg of CO<sub>2</sub> equivalent. The targeted emissions reduction will be achieved domestically through strategies and measures which are relevant for the implementation of the target.

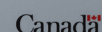


**INDIA:** In its first NDC India has pledged to reduce its emission by 33-35% by the year 2030. The country aims to achieve about 40 percent cumulative electric power installed capacity from non-fossil fuel based energy resources by 2030 with the help of transfer of technology and low cost international finance including from the Green Climate Fund (GCF). The country also aims to create an additional carbon sink of 2.5 to 3 billion tonnes of CO<sub>2</sub> equivalent through additional forest and tree cover by 2030. Further information is contained in the country's NDC.

Read more about ASSAR's work on what the 1.5 degrees projections mean in the semi-arid zones of the world [here](#).

NAME OF INSTITUTION	CONTACT DETAILS	CLIMATE CHANGE I NTERVENTION	SUMMARY
Habitat Research and resource centre	Address: c/o Claudius Kandovazu and Abraham Mashego streets, Soweto Katutura  Email:  Telephone: +264 61 - 268200 Fax: +264 61 - 268201	Sustainable housing Energy efficiency Recycling, reuse Biogas generation from wastewater Urban gardening	The HRDC was set up to focus on sustainable low-cost housing in Namibia, this construction constituting its first major research project. Its scale relates to the low-income housing surrounding it, with the thatched-roofed exhibition space and cooling towers as signposts. Materials include stabilised earth bricks, rammed earth, sandbags, soil-filled tyres and cob, with recycled steel beams and corrugated metal for most of the roof.
Dagbreek Primary School	Address: John Ludwig &, Hebenstreit Street, Windhoek  Email: dagbreeschool@iway.na Rainer Pinseschaum and Paul du Plessis  Phone: 061 227 901  website: <a href="http://www.dagbreeschool.com/">http://www.dagbreeschool.com/</a>	Aquaponics and hydroponics	Dagbreek Primary School implemented a gardening project which was designed by perma-culturists into a forest garden with a greywater system and nursery using different gardening methods, including aquaponics, hydroponics, wicking beds and planting in the soil or seedbeds. The aim is to become a green school in all aspects. The planned Urban Farm and Skills Training Centre project will make a huge impact on the future of the learners at the school by equipping them with different skills.
Rent a drum or Plastic packaging or Zero Waste Store	Address: Outskirts of Windhoek, on the way to Daan Viljoen resort  Email: reception@rent-a-drum.com.na facilitymanager@rent-a-drum.com.na  Telephone: +26461244097  <a href="http://www.rent-a-drum.com.na">www.rent-a-drum.com.na</a>  <a href="http://www.plasticpackagingnamibia.com/en/pp/home">http://www.plasticpackagingnamibia.com/en/pp/home</a>  <a href="https://www.zerowastestore.com.na/">https://www.zerowastestore.com.na/</a>	Waste Management	Rent-A-Drum is a privately owned Namibian company that has grown into the biggest enterprise of its kind with an extended fleet of general waste management and recycling, industrial and mining site solutions that includes recycling, metal recovery management, bioremediation, demolition, rehabilitation and waste removal.  Rent-A-Drum continuously strives to improve methods of proper and more effective waste removal and containment management processes. The company has a strong environmental focus and aims to reduce and control pollution to the absolute minimum. The company's vision is encapsulated in two powerful words; Zero Waste!!
Namib Poultry Industry	Address: Okapuka Farm B1 Highway, Windhoek, Namibia  Email: afourie@npi.com.na  Telephone: 0612901700  <a href="http://www.npi.com.na">www.npi.com.na</a>	Water Management Waste management Biogas production	NPI produces 40 tonnes of chicken waste per day that is converted into more than 9000 cubic metres of biogas and 34 tonnes of fertilizer every day. The biogas can be turned into electricity at the same time, the plant reduces the amount of carbon dioxide released into the air by 23300 tons per year.  Using renewable energy sources is one way NPI can lower Namibian carbon footprints. Biogas is indeed a form of renewable energy as it is produced from organic waste which is a renewable material.
Namibia National Farmers Union	Address: Erf 4, Axali Doeseb Street, Windhoek, Namibia  Email: info@nnfu.org.na  Telephone: 061 271 117  <a href="https://www.nnfu.org.na/">https://www.nnfu.org.na/</a>	Conservation agriculture	NNFU is a national federation of regional farmers unions which aims to increase food production for household security, enhance the marketing of farming products to increase household income, increase participation and recognition of women in farming, contribute to environmental protection and sustainable utilization of natural resources.
Namibia National Farmers Union	Address: Robert Mugabe Avenue, Windhoek  Email: benson@eduventures-africa.org corris@eduventures-africa.org  Telephone: 061-276809  <a href="http://eduventures-africa.org/">http://eduventures-africa.org/</a>	Edumobile Climate change exhibition	EduVentures actively provides environmental experiences for mainly disadvantaged Namibian youth whilst simultaneously contributing to the continued expansion of Namibian scientific knowledge and deepening the collective understanding of its natural and cultural heritage, all of which are crucial to the conservation & sustainable use of Namibia's environment. They provide greater environmental literacy amongst all expedition participants, equipping them to be leaders that actively promote and contribute to the wise and ethical management of Namibia's natural and cultural heritage and to ensure environmental sustainability and well-being.
Penduka Village	Address: Goreangab Reservoir off, Green Mountain Dam Road, Windhoek  Telephone: 081 232 3230  Email: hospitality@penduka.org  <a href="https://www.penduka.com/en/">https://www.penduka.com/en/</a>	Alternative livelihoods Living in harmony with nature	Penduka is a non-governmental development organisation working with women in Namibia. Penduka women make beautiful products. The type of products that you would like to put as an ornament in your house, or use on a daily basis. Products that will enrich your life. A product for you is an income for the women of Penduka. Not only that, but by buying products you also contribute towards financing Penduka's educational- and health projects.





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This work was carried out with the aid of a grant from the International Development Research Centre (IDRC), Canada, as part of the Uptake of Climate Change Adaptation research results in Africa (CLARE NAMIBIA) project. The views expressed herein do not necessarily represent those of the International Development Research Centre (IDRC) or its Board of Governors, or of the entities managing CLARE- NAMIBIA.

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