



Republic of Namibia
Ministry of Environment & Tourism



NATIONAL POLICY ON CLIMATE CHANGE FOR NAMIBIA - 2011



GOVERNMENT OF THE REPUBLIC OF
NAMIBIA

**NATIONAL POLICY ON CLIMATE
CHANGE FOR NAMIBIA**

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Namibia is recognized as one of the countries most vulnerable to the impacts of climate change. The predicted increases in temperature and evaporation as well as increased variability of rainfall will exacerbate the existing challenges that Namibia is facing as the driest country south of the Sahara. Given the reliance of the majority of our population on climate-sensitive sectors such as agriculture, livestock management and fishing, the potential impacts of these changes could be catastrophic for our people. In addition climate change will bring a host of new challenges and opportunities for which we need to be thoroughly prepared.

The damages to infrastructure and loss of livelihoods caused by the extreme flooding events of consecutive three years since 2008 in our northern regions have exposed our vulnerability and unpreparedness for climate change impacts. These events further highlighted the linkages between vulnerability to climate change and pressing socio-economic issues in Namibia such as poverty, lack of income and employment opportunities, high levels of rural to urban migration and unplanned development in urban areas. Drought events equally have the potential to devastate our fragile ecosystems and the livelihoods of our people who depend thereon.

Shifts in the distribution patterns of rainfall, evaporation and temperature are likely to affect the distribution and range of animals and plants as well as vector and water-borne diseases.

The increasing harshness of the climate will place greater stresses upon our plants and animals, many of which are already at the limit of their survival threshold. It has also been predicted that the malaria-prone zone will extend, while cholera and bilharzia may also become more of a threat with increasing flood events. Increased levels of poverty and disease among vulnerable groups are thus a key concern associated with climate change.

In spite of all of these challenges and threats, there are also opportunities for Namibia to benefit from climate change. The worldwide drive to stabilise greenhouse gas concentrations in the atmosphere is increasing the importance of alternative energy sources such as solar, wind, and biomass, with which



Namibia is particularly well-endowed. Financial provisions under the United Nations Framework Convention on Climate Change (UNFCCC) such as the Clean Development Mechanism (CDM), Green Climate Change Fund, Special Climate Change Fund, Adaptation Fund etc, represent a great opportunity for us to leverage much-needed investments into these areas.

The task of addressing these challenges and capitalising on the associated opportunities clearly requires an inter-sectoral approach. The Ministry of Environment and Tourism, with this policy as a first step, is taking the lead role in coordinating this process. The policy lays out a number of principles that aim to guide the process, while also outlining the roles and responsibilities of the relevant stakeholders to ensure the effective implementation of the policy. Climate change has the potential to undermine our development goals, but by preparing ourselves effectively now, we can use the threats and opportunities of climate change to lay solid foundation for a sustainable and prosperous Namibia.



Netumbo Nandi-Ndaitwah, MP

MINISTER



The National Policy on Climate Change pursues constitutional obligations of the Government of the Republic of Namibia, namely for “the state to promote the welfare of its people and protection of Namibia’s environment for both present and future generation.”

The policy seeks to outline a coherent, transparent and inclusive framework on climate risk management in accordance with Namibia’s national development agenda, legal framework, and in recognition of environmental constraints and vulnerability. Similarly, the policy takes cognizance of Namibia comparative advantages with regard to the abundant potential for renewable energy exploitation.

The goal of the National Policy on Climate Change is to contribute to the attainment of sustainable development in line with Namibia’s Vision 2030 through strengthening of national capacities to reduce climate change risk and build resilience for any climate change shocks.

Climate change is real and our actions and behaviours need to be more climate-sensitive. The Policy requires a significant improved capacity in adaptation and mitigation measures. The policy considers existing coping mechanism of vulnerable communities, households and individual, thus, advocating the enhancement of coping capacities in effected communities, and improved institutional response and action at local, regional and national levels.

This Policy presents an overview of climate change from Namibia perspective, vulnerability of Namibia to climate change per sector, predictions for Namibia. The document outlines guiding principles for mainstreaming climate change into policies, legal framework and development planning as well as strategies that need to be followed in key sectors. Furthermore, the document makes provision for resources mobilization, monitoring and evaluation for the implementation of this policy.

This policy promotes the integration and harmonisation of different legislation for effective planning and implementation of climate response measures, taking into

account both environmental and human development needs. The policy will guide Government on the development and enactment of climate-specific legislation to establish appropriate legal mechanisms for policy implementation. The policy supports institutional arrangements that bring flexibility and the capacity to respond quickly to threats and opportunities that may come our way.

The Ministry of Environment and Tourism owe thanks to many who contributed directly or indirectly to the completion of this Policy. We thank the National Climate Change Committee (NCCC) for guiding the process of developing the Policy. Special thanks to Versatile Environmental Consulting CC (VERSACON) for initial formulation of this policy.


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LIST OF ACRONYMS

CAU	Climate Analysis Unit
CCU	Climate Change Unit
CBO	Community Based Organisation
CDM	Clean Development Mechanism
CFC	Chlorofluorocarbons
DDRM	Directorate of Disaster Risk Management
DEA	Directorate of Environmental Affairs
DNA	Designated National Authority
ETSIP	Education and Training Sector Improvement Programme
EU	European Union
GCM	Global Circulation Models
GHG	Greenhouse gasses
INC	Initial National Communication
IPCC	Inter-governmental Panel on Climate Change
LTER	Long-term environmental observation networks
MDG	Millennium Development Goals
MET	Ministry of Environment and Tourism
MWT	Ministry of Works and Transport
NCCC	National Climate Change Committee
NDP 2	National Development Planning 2
NDP 3	National Development Planning 3
NGO	Non Government Organisation
NRAP	National Poverty Reduction Action Programme
ODA	Ozone depleting substances
OPM	Office of Prime Minister
SADC	Southern African Development Community
SNC	Second National Communication
UN	United Nations
UNCBD	United Nations Convention on Biological Diversity
UNCCD	United Nations Convention to Combat Desertification
UNCED	United Nations Conference on Environment and Development
UNFCCC	United Nations Framework Convention on Climate Change

1 INTRODUCTION

1.1 Overview of climate change

Global climate change is one of the greatest challenges the world is grappling with in the 21st century. During the 20th century, global average temperature increased about 0.75 °C and the beginning of the 21st century has been the warmest period in the history of global temperature records (Intergovernmental Panel on Climate Change (IPCC) Report, 2007). Human induced global warming is caused by the emission of greenhouse gases (GHGs), which trap heat in the atmosphere, causing a gradual warming of the earth's surface. The most important greenhouse gases are carbon dioxide (CO₂), methane (CH₄) and nitrous oxide (N₂O). Global CO₂ equivalent concentrations have increased from 280 parts per million per volume (ppmv) in the pre-industrial era (1850s) to 430 ppmv CO₂ today. This represents a 37 % increase mainly due to burning fossil fuels for energy, industries and transport, as well as land use changes including deforestation. Levels of CH₄ and N₂O have also risen by 150 % and 18 % respectively (IPCC Report, 2007). The IPCC predicts that by 2100 the near surface average temperature of the earth, over the globe, will increase by 1.4 °C to 5.8 °C from 1990 levels. This increase is 2 to 10 times more than observed in the 20th century.

Global warming is of considerable concern to society as it will have profound impacts on human lives, through changes in food production, water supply, health, land availability, energy and ecosystems (IPCC Report, 2007). Poor nations, mainly those in Africa, are likely to be affected most by climate change impacts and have less capacity to adapt to such impacts. Ironically, these nations have contributed the least to the problem of global warming.

Climate change is likely to cause changes in the distribution pattern and seasonality of rain, and increase the severity and frequency of extreme weather events such as droughts and floods. According to the fourth Intergovernmental Panel on Climate Change (IPCC) report of 2007 between 75-250 million people in Africa are projected to experience water stress by 2020 and yields from rain-fed agriculture could be reduced by up to 50 % in some African countries, plunging them into food insecurity and malnutrition.

For Southern Africa, sub-continental warming is predicted to be greatest in the northern regions and mean rainfall range from an increase of more than 10 % to decrease in excess of 45 % of current rainfall by 2050. Namibia's climate is



predicted to become hotter and drier with greater variability in rainfall. The prospect of reduced precipitation is of serious concern to Namibia, as a semi-arid country.

In consideration of the implications of global climate change, the Namibian government ratified the United Nations Framework Convention on Climate Change (UNFCCC) in May 1995. The objective of the UNFCCC is to stabilize concentrations of GHG emissions in the atmosphere at a level that would prevent anthropogenic interference with the climate system. According to the UNFCCC, there are general commitments applicable to all parties, however developed countries, designated as annex-1 countries, have specific extra commitments applicable only to them. As a developing country Namibia is mandated to provide prescribed data in the form of emission inventories and submit periodic national communications to the UNFCCC secretariat. It also makes several other contributions, which are essentially of a voluntary nature.

1.2 Vulnerability of Namibia to climate change

Namibia's climate is generally hot and dry with variable and unpredictable rainfall patterns. This situation will become worse as a result of climate change. The country is highly dependent on climate sensitive natural resource-based sectors such as agriculture, fisheries and mining, which accounted for 24% of the total Gross Domestic Product (GDP) in 2008 (Central Bureau of Statistic, National Planning Commission, 2009). In the initial national communication (INC) of 2002, Namibia was classified as being highly vulnerable to the impacts of climate change, particularly the sectors of water resources, marine resources, agriculture, biodiversity and tourism, ecosystems, coastal zones, health, infrastructure and energy (INC, 2002). As an arid country, with low economic growth and a high dependence on natural resource-based industries, Namibia has limited capacity to adapt to climate change impacts.

Based on data from selected Meteorological stations, historical trends of climate in Namibia reveal that there has been a consistent increase in daily maximum temperatures (Dirkx *et al.*, 2008). A mean decadal temperature increase of 0.2°C, which is roughly three times the global mean average temperature increase reported for the 20th Century, has been recorded (Reid *et al.*, 2007, Midgley *et al.*, 2005).

The following highlight the vulnerability of Namibia to climate change:

- Namibia's climate is highly variable. Climate change is expected to worsen this variability and to amplify its adverse impacts.
- The economy of Namibia is highly dependent on its endowment of natural resources including diverse rangelands, arable land, mineral deposits, ecosystems, and biodiversity. Adverse impacts of climate change predicted for Namibia pose a great threat to the economy and sustainable development. This in turn will affect the attainment of national development goals and plans.
- Socio-economic factors including population growth, high levels of poverty, lack of income and lack of employment opportunities greatly worsen the vulnerability of households to the impacts of climate change (Dirkx *et al.*, 2008). In addition, the high prevalence of HIV at 15.3% among parents in 2010 (UNAIDS, 2010), and the high number of female headed households make Namibia even more vulnerable to impacts of climate change.

Climate change has critical health implications. Changes in rainfall will affect the presence or absence of vector and water-borne pathogens (IPCC Report, 2001). Health impacts expected from the increase in temperature and changes in precipitation will result in the occurrence of heat strokes, skin diseases, dehydration, and increased susceptibility to respiratory and gastro-intestinal infections due to drought as well as poor nutrition and sanitation. Incidences of water borne-diseases such as cholera, bilharzia and vector-borne diseases such as malaria could also increase due to the extension of malaria prone zones as predicted in the projected climate change scenarios for Namibia. These problems will be exacerbated by the inability of many communities to cope with increased diseases.

With respect to **water resources**, even in the absence of significant climate change, Namibia is predicted to suffer complete water scarcity by 2020 (INC, 2002). With less than 5% of Namibia considered as dry sub-humid, the vast majority of the country is arid to semi-arid. Bulk water supply is provided through a network of storage dams and from the perennial rivers situated along the northern and southern borders. Thus a reduction in the amount and reliability of rainfall and/or the increase in evaporation due to rises in temperature will decrease the availability of already scarce water resources.

The **agriculture** sector provides food for the majority of the population and also formal and informal jobs. About 62% of Namibians are living in rural areas and

depend heavily on rain-fed agriculture, which is highly vulnerable to changes in climate, seasonal shifts and precipitation patterns. Rain-fed agriculture will continue to produce the bulk of the world's food (FAO, 2008). Reid *et al.* (2007) estimate the losses to the Namibian economy as a result of climate change to range between 1 - 6 % of GDP. In monetary terms this translates to annual losses ranging from N\$385 million to N\$1.1 billion if no action is taken to adapt to climate change. An individual sectoral analysis shows that subsistence agriculture, which supports two-thirds of Namibians, production could decline by 40 to 80 %, while crop and cereal production currently contributing some 1.5% of GDP, would decrease by 10 to 20% due to climate change impacts. Commercial livestock production which is an important sector of the Namibian economy (4 % of GDP), is largely based on the maintenance of good rangelands and water availability. Livestock contribution to the economy could thus decrease by 20 to 50% with the declining condition of this resource. The number of both small and large stock has already declined markedly over the past 20 to 30 years, due to declining rangeland condition and increasing bush encroachment. Reductions in rainfall due to climate change are likely to worsen the impact of this trend on the agricultural sector.

Namibia is home to remarkable **biodiversity**, with more than 4,500 plants and 217 mammals species found in the country. Biodiversity is an essential resource for the Namibian people, with uses ranging from consumptive (food, fuel, medicine) to non-consumptive such as ecosystem services and tourism which rely on the integrity of the natural ecosystem. Namibia's biodiversity is threatened by climate change, for example the diversity of plant life in the winter-rainfall Succulent Karoo biome is vulnerable to changes in rainfall seasonality. Loss of biodiversity may thus lead to reduced tourism revenues for the country.

Namibia's **marine fisheries**, which rely on the nutrient-rich upwelling of the Benguela Current system, are threatened by possible changes brought by climate change. When upwelling is suppressed by northerly or easterly winds, oxygen-poor water can accumulate near the seabed and suffocate marine life. Future changes in the distribution and intensity of winds could therefore affect the fisheries sector. Oceans also absorb more than 80% of solar irradiation received by the earth and continued warming is now unavoidable. It is also possible that observed reductions in pilchard stocks since 1993 could be partially explained by warmer seas (INC, 2002). Climate change impacts will thus affect fish catches, which contribute 6% to GDP, and decreases in production are likely to range from 30% to 50%.

Tide gauge records from Lüderitz and other localities on the west coast of southern Africa over the last 30 years have revealed evidence of sea-level rise. Namibia's coastal towns and settlements, which are important for the country's fishing, tourism, salt and mariculture industries, are threatened by sea level rise.

1.3 Climate change predictions for Namibia

There is considerable uncertainty regarding the accurate detection of future climate change scenarios, despite the continuous improvements in climate science. This is because of various limitations related to the uncertainty in future global GHG emissions, understanding of the dynamics of global climatic systems, natural climatic variability, and lack of long term quality datasets among others. Despite the shortcomings mentioned above, it is predicted with a high degree of certainty by various assessments that Namibia can expect an increase in temperature and evapo-transpiration at all locations, with the maximum increase in the interior (Turpie *et al.*, 2010, Dirkx *et al.*, 2008, INC 2002). Warming is likely to be less along the coast. According to INC report in 2002, climate models predicted that the mean annual temperature for central parts of Namibia will increase by 2 to 6°C by 2100.

Precipitation projections have greater uncertainty compared to those of temperature; however the Global Circulation Models (GCMs) indicate that Namibia will become drier with more variability in rainfall (Reid *et al.*, 2007). Rainfall reductions of 10 % to 30 % relative to the present are predicted for the entire country by 2050 and 2080, with reductions expected to be greatest in the northwest and central regions. Particularly strong reductions are expected in the central areas around Windhoek and surrounding highlands (Midgley *et al.*, 2005). While some areas will become drier and harsher, while others could potentially benefit from more humid conditions. Changes are expected in the temporal and spatial scales of both the growing and rainy seasons. Overall an increase in frequency and intensity of both floods and droughts is predicted. With less than 5% of Namibia being considered dry sub-humid, the majority of the country's climate at present is arid to semi-arid with high variability and thus, inherent uncertainty. The already inherent uncertainty to Namibia's climate is expected to become more pronounced and difficult to manage considering the climate change risk.

Evaporation in Namibia is already extremely high with 83% of total precipitation lost. With a decrease in rainfall and increase in temperature expected,

evaporation rate is predicted to increase by about 5% per degree of warming (INC, 2002). Therefore Namibia is likely to face severe water shortages with the poor rural population likely to be affected the most.

The frequency and intensity of extreme events such as droughts and floods have increased across Africa and Namibia is no exception. These events caused major disruptions to the economy of the country, thus worsening its vulnerability. For example the 2003/4 drought cost the Namibian Government N\$ 275 million in provision of emergency relief. Extreme events are predicted to increase with devastating impacts on the lives of many people.

In terms of Namibia's economy, Reid *et al.* (2007) suggests that over a 20-year period, annual losses due to climate change impacts on the natural resource base alone could be 1 - 6 % of the Namibian GDP. In monetary terms this translates to annual losses ranging from N\$490 million to N\$1, 4 billion if measures against climate change are not put in place.

One of the predicted consequences of climate change is sea level rise, which is expected to increase by 18-59cm over the 20th century. Climate change induced sea level rise is expected to cause (i) increased coastal erosion, (ii) flooding, inundation and displacement of coastal wetlands and lowlands (iii) impairment of water quality in freshwater aquifers and estuaries due to increased salt intrusion and (iv) reduced protection from extreme storm and flood events with accompanying damage to infrastructure and displacement of communities.

Human livelihoods and the capacity of nature to support human needs will severely be affected by the impacts of climate change on natural resources and the functioning of ecosystems. Of particular vulnerability are the poor, due to their heavy dependence on natural resources for their livelihoods and their low capacity to adapt to the impacts of climate change. The need for Namibia to adopt climate change strategies that reduce vulnerability and improve adaptive capacity, while at the same time working towards long-term economic development goals, cannot be overemphasized.

Despite the uncertainty of the impacts of climate change on many sectors, there is an urgent need to act now. Indeed there is a huge need for knowledge production regarding climate change and its impact in various sectors.

2 POLICY FRAMEWORK

This policy of the Government of the Republic of Namibia aims to manage climate change response 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 maximized, and negative impacts minimized. In order to achieve this, the government will implement adaptation measures to reduce the vulnerability of the population to impacts of climate change by enhancing their adaptive capacity whilst pursuing sustainable development.

2.1 Aim

Namibia strives for excellence to address climate change as a challenge by responding in a timely, effective and appropriate manner via exploring adaptation and mitigation approaches relevant to different sectors at local, regional and national level in order to improve the quality of life of its citizens.

2.2 Objectives

In Namibia, economic and social development remain critical issues, thus the climate change policy seeks as far as possible to promote the primary government objectives, which include job creation, provision of basic services and infrastructure development, alleviation of poverty and provision of housing. These priorities are generally compatible with the principles of sustainable development as defined in the Rio Declaration of 1992. The objectives of this policy are:

2.2.1 Objective 1

To develop and implement appropriate adaptation strategies and actions that will lower the vulnerability of Namibians and various sectors to the impacts of climate change.

This will be achieved through the adoption and successful implementation of appropriate and effective climate change adaptation measures. Achievement of this objective will significantly contribute to the attainment of national development goals and the long-term national vision.

2.2.2 Objective 2

To develop action and strategies for climate change mitigation

This will be achieved through the development and implementation of renewable energy and energy use efficiency, Clean Development Mechanism (CDM) and enhanced carbon sinks.

2.2.3 Objective 3

To integrate climate change effectively into policies, institutional and development frameworks in recognition of the cross-cutting nature of climate change.

Most existing policies relevant to climate change were developed at a time when climate change was not a national or global problem. Although the Ministry of Environment and Tourism (MET) is the designated lead agency for climate change response in Namibia, the cross cutting nature of climate change issues has ramifications for diverse activities in other government ministries. The MET should strive to make government departments in all spheres work together on a cooperative basis to deal with climate change. It is envisaged that the Policy will help enhance synergies to ensure climate change and other issues are effectively, efficiently and cost-effectively addressed by relevant sectors and stakeholders. This objective will be achieved through the harmonisation of policies and laws to reflect an integrated approach in planning, decision making and implementation with respect to climate change. As far as possible, climate change shall be mainstreamed into sectoral policies.

2.2.4 Objective 4

To enhance capacities and synergies at local, regional and national levels and at individual, institutional and systemic levels to ensure successful implementation of climate change response activities.

At all levels capacity regarding climate change lags behind the requisite standards in Namibia for historic reasons. This matter warrants immediate action across the whole spectrum of national activities, both within and outside government. Given the grim predictions of the effects of climate change on rural poor communities; women; children and marginalised groups, it is imperative to increase awareness and knowledge about climate change, as

well to empower people to participate in the planning, development and implementation of appropriate responses to climate change.

2.2.5 Objective 5

To provide secure and adequate funding resources for effective adaptation and mitigation investments on climate change and associated activities (e.g. capacity building, awareness and dissemination of information, etc)

It is imperative that adequate funding resources are secured for short, medium and long-term adaptation and mitigation responses to climate change. In addition, funding should cover awareness generation, capacity building and education about climate change to ensure that people at all levels can participate effectively in climate change interventions. Such funding will be provided through Namibia's treasury budgetary allocation using set procedures.

The Namibian government shall ensure that Namibia leverages the best possible access to available climate change funding. Such funding can be accessed through international bodies like the UNFCCC to meet international obligations, provided that such funding results in projects that are in line with Namibia's domestic sustainable development needs.

3 GUIDING PRINCIPLES

3.1 Mainstreaming climate change into policies, legal framework and development planning

Given Namibia's vulnerability to climate change, the Namibian government recognises the need to prioritise climate change issues and integrate climate change into sectoral policies, as well as mainstreaming climate change into development planning to ensure that it is addressed at appropriate levels at all times. There is a need to mainstream youth, gender, child welfare and vulnerable groups into climate change responses at local, regional and national levels. This mainstreaming shall be integrated into existing policies and laws; and shall be supported by all government agencies especially at local and regional levels, non-governmental organisations (NGOs), community-based organisations (CBOs) and Faith Based Organisations.

3.2 Sustainable development and ensuring environmental sustainability

The government recognises the need for Namibia to develop in such a way as not to compromise the ability of current and future generations to meet their needs. In recognition of Namibia's reliance on natural resources, it strongly advocates the sustainable and equitable use of natural resources as catered for in existing policy instruments, legal and development instruments and, where necessary to enhance the enabling environment.

3.3 Stakeholder participation in climate change policy implementation

The government recognises the importance of meaningful participation in the planning, development and implementation of climate change activities at local, regional and national level. The policy recognises the need to ensure the participation of women, children and other vulnerable/ marginalised groups and individuals, as well as, the use of appropriate local knowledge for adaptation. The role of the participation of Non-Government Organisations (NGOs), Academic Institutions, Community Based Organisations (CBOs) and Faith Based Organisations and the private sector in climate change adaptation and mitigation is viewed as important. In particular NGOs, CBOs and Faith Based organisations should contribute to climate change awareness and advocacy.

3.4 Awareness generation, education, training and capacity building

The need for and importance of raising awareness, building capacity and empowering stakeholders at local, regional and national levels and at the individual, institutional and systemic levels to ensure a collective and timely response to climate change is emphasised. It is also recognised that in order to foster long-term capacity for climate change in Namibia, there is a need to appropriately integrate climate change into the education system to generate awareness and capacities at the early stages of educational development in the country.

3.5 Human rights-based development

The Namibian government recognises and embraces the fundamental rights of humankind and further recognises the prediction that the most severe effects of climate change will be felt by the rural poor, women, children and marginalised groups/ individuals. It thus advocates for the practising of human rights-based development in accordance with national and international law at all times during implementation of climate change response activities.

3.6 Promote and address 'adaptation' and 'mitigation' as key approaches

Namibia is vulnerable to climate change for reasons already mentioned. In light of Namibia's vulnerability and the risks associated with climate change, this policy seeks to provide a response tailored to local, regional and national conditions, such that the country can effectively and efficiently mitigate and adapt to climate change.

The Namibian government advocates for the development of adaptation and mitigation measures that will reduce Namibia's vulnerability to climatic variability and change while addressing the needs of the most vulnerable social groups and sectors. This will ensure that Namibia's development trajectory is climate resilient and focused on sustainable livelihoods of the most vulnerable, as well as the socio-economic and economic viability of current sectors.

3.7 Public, Private Partnership

The role of the private sector in climate change adaptation and mitigation is important. The government shall encourage the development of public private

partnerships that shall contribute to climate change adaptation and mitigation. The private sector can also play a role in raising funds, the development and transfer of technology for climate change adaptation and mitigation as well as capacity building for climate change.

4 STRATEGIES

While Namibia has achieved much to address its national development goals in the face of the predicted impacts of climate change, this policy serves as a legal framework within which to formulate and implement a strategy and action plan to address the challenges of climate change. Climate change is complex and its impacts will affect many sectors in Namibia. Impacts of climate change will also vary widely in different parts of the country. In order to adequately address the impacts of climate change, sectoral strategies will be devised in the following sectors.

4.1 Sustainable access to water

Climate change impacts are expected to affect water availability through increased variability of rainfall, temperature increases, prolonged and more severe droughts, declining soil moisture and increased evapo-transpiration. 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 government will:

- (a) Formulate and implement a strategy for harvesting and capturing water during the rainy season and provide guidelines for more efficient water use by sectors, households and individuals.
- (b) Be flexible in water use allocations and increase coverage of water supply and water treatment facilities across sectors, households and individuals targeting both rural and urban communities at local, regional and national level.
- (c) Promote and encourage integrated water resources management, including contingency planning for extreme events such as floods and droughts.
- (d) Promote and encourage artificial recharge of groundwater in arid and semi-arid environment.
- (e) Construct new water facilities, infrastructure and promote alternative water access e.g. desalinization and fog harvesting as well as optimizing the existing facilities.
- (f) Prevention of water pollution.

4.2 Food security and sustainable resource base

Climate change will negatively impact food security and the natural resource base in Namibia. In particular, the poor and vulnerable, especially women and children will be severely affected. To effectively address the issues of food security and the sustainable resource base in Namibia as affected by climate change, the government will:

- (a) Encourage the integration of landscape ecology into land use planning.
- (b) Integrate poverty-climate change issues into economic policies and plans across sectors.
- (c) Promote diversification of the food base.
- (d) Promote systems in the agricultural sector that are climate resilient.

4.3 Agriculture

Agriculture is one of the most vulnerable sectors to climate change as its activities are dependent on climate. The possible impacts of climate change on food security have tended to be viewed with most concern in locations where rain-fed agriculture is still the primary source of food and income (FAO, 2008). Nonetheless rain-fed agriculture will continue to produce the bulk of the world's food. In order to achieve sustainable agricultural production, the government will:

- (a) Make provision and installation of water treatment plants as an integral component of all irrigation water supply schemes.
- (b) Promote and encourage conservation agriculture and ecologically compatible cropping systems.
- (c) Promote and encourage highly adaptive and productive breeds of livestock in both communal and commercial areas.
- (d) Promote and encourage highly adaptive and productive crop cultivars in dry-land or rain-fed crop farming system.
- (e) Promote and encourage agricultural production to best maintain and improve household income.
- (f) Promote sustainable management of rangelands and pastures through preparation and implementation of integrated rangeland management plans to avoid land degradation and deforestation.

4.4 Forestry

Changes in rainfall and intensified land use will exacerbate or worsen the desertification process and land may become more degraded. To ensure sustainable management of natural forestry and increased vegetation cover, the government will:

- (a) Strengthen the existing National Forestry Policy to avoid illegal logging that can lead to deforestation and land degradation.
- (b) Strengthen existing forestry research and encourage the conservation and restoration of ecosystems critically threatened by climate change.
- (c) Promote and encourage reforestation and forestry preservation carbon offset projects which are in line with global warming solutions.

4.5 Biodiversity and Ecosystem services

The government promotes the conservation and sustainable use of Namibia's biodiversity and effective management of ecosystems, as well as the equitable sharing of benefits arising thereof for the well-being of the nation. To effectively address the challenges posed by climate change to biodiversity, the government will:

- (a) Encourage involvement of local communities in the conservation and sustainable use of biodiversity through provision of conservancies.
- (b) Ensure that any mining activity within and in the vicinity of National parks does not compromise the wellbeing of the ecosystem.
- (c) Identify biodiversity hotspots where no development should be allowed.

4.6 Human health and wellbeing

Poor sanitary conditions due to predicted floods in some areas, as well as malnutrition due to reduced crop yields and livestock productivity will increase illness and child mortality. Therefore, health and well being is an important component that the policy addresses. In order to prevent and minimize challenges posed by climate change to the people of Namibia, the government will:

- (a) Make the provision of safe water and sanitation facilities mandatory for the public in affected areas and other public facilities such as hospitals and schools.

- (b) Provide medical assistance to the citizens of Namibia affected by climate change-induced diseases as well as malnutrition.

4.7 Fisheries and marine resources

A warmer sea surface temperature has already been noted over the northern Benguela region off the coast of Namibia. This warming trend may be one of several environmental factors that have contributed to declining fish stocks experienced in recent years. To ensure sustainable management of fisheries and marine resources with the uncertainty of climate change, the government will:

- (a) Promote integrated fisheries and marine resources management.
- (b) Encourage any other approach that leads to sustainable management and utilization of fisheries and marine resources.
- (c) Strengthen and encourage integrated coastal zone management plans for the protection of marine life.

4.8 Infrastructure

Predicted impacts of climate change in Namibia are likely to affect infrastructure including houses, buildings, roads, railways, dams, water pipes, electricity transmission, communication, sewerage and drainage systems. High sea level rise may inundate coastal towns including Walvis Bay, Namibia's only deep water harbour, and the diamond and fishing harbour of Lüderitz. In highly populated areas of north central and north east Namibia, which are flood-prone, houses and businesses are frequently destroyed and roads flooded, which restricts access to homesteads and amenities. Impacts of climate change on infrastructure are magnified in places where housing and settlements are poorly planned and developed. The economic cost of impacts of climate change on damages to infrastructure, insurance claims, and repairs and reconstructions, though not easy to estimate, is likely to be very high. Hence infrastructure is a key issue that is integrated in this policy. To effectively ensure sustainable management of infrastructure and developmental challenges related to climate change, the government will:

- (a) Establish and enforce standards for infrastructure development such as roads, housing, and water infrastructure etc. Through monitoring and reporting systems.

- (b) Encourage the integration of climate change issues into development planning strategies.
- (c) Develop a national strategy for infrastructural developments that take into account the risks related to climate change and that are environmentally friendly.
- (d) Encourage the adoption of town planning standards and principles to make cities and towns more climates resilient.

4.9 Sustainable energy and low carbon development

Power capacity shortages experienced in the SADC region since 2007 suggest a looming energy crisis in southern Africa (Electricity Control Board 2006). In addition to complicating the huge challenge of electrification throughout the region, the energy crisis has cross-sector implications as energy and economic development are inextricably linked. Given the imminent, widespread threat of such a crisis, adaptation that accounts for the impact of climate change in the energy sector is a matter of the highest urgency.

Adaptation in the energy sector can take place on the supply or demand sides or, preferably, both. Energy production adaptation works toward long-term energy security through the use of renewable and energy efficient production technologies and decreases the dependence on non-renewable, volatile and environmentally unsound resources. On the other hand, energy demand adaptation focuses on the decrease of energy consumption through the use of energy efficient and renewable energy devices and technologies. The energy policy adopted by Namibia will to a large extent determine its development path (low carbon vs. high carbon development path) and Namibia's contribution to climate change mitigation. The policy supports sustainable energy and exploration of low carbon development. To promote sustainable energy and the exploration of low carbon development as a means of sustainable development with the uncertainty of climate change, the government will:

- (a) Promote renewable forms of energy (wind, solar, bio-gas etc.) at all levels to reduce Green House Gases (GHG).
- (b) Formulate and enact energy conservation legislation and audit standards.
- (c) Promote Green technology, practices and standards.
- (d) Ensure reduction and control of harmful emissions through regulatory programs.

4.10 Education, training, capacity building and institutional strengthening

The complex nature of climate change requires the involvement of well-trained scientific, technical and managerial staff that not only understand climate change but are also involved in adaptation to climate change (Mfune and Ndombo, 2005). Namibia also needs institutional structures that are adequately equipped and able to provide facilities and finances to support programs and activities of climate change adaptation and mitigation. Education, training and capacity building for climate change refers to the development and/ or strengthening of individual skills, expertise and increasing the capacities of relevant institutions and organisations to reduce GHG emissions and/ or reduce vulnerability to climate-related impacts (adaptation). Education, training and capacity building should involve multiple stakeholders, including the government, NGOs, research institutions, local communities and international organisations. Building and strengthening human and institutional capacity to address climate change shall be a fundamental component of Namibia's climate change strategy. To effectively address challenges brought by climate change in Namibia, the government and its stakeholders will:

- (a) Mainstream climate change into the formal education system, at all levels (primary to tertiary) and support educational institutions. Link to ETSIP and relevant educational policies and education through the media.
- (b) Support specialized post graduate training of Namibians to address climate change science, impacts, vulnerabilities, adaptation and mitigation
- (c) Promote and encourage training and strengthening through capacity building of media institutions as they have an important role to play to provide accurate and reliable information to the community.
- (d) Strengthen institutional capacity of institutions of higher learning and government ministries through provision of equipment; infrastructure and financial resources to enable them effectively implement the policy.
- (e) Foster collaboration and international partnerships.
- (f) Support institutions (including private sector) to mainstream climate change issues into their policies and activities, to adopt low-carbon technologies, renewable energy and energy efficiency measures.

4.11 Research and information needs

Although scientific evidence indicates that the climate is changing due to anthropogenic forces (IPCC, 2001) climate change and its impacts are not well

understood. Many stakeholders including scientists, policy makers and more importantly the vulnerable people in rural areas in developing countries, do not understand climate change. Little is known regarding the manner in which the climate system, its components and its interactions will respond to climate change. Due to the uncertainties in the predicted impacts and the futuristic nature of when impacts will occur, much is not known for certain how climate change will affect Namibia.

Climate change research needs to be properly coordinated and the benefits optimised to meet the needs of decision makers in Namibia. Attention needs to be focused on projects that will assist with adaptation and mitigation to climate change and address specific areas of vulnerability. Further development and demonstration projects are required to show the advantages and acceptability of a variety of technologies related to climate change. It is also the purpose of this policy that research results obtained in Namibia or elsewhere shall form the basis of the development and implementation of strategies and action plans for adaptation and mitigation of the impacts of the climate change. The strategies and action plans for climate change adaptation and mitigation should be evidence-based, as informed by research findings. To effectively address challenges posed by climate change in Namibia, scientific evidence is required, therefore the government will:

- (a) Identify national research priorities of climate change across sectors.
- (b) Provide adequate funds for research to undertake needs-based research in priority areas of climate change.
- (c) Strengthen and encourage relevant research and technological development at institutions of higher learning.
- (d) Establish observation posts around the country in each region to monitor and evaluate climate change effects in Namibia over time.
- (e) Research on indigenous knowledge and adaptation strategies.
- (f) Create mechanisms to collect, manage and *disseminate* information to all community levels in Namibia.
- (g) Foster international collaboration with regard to climate change research.
- (h) Coordinate, manage and encourage research and information sharing; capacity building for knowledge production on climate change.

4.12 Public awareness, participation and access to information

Climate change is likely to exert its greatest impact on the natural resources of Namibia, and on the livelihoods of the majority of local people who live in rural areas. Public awareness will empower stakeholders, especially local subsistence and commercial farmers to participate in adaptive response activities. In order to effectively address adaptation and mitigation, the public needs to be aware and have access to accurate, up-to-date information of climate change issues, therefore the government will:

- (a) Develop and implement a national strategy for raising climate change awareness of the general public as well as targeted groups (such as Councillors, Parliamentarians, Church, traditional leaders and Youth) at the regional and national level. Information dissemination through various media and outline role of media. Mobilize citizens to adopt adaptation and mitigation measures (e.g. low-carbon lifestyles)
- (b) Mainstreaming of public awareness, participation and access to information as a key issue of concern and importance to climate change through the Ministry of Information and Communication Technology (MICT).
- (c) Establish a climate change management information system to provide accurate and timely information for informed decision-making as well as to ensure public access to climate change information.

4.13 Disaster reduction and risk management

Namibia's risk reduction management is committed to international risk reduction initiatives such as the Hyogo Framework for Action and the Africa Regional Strategy for Disaster Risk Reduction. The disaster risk management strategy recognises disaster risk reduction as a frontline defence in adapting to impacts of climate change. To ensure disaster risk reduction and adequate preparedness for climate change induced disasters, the government will:

- (a) Develop and implement a climate change induced disaster management strategy.
- (b) Establish and strengthen climate change induced disaster management institutions at regional and national levels to reduce causality and ensure preparedness.
- (c) Provide basic needs to the victims of climate change induced disaster either in the form of financial assistance or donations of food, goods and services as the need arises in terms of economic losses.

4.14 Financial resource allocation, mobilization and management

Adequate resources, including finances are required in order to undertake climate change adaptation and mitigation. The New Delhi Work programme recognises the need for adequate financial and technical resources to ensure the effective implementation of the activities of Article 6 of UNFCCC. Since Namibia contributes very little to greenhouse gas (GHG) emissions, its preoccupation focuses on adaptation to the effects of climate change. Financial and other resources are needed in the quest for adaptation. The UNFCCC, through the Bali Action Plan, also recognises the importance of funds. All activities of climate change adaptation and mitigation will require financial and other resources. Such funding sources should include adequate allocation for the exploration of appropriate off-setting opportunities in the various sectors. To ensure sustainable development and implementation of climate change adaptation and mitigation approaches, the government will:

- (a) Develop a strategy to finance mitigation and adaptation activities.
- (b) Establish a sustainable development fund for climate change emergencies at regional and national levels to support the affected sectors and people of Namibia.
- (c) Make provision of financial resources for climate change induced disasters at the regional and national levels.
- (d) Allocate financial resources based on needs assessment to the institutions of higher learning to enhance the capacity of regional government and affected ministries or sectors.

4.15 International cooperation and networking

The global nature of climate change necessitates the exchange and sharing of data, information and expertise at regional and international levels in order to enhance appropriate and effective responses. There is a wealth of data on climate change adaptation and mitigation programmes and activities, as well as good case studies from different parties to the UNFCCC, which can be shared, adopted and adapted. In addition, lessons learned and best practices to capitalise on off-setting opportunities can be accessed through cooperation and networking and can be developed and implemented through bilateral or multi-lateral frameworks. To address and enhance appropriate and effective responses to climate change effects, the government will:

- (a) Make provision for regional and international cooperation, collaboration and networking in order to tap into the existing wealth of information, data, expertise, and financial resources.
- (b) Effectively participate in regional and international platforms to enhance cooperation in dealing with the climate change.
- (c) Make provision for regional cooperation in order to deal properly with transboundary issues related to climate change (such as transboundary surface and ground water; transboundary disasters as well as regional climate change models to mention a few.)
- (d) Develop and implement national strategies and action plans for all bilateral or multilateral global warning frameworks in line with National Development Plans and Vision 2030 as well as the Millennium Development Goals.

4.16 Technology development and transfer

In order to address climate change mitigation and adaptation, the need to develop new technologies and the transfer of existing appropriate technologies cannot be ignored. New and clean energy technologies need to be developed to reduce greenhouse gas emissions while technologies also need to be developed to address climate change issues related to water shortages for agricultural production, drought resistant crop varieties and livestock breeds and food security. The African Ministerial Conference on the Environment (AMCEN) in May 2009 in Nairobi reaffirmed that the development and technology transfer are critical to the achievement of both adaptation and mitigation programmes in Africa. Technology transfer and development is one of the four pillars of the Bali Action Plan, but more importantly can benefit adaptation and mitigation initiatives. The role of technology in the socio-economic growth of Namibia is enshrined in both Vision 2030 and the NDPs (one key Results Area of NDPs is knowledge based economy and technology driven nation). The National Climate Change Policy identifies technology development and transfer to be a key issue for which strategies and action plans should be developed. Therefore the government will:

- (a) Identify technology development and knowledge transfer to be a key issue for which strategies and action plans may be developed.
- (b) Promote and encourage new and clean energy technologies to be developed in order to reduce greenhouse gas emissions.
- (c) Encourage technological development to address climate change issues related to water shortages for agricultural production, drought resistant crop varieties and livestock breeds and food security.

- (d) Ensure that technological development goes hand in hand with affordability, transfer of skills and is sustainability.

4.17 Policy and legislative development

The government of Namibia has many legal and policy instruments. Examples include the Constitution of Namibia, NDPs, the National Land Policy, the National Drought Policy and Strategy, the Agriculture Policy, the Poverty Reduction Strategy and Action Plan of Namibia, a policy on desertification and the National Policy and Strategy for Malaria control. Most of these sector specific policies were developed without due consideration of climate change because at their time of development, climate change was not regarded as a serious issue. However, it is now known that climate change will affect most of these sectors and should therefore be considered. For instance, climate change is expected to severely affect the agriculture sector and so the Agriculture Policy needs to integrate climate change issue in order to address predicted impacts of climate change. In addition, new policies may need to be developed to address climate change. To effectively address challenges posed by climate change in Namibia, the government will:

- (a) Integrate climate change policy into the existing policies based on specific sectors.
- (b) Identify issues of climate change commonality amongst sector policies in order to enhance synergies, facilitate cost effectiveness and avoid duplications of effort.
- (c) Encourage that all climate change activities are in line with internationally accepted scientific findings.
- (d) Review the climate change policy as the need arises.

4.18 Gender issues and child welfare

Namibia's vulnerability and adaptation assessment indicates that the poor and rural populations of Namibia, most of them being women, are most vulnerable to climate change because rural populations are extremely dependant on natural resources. Children in rural areas are still very prone to curable diseases and thus more vulnerable to illness, child and infant mortality. The policy recognizes that both rural and urban communities are vulnerable to climate change effects. Therefore the government will:

- (a) Ensure that communities are empowered and both men and women participate meaningfully in the planning, testing and roll out of adaptation and mitigation activities in both rural and urban areas.
- (b) Ensure that climate change response activities are gender sensitive.
- (c) Include gender and climate change in the curriculum of education and training programs.

4.19 Vulnerable groups

Climate change is expected to disproportionately affect vulnerable groups such as the poor, people living with disability, people living with HIV, the elderly, Orphans and Vulnerable Children (OVC), and marginalised communities. To effectively address the challenges posed by climate change to the vulnerable groups, the government will:

- (a) Make provision to ensure that the vulnerable groups are empowered to effectively and adequately adapt to the impacts of climate change.
- (b) Encourage and support vulnerable groups to engage in sustainable adaptation mechanisms to cope with climate change effects.
- (c) Integrate climate change poverty related issues into economic policies and actions plans.

5 NATIONAL POLICIES AND LAWS RELEVANT TO CLIMATE CHANGE

Given the crosscutting nature of climate change, it is imperative that all the sectors evaluate the impacts of climate change and find strategies towards adaptation and mitigation. Namibia has a number of laws and policies that are regarded as key to the natural resources, environment and climate change interface in Namibia as listed in Table 1.

There are also overarching policies, frameworks and conventions, which this policy should support, such as the constitution of Namibia, Vision 2030, National Development Plans, and United Nations Conventions and Protocols.

Table 1: Key policies and laws of relevance to climate change

Sector	Policy and laws
Environment	Environmental Assessment Policy (MET, 1995) Environmental Management Act (2007) Land Use Planning Towards Sustainable Development Policy (MET, 1994) Pollution Control and Waste Management Bill
Agriculture	National Agriculture Policy (MAWF, 1995) National Drought Policy and Strategy (MAWF, 1997) Green Scheme Policy (MAWF, 2004 and revised in 2008) National Rangeland Management Policy and Strategy (MAWF, under compilation)
Water	National Water Policy White Paper (MAWF, 2000) Water Resources management Act (2004)
Planning	Regional Planning and Development Policy (NPC, 1997) National Poverty Reduction Action Programme (NPC) National Development Plans Vision 2030
Forestry, Parks and Wildlife	Forestry Development Policy (MAWF, 2001) Forest Act (2001) Wildlife Management, utilisation and Tourism in communal Areas (MET, 1995) Amendment to the 1975 Nature Conservation Ordinance (1996) Promotion of Community Based Tourism Policy (MET, 1995)
Land	National Land Policy (MLR, 1998) National Resettlement Policy (MLR, 2001) Commercial Land Reform Act (1995) Communal Land Reform Act (2002)
Energy	White Paper on Energy
Fisheries and coastal management	Territorial sea and exclusive economic zone of Namibia Act 3 of 1990 Sea shore Ordinance Walvis Bay and Offshore Islands Act 1, 1994 Namibian Ports Authority Act 2 of 1994 Division of Land Ordinance of 1963 Marine Resources Act 27 of 2000 Aquaculture Act 18 of 2002 Inland Fisheries Act of 2003
Education	Education policy Programmes such as the Education and Training Sector Improvement Programme (ETSIP)
Disaster Risk Management	National Policy for Disaster Risk Management in Namibia (OPM, 2009)

6 REGIONAL AND INTERNATIONAL PROTOCOLS AND CONVENTIONS

6.1 SADC Climate Change related policies and strategies

The policy recognizes that the impacts of climate change are multi-sectoral in nature and that these impacts are not necessarily restricted to national boundaries. There is a need to cooperate at regional level in the development and implementation of climate change adaptation and mitigation interventions. Hence the government will.

- Recognize climate change policy at SADC level should it come into existence.
- Align with relevant African Union (AU) policies, which are in line with SADC policies that refer to climate change aspects. These include but are not limited to;
 - SADC Regional Biodiversity Strategy
 - SADC Protocol on Forestry
 - SADC Regional Agriculture Policy
 - Lusaka Agreement (2008) - Southern African Development Community (SADC) Regional Policy Framework on Air Pollution
 - SADC Regional Water Policy and Regional Strategy (RWSP)
 - NEPAD
 - Trans-boundary Water Resources Management
 - SADC Protocol for Fisheries
 - SADC Protocol on shared water courses
 - SADC Protocol on Energy
 - SADC Protocol on Transport, Communication and Meteorology.

6.2 Millennium Development Goals (MDGs)

In 2000, Namibia, signed the Millennium Declaration, adopted by the United Nations, which sets out key challenges that face humanity worldwide. The Declaration is a determined promise by UN member States to address these challenges and establishes concrete measures for assessing progress and performance through a set of interrelated goals. The eight Millennium Development Goals of the United Nations are eradicating extreme poverty and hunger (MDG1), achieving universal primary education (MDG2), promoting gender equality and empowering women (MDG3), reducing child mortality (MDG4), improving maternal health (MDG5), combating HIV/AIDS and other

Table 1: Key policies and laws of relevance to climate change

diseases (MDG6), ensuring environmental sustainability (MDG7) and developing global partnership for development (MDG8). While these goals aim to address specific issues, they are interrelated and raise cross-cutting issues that need to be addressed at national levels to achieve the goals by 2015. Climate change will directly and indirectly impact on the achievements of the MDGs. The MDG's clearly reflect major challenges that are addressed in medium term National Development goals (NDPs) and the long-term Vision 2030 of Namibia. To effectively address the challenges posed by climate change issues to the MDGs, the government will:

Continue to play a proactive role to ensure the implementation of regional and global strategies and cooperate with the international community in promoting adaptation and mitigating to climate change in order to achieve the MDGs.

6.3 United Nations Framework Convention on Climate Change (UNFCCC) and other UN Conventions

In Namibia and most other SADC member countries, climate change is receiving increased attention. During the 1992 United Nations Conference on Environment and Development (UNCED), also known as the *Rio or Earth Summit*, three Conventions were developed;

- the United Nations Framework Convention on Climate Change (UNFCCC)
- the United Nations Convention to Combat Desertification (UNCCCD)
- The United Nations Convention on Biological Diversity (CBD).

The UNFCCC allows for the introduction of Protocols to the Convention. The first is the Kyoto Protocol, which came into force on 16 February 2005. Namibia signed and ratified both the UNFCCC and the Kyoto Protocol. As a non-Annex I Party to the Protocol, Namibia is not bound by specific targets for GHG emissions; however a number of global initiatives are being implemented, through donor and other support, to assist in the operationalization of the UNFCCC. To ensure sustainable development while taking into account the issues of climate change, the government will:

- (a) Continue to play a proactive role to ensure the protection of the regional and global environment and cooperate with the international community in promoting adaptation and mitigating strategies.
- (b) Align with and strictly enforce the existing international climate change legislative and regulatory framework.
- (c) Align with the Bali Road Map, Nairobi declaration and Bonn Agreement

7. INSTITUTIONAL ARRANGEMENTS FOR POLICY IMPLEMENTATION

The Cabinet of Namibia is the Government agency responsible for approving policies. The Parliamentary Standing Committee on Economics, Natural Resources and Public Administration shall advise Cabinet on relevant policy matters. While the Ministry of Environment and Tourism (MET) is responsible for all environmental issues in the country, MET shall also be the climate change coordinating Ministry through the Climate Change Unit (CCU) established within the MET. The CCU shall be supported directly by a formalised multi-sectoral National Climate Change Committee (NCCC) for sector-specific and cross-sectoral implementation and coordination advice and guidance. Climate change affects many sectors therefore various Ministries, Organisations and Agencies shall actively implement climate change related issues. The unit for Climate Change will assist directly with the planning, development, implementation and coordination of climate change activities at local, regional and national levels. Existing local and regional structures will be used for implementation at those levels. Where functions of line ministries have been successfully decentralised, these will be used to support local and regional level implementation and coordination. At present a function exists within the Meteorological Services Division of the Ministry of Works and Transport (MWT) that carries out climatic monitoring, research and assessment. This unit will serve as the national Climate Analysis Unit (CAU) that will support the CCU, MET, NCCC and line ministries with pertinent information and data for informed planning and decision making about climate change issues. The implementation arrangements should cater for feedback loops through monitoring and evaluation to ensure that activities are relevant, appropriate and targeted at local and regional levels. Figure 1 depicts the institutional arrangements.

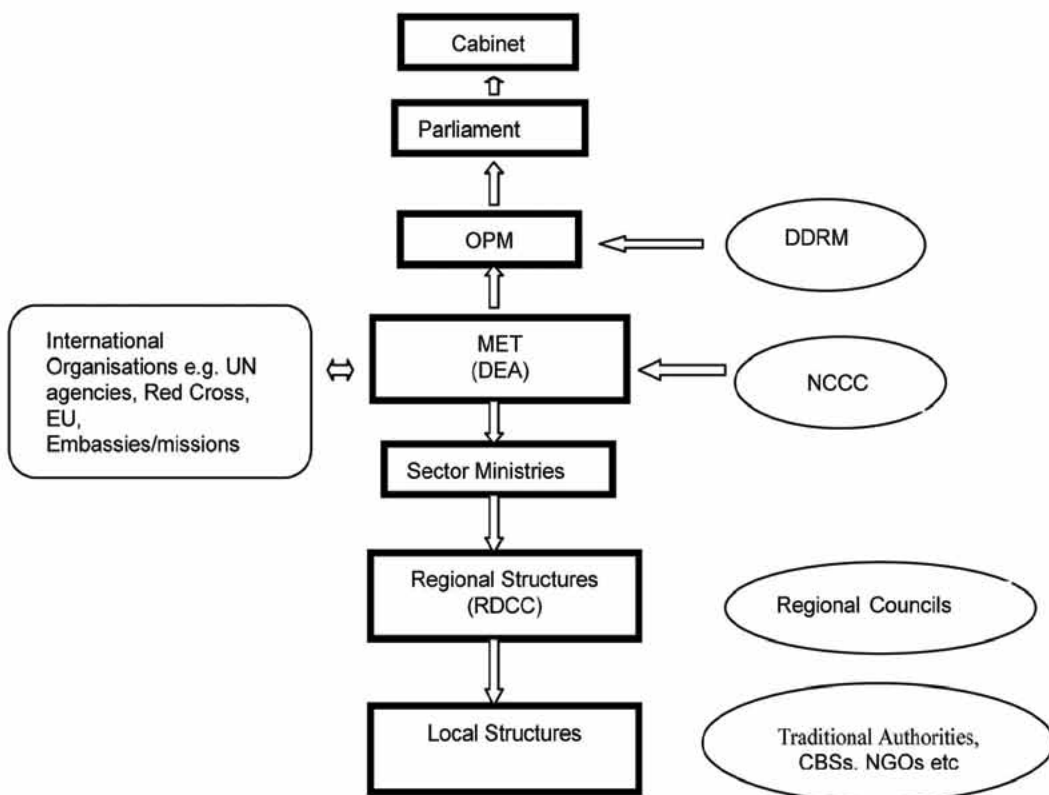


Figure 1: Institutional structure for implementation of the National Climate Change Policy.

7.1 Roles and responsibilities of stakeholders

7.1.1 General public

The Namibian government recognises that civil society has a role to play in climate change interventions. It is well known for example that the rural population is predominantly poor and predicted to bear the brunt of climate change effects. Yet civil society can contribute significantly to climate change

adaptation and mitigation through the adoption of climate change interventions that will reduce the predicted impacts. Active participation of the public in awareness regarding climate change campaigns, access to climate change information and adoption of climate change interventions is encouraged from civil society.

7.1.2 Private Sector

The government recognises the pivotal role which the private sector should play in addressing climate change adaptation and mitigation. The cross-cutting and multi-sectoral nature of the impacts of climate change requires collaboration and establishment of smart partnerships between various stakeholders including the private sector. There are many ways in which the private sector can contribute to climate change adaptation and mitigation. These include but are not limited to the provision and mobilisation of financial and other resources, technical assistance as well as capacity building for climate change adaptation and mitigation. The private sector should be engaged in low carbon development and renewable energy ventures.

7.1.3 Non Government Organisations (NGOs), Faith and Community Based Organisation

Involvement of NGOs and Faith and Community based organisations is critical to bring awareness of the impacts of climate change and also mobilisations of financial and other resources to local communities for climate change adaptation and mitigation. The government recognises that these NGOs and CBOs already play an important role in the disaster recovery efforts of the country. It is foreseen that these institutions will advocate for climate change adaptation and mitigation. These NGOs and CBOs shall be encouraged to assume the role of coordinating and integrating efforts amongst various stakeholders in order to address climate change issues.

7.1.4 Training and Research Institutions

The Namibian government recognises the role of training institutions, at different levels including pre-primary, primary, secondary school, colleges and tertiary levels, in training, research, capacity building, for knowledge production on climate change and public awareness regarding climate change adaptation and mitigation. Training institutions at different levels will contribute to research and capacity building of well-trained scientific, technical and managerial

persons, who will understand and become actively engaged in climate change adaptation and mitigation. Decisions regarding interventions need to be informed by scientific knowledge. Research institutions, therefore shall play an important role to generate relevant climate change scientific information that shall be accessible to the public and decision makers. The government envisions that tertiary and research institutions shall undertake research to quantify likely impacts of climate change and develop practical solutions for adaptation to and mitigation of climate change.

7.1.5 The Media

The media will play a key role to inform and educate the public regarding climate change. The media shall be encouraged to take an active role to obtain accurate information about the causes and impacts of climate change worldwide and in Namibia and interventions to address climate change adaptation and mitigation. The media should be at the forefront of facilitating public awareness about climate change. The media shall be at the interface of translating scientific information on climate change and disseminating it to various stakeholders in a manner that is easily understood. Media coverage of climate change issues is pivotal to ensure adequate availability and supply of climate change information to communities which shall empower local communities to undertake appropriate action or interventions.

7.1.6 International Development Partners

The Namibian government appreciates the continued assistance of international agencies as they support efforts of the Government of Namibia to achieve human and socio-economic development. It is anticipated that the support of international agencies to human and institutional capacity for climate change interventions, as well as capacity to adapt and mitigate climate change by various stakeholders shall be enhanced by this policy. The policy seeks to ensure that the pivotal role played by international agencies will be encouraged and supported at national, regional and local levels.

8 RESOURCE MOBILIZATION FOR POLICY IMPLEMENTATION

8.1 Government Provision

Climate change is a developmental issue that threatens the achievement of national development goals including Vision 2030. Therefore to ensure sustainable development, the government will:

- (a) Make budgetary provision per sector based on needs assessments to address aspects of climate change adaptation and mitigation.
- (b) Provide financial resources to strengthen the Climate Change Unit in the MET in order to effectively facilitate its climate change coordinating role.

8.2 Government to secure and mobilize resources

The Government will mobilise adequate human and material resources for the effective and efficient implementation of a National Climate Change Policy (NCCP). To ensure adequate resources at all times, Government shall consider and explore available, multilateral funding avenues (e.g. grants, loans and concessional funding) and, bilateral investment and donor funding. Private sector, insurance, risk management, and market-based instruments will also be explored. The country will improve access to financing through, rationalising the ever-growing number of funds, including eliminating duplications and harmonising the governance of these funds, to reduce conditionality to the disbursement of the funds, in addition to streamlining bureaucratic procedures and reducing transaction costs. Government institutions should join hands to secure and mobilise funds for climate change adaptation and mitigation.

It is imperative for Namibia to increase capacity at individual, institutional and systemic levels for an appropriate response to climate change. Such interventions will include human resource development through focused training, mentoring and learning-by-doing approaches, enhancing observation, research and knowledge management; strengthening communication, education and awareness-raising at all levels, especially at the local and community levels; strengthening and using regional networks of information and knowledge sharing; developing tools, methods and technologies and supporting their application; encouraging and strengthening participatory and integrated approaches in planning and decision making, including the meaningful participation of civil society; sharing experiences, information and

best practices of African countries; assessing, strengthening and mobilising the capacities of existing relevant facilities and institutions in Africa.

8.3 Government to facilitate Public Private Partnership

The Government shall explore and facilitate the establishment of Public Private Partnerships that will contribute both monetary and human resource capacity to address climate change adaptation and mitigation. Government will encourage the private sector to invest in climate change adaptation and mitigation. Activities should entail securing resources and managing them, allocating them equitably based on priority groups of sectors, and mobilising resources and the management thereof.

9 MONITORING AND EVALUATION

The Government is aware of the need to monitor and evaluate climate change variables, impacts and interventions, to ensure that they respond to the national, regional and local circumstances, and the need for mitigation and adaptation. Indicators defined in NDPs and the MET Strategic Plan will be used to measure progress and performance. Where possible these indicators could be extended to cater for activities, sectors and institutions dealing with climate change issues.

The Government will develop measureable and verifiable indicators to gauge this policy implementation. The Ministry of Environment and Tourism and the Meteorological Services of Namibia will play a vital role in regular and adhoc monitoring. In addition, the government will further establish sites in regions to monitor and evaluate climate change effects over time.

10 GLOSSARY OF TERMS

Adaptation

Adaptation to climate change refers to adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities. Various types of adaptation can be distinguished, including anticipatory and reactive adaptation, private and public adaptation, and autonomous and planned adaptation.

Afforestation

Planting of new forests on lands that historically have not contained forests

Anthropogenic

Made by people or resulting from human activities. Usually used in the context of emissions that is produced as a result of human activities

Carbon Dioxide (CO₂)

A naturally occurring gas, and also a by-product of burning fossil fuels and biomass, as well as land-use changes and other industrial processes. It is the principal anthropogenic greenhouse gas that affects the Earth's radiative balance.

Chlorofluorocarbons (CFC)

Greenhouse gases covered under the 1987 Montreal Protocol and used for refrigeration, air conditioning, packaging, insulation, solvents, or aerosol propellants. Since they are not destroyed in the lower atmosphere, CFCs drift into the upper atmosphere where, given suitable conditions, they break down ozone.

Clean Development Mechanism (CDM)

One of the three market mechanisms established by the Kyoto Protocol. The CDM is designed to promote sustainable development in developing countries and assist Annex I Parties in meeting their greenhouse gas emissions reduction commitments. It enables industrialized countries to invest in emission reduction projects in developing countries and to receive credits for reductions achieved.

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 of years. The classical period is 3 decades, as defined by the World Meteorological Organization (WMO). These quantities are most often surface variables such as temperature, precipitation, and wind. Climate in a wider sense is the state, including a statistical description, of the climate system

Climate Change

Climate change refers to any significant change in measures of climate (such as temperature, precipitation, or wind) lasting for an extended period (decades or longer). Climate change may result from:

- natural factors, such as changes in the sun's intensity or slow changes in the Earth's orbit around the sun;
- natural processes within the climate system such as changes in ocean circulation;
- Human activities that change the atmosphere's composition through burning fossil fuels and land surface through deforestation, reforestation, urbanization, desertification, etc.

Climate Sensitivity

The average global air surface temperature change resulting from a doubling of pre-industrial atmospheric CO₂ concentrations. The IPCC estimates climate sensitivity at 1.5-4.5°C (2.7-8.1°F).

Climate Variability

Refers to changes in patterns, such as precipitation patterns, in the weather and climate.

Deforestation

Those practices or processes that result in the conversion of forested lands for non-forest uses. This is often cited as one of the major causes of the enhanced greenhouse gas effects for two reasons: 1) the burning or decomposition of the wood releases carbon dioxide; and 2) trees that once removed carbon dioxide from the atmosphere in the process of photosynthesis are no longer present.

Desertification

Land degradation in arid, semi-arid, and dry sub-humid areas resulting from various factors, including climatic variations and human activities. Further, the UNCCD (The United Nations Convention to Combat Desertification) defines land degradation as a reduction or loss, in arid, semi-arid, and dry sub-humid areas, of the biological or economic productivity and complexity of rain-fed cropland, irrigated cropland, or range, pasture, forest, and woodlands resulting from land uses or from a process or combination of processes, including processes arising from human activities and habitation patterns, such as: (1) soil erosion caused by wind and/or water; (2) deterioration of the physical, chemical and biological or economic properties of soil; and (3) long-term loss of natural vegetation. Conversion of forest to non-forest.

Ecosystem

Any natural unit or entity including living and non-living parts that interact to produce a stable system through a cyclical exchange of materials.

Emissions

The release of a substance usually a gas when referring to the subject of climate change into the atmosphere.

Enhanced Greenhouse Effect

The concept that the natural greenhouse effect has been enhanced by anthropogenic emissions of greenhouse gases. Increased concentrations of carbon dioxide, methane, and nitrous oxide, chlorofluorocarbons (CFCs), hydro chlorofluorocarbons (HFCs), perfluorocarbons (PFCs), sulphur hexafluoride (SF₆), nitrogen trifluoride (NF₃), and other photo-chemically important gases caused by human activities such as fossil fuel consumption, trap more infra-red radiation, thereby exerting a warming influence on the climate.

Evapotranspiration

The combined process of evaporation from the Earth's surface and transpiration from vegetation.

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. In common usage, "global warming"

often refers to the warming that can occur as a result of increased emissions of greenhouse gases from human activities.

Greenhouse Effect

Trapping and build-up of heat in the atmosphere (troposphere) near the Earth's surface. Some of the heat flowing back toward space from the Earth's surface is absorbed by water vapour, carbon dioxide, ozone, and several other gases in the atmosphere and then reradiated back toward the Earth's surface. If the atmospheric concentrations of these greenhouse gases rise, the average temperature of the lower atmosphere will gradually increase.

Greenhouse Gas (GHG)

Any gas that absorbs infrared radiation in the atmosphere. Greenhouse gases include, but are not limited to, water vapour, carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), chlorofluorocarbons (CFCs), hydro-chlorofluorocarbons (HCFCs), ozone (O₃), hydro-fluorocarbons (HFCs), perfluorocarbons (PFCs), and sulphur hexafluoride (SF₆).

Intergovernmental Panel on Climate Change (IPCC)

The IPCC was established jointly by the United Nations Environment Programme (UNEP) and the World Meteorological Organization in 1988. The purpose of the IPCC is to assess information in the scientific and technical literature related to all significant components of the issue of climate change.

Ozone Depleting Substance (ODS)

A family of man-made compounds that includes, but are not limited to, chlorofluorocarbons (CFCs), bromofluorocarbons (halons), methyl chloroform, carbon tetrachloride, methyl bromide, and hydro-chlorofluorocarbons (HCFCs). These compounds have been shown to deplete stratospheric ozone, and therefore are typically referred to as ODSs.

Parts Per Million (ppm)

Number of parts of a chemical found in one million parts of a particular gas, liquid, or solid.

Reforestation

Planting of forests on lands that have previously contained forests but that have been converted to some other use.

Sink

Any process, activity or mechanism which removes a greenhouse gas, an aerosol or a precursor of a greenhouse gas or aerosol from the atmosphere.

Uncertainty

Uncertainty is a prominent feature of the benefits and costs of climate change. Decision makers need to compare risk of premature or unnecessary actions with risk of failing to take actions that subsequently prove to be warranted. This is complicated by potential irreversibilities in climate impacts and long term investments.

Weather

Weather is atmospheric condition at any given time or place. It is measured in terms of such things as wind, temperature, humidity, atmospheric pressure, cloudiness, and precipitation. In most places, weather can change from hour-to-hour, day-to-day, and season-to-season.

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MINISTRY OF ENVIRONMENT AND TOURISM

NOTES

This image shows a single sheet of white paper with horizontal blue or grey ruling lines. The lines are evenly spaced and run across the width of the page. There are approximately 20 lines visible. The paper has a slight shadow on the right side, suggesting it's resting on a surface.

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