



GOVERNMENT OF MALAWI

NATIONAL METEOROLOGICAL POLICY



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FOREWORD

The National Meteorological Policy is developed to contribute towards enhanced meteorological services to support socio-economic development of Malawi. The policy prioritizes seven issues: monitoring and prediction of weather and climate; management of meteorological data and information; meteorological engineering and Information Technology (IT) development; meteorological research services; financing the climate change and meteorological sector; capacity building and awareness; and cross-cutting issues.

Malawi has a high risk of weather, climate and hydrological hazards including droughts, severe storms, floods and associated landslides. As such, the country's medium term development strategies recognize the need to manage climate change to support socio-economic development. The MGDS III, in particular, prioritizes improving weather and climate monitoring, prediction systems and information and knowledge management systems as one of the key strategies for climate change management.

In 2016, Malawi developed various policy frameworks including the climate change policy that provides general policy guidance on climate change at a broad and long-term scale. The climate change policy and other policies are silent on growth and development of the meteorological sector. These policies provide limited room for action, especially at local community level, with respect to weather and climate related issues including addressing weather related hazards. Therefore, the country developed this National Meteorological Policy to address shortfalls in the climate change policy and other relevant policies. The National Meteorological Policy will complement and strengthen operationalization of the climate change policy. The National Meteorological Policy will assist Malawi to contribute to international discourse on weather and climate, as well as to benefit from services offered by relevant international organizations to which Malawi is affiliated through the Department of Climate Change and Meteorological Services (DCCMS). These organizations include: World Meteorological Organization (WMO), Meteorological Association of Southern Africa (MASA), SADC Climate Service Centre; United Nations Framework Convention on Climate Change (UNFCCC), African Centre for Meteorological Applications for Development (ACMAD), Intergovernmental Panel on Climate Change (IPCC) and United Nations Environmental Programme (UNEP).

I commend all stakeholders for their commitment in the development of this policy and assure the public that the government through the Ministry of Natural Resources, Energy and Mining is committed to ensure implementation of the policy. It is, therefore, my sincere hope that all stakeholders in the country will align their activities towards this policy in order to ensure that meteorological services play a key role in building resilience of the citizens to climate change.



Aggrey C. Masi, MP

MINISTER OF NATURAL RESOURCES, ENERGY AND MINING

PREFACE

Meteorological information is used in a number of sectors including agriculture, aviation, health, education, forestry and wildlife. These sectors require timely, site specific and accurate weather forecasts and predictions. The climate change and meteorological Sector has provided useful information but is fraught with major challenges in the delivery of meteorological services which include: few and poorly distributed functional observational stations, shortage of trained personnel, vandalism of equipment, weak telecommunication support systems, and inadequate data processing and information dissemination facilities. These challenges affect provision of reliable weather and climate services to meet national, regional and international requirements.

Despite the above challenges, there is high recognition of meteorological services to support sustainable development in Malawi as well as in contribution to the attainment of sustainable development goals and as such, the Malawi Growth and Development Strategy puts “improving weather and climate monitoring, prediction systems, and information and knowledge management systems” as one of the key strategies for climate management. To operationalize Malawi Growth and Development Strategy and give the meteorological sector a more focused policy direction, there is need for a standalone National Meteorological Policy with an implementation plan and a monitoring and evaluation (M and E) framework. The development of the policy will also assist to meet requirements of international obligations, protocols and frameworks on weather and climate change including the World Meteorological Organization (WMO), International Civil Aviation Organisation (ICAO) and the United Nations Framework Convention on Climate Change (UNFCCC).

This policy has been developed through a consultative process with stakeholders from government ministries and departments, national and international non-governmental organisations, United Nations agencies, development partners, civil society organizations, local leaders, communities and individuals. The financial support was provided by United Nations Development Programme (UNDP) and the World Bank. I would like to commend the Director of Climate Change and Meteorological Services in leading the development of the national Meteorological Policy.

It is my sincere hope that the momentum stakeholders had during the development of the policy will be extended into the implementation of the policy.



Patrick C.R. Matanda
SECRETARY FOR NATURAL RESOURCES, ENERGY AND MINING

List of Acronyms and Abbreviations

ACMAD	African Centre for Meteorological Applications for Development
AU	African Union
COMESA	Common Market for Eastern and Southern Africa
CSOs	Civil Society Organisations
DCCMS	Department of Climate Change and Meteorological Services
DHRMD	Department of Human Resource Management and Development
DoDMA	Department of Disaster Management Affairs
ICAO	International Civil Aviation Organization
IPCC	Intergovernmental Panel on Climate Change
IT	Information Technology
LUANAR	Lilongwe University of Agriculture and Natural Resources
M & E	Monitoring and Evaluation
MASA	Meteorological Association of Southern Africa
MDP	Meteorology Data Policy
MGDS	Malawi Growth and Development Strategy
MNSSD	Malawi National Strategy on Sustainable Development
MoAIWD	Ministry of Agriculture, Irrigation and Water Development
MoEST	Ministry of Education Science and Technology
MoTPW	Ministry of Transport and Public Works
MUST	Malawi University of Science and Technology
NCCIP	National Climate Change Investment Plan
NCST	National Commission for Science and Technology
NGO	Non-Governmental Organization
NMHS	National Meteorological and Hydrological Services
NMP	National Meteorological Policy
PPP	Public Private Partnership
PPPC	Public Private Partnership Commission
SADC	Southern Africa Development Community
UN	United Nations
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
WMO	World Meteorological Organization

Glossary of Key Terms

Agro-meteorology: the study of weather and use of weather and climate information to enhance or expand agricultural crops and/or to increase crop production.

Climate data: Historical and real-time climate observations along with direct model outputs covering historical and future periods. Information about how these observations and model outputs were generated (“metadata”) should accompany all climate data.

Climate information: Climate data, climate products and/or climate knowledge.

Hydro-meteorology: a branch of meteorology and hydrology that studies the transfer of water and energy between the land surface and the lower atmosphere particularly in the boundary layer

Meteorological service: Providing meteorological information in a way that assists decision making by individuals and organizations. A service requires appropriate engagement along with an effective access mechanism and must respond to user needs.

Meteorology: The study of phenomena of the atmosphere and all the processes that take place in the atmosphere and their relationships with processes at the surface of the earth.

Weather: The daily conditions of the atmosphere in terms of temperature, atmospheric pressure, rain, wind, and moisture etc.

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1. INTRODUCTION

Proper utilization of meteorological services plays an important strategic role in the socio-economic development of any country, including that of Malawi. Meteorological information products provide useful inputs for strategic decision making by weather and climate sensitive sectors such as agriculture, road, air and maritime transport, health and public safety, building and construction, disaster management and water resource management. The National Meteorological Policy seeks to put in place appropriate strategies, and legislation framework for the provision of weather, climate and climate change services.

Recorded meteorological observations in Malawi started in the 1800's mainly by British colonial farmers and missionaries. The meteorological services were later taken over by the Federal Government of Rhodesia and Nyasaland which ended in 1964. After independence, the Federal Government handed over the meteorological services to the Government of Malawi and was provided under Civil Aviation. Financing and expert management of meteorological programs for use by aviation was not a priority for the Nyasaland Government in the 1930s. For example, the first meteorological station in Zomba was manned by an unqualified person. Downgrading the importance of meteorological services by Nyasaland compromised the quality and utilization of data. During the period from 1964 to 1982, growth of meteorological services was weak, with aviation given higher priority than meteorological activities which is broad in nature.

However, significant recognition of the sector received a boost in 1983 when an autonomous department called the Meteorological Department (MD) was created within the then Ministry of Transport and Public Works. The department assumed more roles as opposed to the Department of Civil Aviation that was managing all meteorology affairs at that time. With the creation of the department, meteorological programmes were given priority as evidenced by recruitment of qualified staff. Creation of an autonomous department also resulted in further expansion and a wider approach and application of meteorological services including aviation, agro-meteorology, hydro-meteorology, public weather services, climate services and meteorological engineering.

The growth of the department was a result of internal capacity development and external factors including the technological evolution of the 1990s. This growth resulted in significant developments in terms of programmes spearheading the collection of observations, forecasting and distribution of data and generation of various meteorological products.

The invention of radar, remote-sensing equipment, computers, automated weather stations and satellites has greatly benefited World Meteorological Organization (WMO) programmes. Observation platforms have increased, from surface stations and ocean weather ships to commercial aircraft and meteorological satellites all working together within the framework of the WMO system.

1.1. Problem Statement

Meteorology is a branch of the atmospheric sciences which is the study of the atmosphere that includes both climate and weather. In Malawi, systematic weather and climate measurements started in 1800s by the British colonialists and missionaries. The first meteorological weather forecasters in the country were in place on 1st January, 1968 when meteorological services were provided by the Department of Civil Aviation until 1st April, 1983 when Malawi Government formed an autonomous Department of Meteorological Services. In 2009 the department was renamed the Department of Climate Change and Meteorological Services within the Ministry of Natural Resources, Energy and Mining in recognizing the synergy between climate change and meteorology to provide leadership and guidance in the meteorological and climate change sector and begin to address the weaknesses and challenges that have beset the sector since colonial days and which were further neglected after independence.

Natural disasters, most of which are weather and climate related, cause instant poverty to a community or a country. The Early Warning System for Disaster Preparedness operated by the Climate Change and Meteorological Sector therefore involves the hourly monitoring of the atmosphere for severe weather likely to cause damage to infrastructure and loss of life such as tropical cyclones, tornadoes, floods, droughts and strong winds. The monitoring requires state of the art equipment which must be operational around the clock.

Early warning system for food security involves the application of weather, climate data and information for agricultural production. The information collected such as temperature, rainfall, evaporation, radiation, etc., is analysed and disseminated to the Ministry of Agriculture and Food security. The collection of this data requires a well-equipped network of weather stations across the country.

The Meteorological sector produces short range (48 hours), medium range (5 to 10 days), weekly weather forecast and seasonal rainfall forecasts for both the general public and specialized users in agriculture, water sector, energy, disaster management, etc. While these forecasts have become popular due to the current extremes of weather being experienced due to climate change, there has been an outcry from both the general public and the specialized users about the accuracy and reliability of these forecasts. To redress this problem there is need to replace certain equipment and instruments and to conduct refresher courses for weather observers and forecasters in order for them to catch up with the rapidly changing technology in the meteorological field.

Once data has been monitored it has to be collected to one point for analysis. The products from the analysis, which are mostly in the form of forecasts, advisories and warnings, must be disseminated to the general public. All this calls for an elaborate communication system that comprises radios, dedicated telephone lines connecting the Department of Climate Change and Meteorological Service with other regional and global Meteorological Services, good internet and a website.

The Government formulated the National Climate Change Management Policy to consolidate the implementation and management of climate change related programs in an effort to address the impacts of climate change in various sectors of the economy. Although the National Climate Change management Policy adopted in 2016 recognises the role and need of meteorological data and information for implementation of climate change programs in all economic sectors, it provides limited or no specific guidance for growth and development of the weather and climate services in the country. As a result, the meteorological sector lacks a clearly defined mandate, authority and legal framework to discharge meteorological functions effectively and efficiently. Furthermore, efficient meteorological services require strong sector linkages and coordination. Presently, there is weak sector coordination in collection, use and application of meteorological data and information. The absence of a meteorological policy has further exacerbated other challenges and constraints such as financing of meteorological infrastructure for effective data capture, processing, archiving and management and, human resource capacity. The absence of the meteorological policy has also adversely affected credibility, reliability and dissemination of meteorological services in the country. This has consequently reduced demand for meteorological services across the relevant sectors and the public. Against the above weaknesses in the meteorological sector, a Meteorological Data Policy (MDP) was developed in 2001 to provide guidelines for improving management and utilization of meteorological data in Malawi. However, The MDP has its limitations too, in that it does not provide broader guidance on meteorological services but rather focuses on data only.

Therefore development of this National Meteorological Policy (NMP) will contribute towards attainment of a number of goals and objectives in the national and sector strategies, including the Malawi National Strategy for Sustainable Development (MNSSD) and Malawi Growth Development Strategy III. It will also support existing policies and frameworks including the MDP, the National Climate Change Policy, and National Climate Change Investment Plan (NCCIP) of 2014. In addition to supporting national development, the implementation of national meteorological policy will support Government efforts in achieving Sustainable Development Goals (SDGs) in particular goal number two of attaining zero hunger which involves promoting sustainable agricultural practices. Malawi agricultural systems are mainly rain fed which is very sensitive to changes in weather and climate patterns. As such the policy will promote use and application of meteorological services for enhanced agricultural production. Sustainable Development Goal number eight which talks about promoting decent work and economic growth and the policy will contribute through provision of accurate and responsive meteorological information for various economic sectors of the country to enable sustained economic growth and higher productivity and meteorological preferred technological innovations. The policy will also support the achievement of Sustainable Development Goal thirteen on enhancing climate actions through provision of continued systematic weather and climate observations, data analyses and weather and climate forecasts that are the basis for up to date climate information for the development of climate change adaptation and mitigation strategies as part of the countries obligations under UNFCCC.

1.2. Linkages with Relevant Existing National Policies

The National Meteorological Policy will complement the implementation of other existing policies, laws as well as international agreements and protocols, including the following:

Malawi Growth and Development Strategy III, 2017

The National Meteorological Policy will directly enhance implementation of the priority area on Agriculture and Climate Change Management in the MGDS III of 2017 to 2021. The goal under this key priority area is to achieve sustainable agricultural transformation that is adaptive to climate change. The National Meteorological policy will also directly enhance the implementation of Vulnerability, Disaster Management and Social Support priority area considering that more than 90% of disasters in Malawi are weather related. As such proper utilization of weather and climate information will enhance early warning systems including those at community levels. The Policy will also support implementation of strategies that will support clean energy generation, transport and human settlement planning as well as environmental sustainability.

National Climate Change Policy, 2017

Government of Malawi has developed a National Climate Change Management Policy to assist the country achieve its long-term goal for climate change management which is to reduce the socio-economic impacts of adverse effects of climatic change. The medium term outcome is improved community resilience to climate change through the development of sustainable livelihoods and reduced emissions of Green House Gases. The Climate Change Policy will act as a wide mechanism for harmonizing and enhancing the planning, development, coordination, financing and monitoring of climate change initiatives and programmes in Malawi focusing on managing the impacts of climate change to various sectors of the economy. It is clear from the above that the National Climate Change Management Policy will address the management of impacts of climate change in Malawi. As such, for its effectiveness, it needs strong and sound meteorological data and information to provide the scientific basis of climate change in Malawi. The National Meteorological Policy seeks to ensure the availability of such data.

National Agricultural Policy, 2016

National Agricultural Policy recognizes weather, climate variability and climate change as challenges that have devastating impacts on agricultural production such as low agricultural yield and enhancement of pests' multiplication, thereby negatively affecting the economic and social well-being of farming households in the country.

National Disaster Risk Management Policy, 2015

The long-term goal for disaster risk management in Malawi is to sustainably reduce disaster losses in lives and in the social, economic and environmental assets of individuals, communities and the nation. This cannot be achieved if the country does not have efficient and effective early warning systems. Most of the disasters in Malawi are weather related. As such, the National

Meteorological Policy is very important in effective implementation of the National Disaster Risk Management Policy as it will provide real time weather and climate forecast for disaster risk management in Malawi

National Environmental Policy, 2004

The National Environmental Policy (NEP) coordinates all natural resource management including forest resources and environmental policy instruments in Malawi. Weather and climate information contribute significantly to the management of natural resources.

The Water Policy, 2005

The policy promotes effective participation of the forestry sector in water resources, catchment protection, conservation and management. Almost all water resources in Malawi originate from rain water and weather has direct impact on availability of water in Malawi.

National Wildlife Policy, 2018

The Policy promotes conservation of Wildlife including forests and biodiversity in protected areas and communal areas. Weather has a direct impact on the survival of wildlife resources both inside and outside protected areas. If there is drought for example, wildlife and its ecosystems resources are put under threat of extinction.

Land Resources Management Policy, 2000

The policy promotes tree planting, natural regeneration and conservation of forests as a way of achieving sustainable land utilisation and management. Survival of these resources is weather dependant.

Energy Policy, 2003

The policy notes the severe effects of nature on lake levels and the flow of the Shire River, upon which the country almost wholly depends for power generation, and man-made effects such as deforestation resulting from agricultural clearing, urbanization and dependence on biomass energy. The policy acknowledges the need for a holistic approach to address the problem by ensuring that people and industries depend less and less on biomass energy and increase dependency on electricity and other renewable sources of energy that are environmentally friendly. The policy promotes use of alternative sources of energy to reduce pressure on wood biomass. The availability of water in our major rivers and the management of alternative energy sources such as solar and wind are all weather dependant.

National Forest Policy, 2017

The National Forest Policy promotes strategies that contribute to increased forest cover and sustainable management of existing forest resources. The policy provides an enabling framework for all stakeholders to participate in the management of forests. It's very clear that weather is one of factors that contribute to sustained growth of trees and other forest ecosystems. As such

implementation of the National Meteorological policy will have a significant role in the implementation of strategies for sustained growth of trees and other forest ecosystems.

National Irrigation Policy, 2016

The National Irrigation Policy takes cognizance of the Water Sector Wide Approach (WaSWAp) and the Agriculture Sector Wide Approaches (ASWAp) which provide priority investment programmes for irrigated agriculture development and management. The Policy also emphasises on developing climate resilient irrigation infrastructure and development and implementation of the Irrigation Master Plan and Investment Framework. This irrigation master plan and investment framework will be ineffective if weather and climate information is not integrated. In addition, most of Malawi Agriculture production is weather and rain dependent as such implementation of national meteorological policy will have significant impact in management of irrigated agriculture production.

National Transport Policy, 2015

The goal of the National Transport Policy is to ensure the development of a coordinated and efficient transport infrastructure that fosters the safe and competitive operation of viable, affordable, equitable and sustainable water, road, rail and air transport services. Weather and climate is an integral part of efficient and safety of transport services in Malawi both in planning for transport climate proofed infrastructures and operations

1.3. Linkages with Relevant Existing International Policies

1.3.1. International protocols, conventions and frameworks

At the international level, the policy conforms with the requirements and will therefore facilitate the implementation of obligations of international protocols, conventions and frameworks of World Meteorological Organization (WMO), the United Nations Convention on Climate Change (UNFCCC) and its Kyoto Protocol, African Centre for Meteorological Application for Development (ACMAD), Meteorological Association of Southern Africa (MASA), International Civil Aviation Organization (ICAO), Southern African Development Community (SADC), Common Market for Eastern and Southern Africa (COMESA), African Union (AU), The SADC Disaster Risk Reduction Strategy; The Africa Regional Strategy for Disaster Risk Reduction (ARSDRR); The Sendai Framework for disaster risk reduction (2015 to 2030) management, United Nations Environmental Programme (UNEP) and Sustainable Development Goals. The development of the NMP will help Malawi raise standards of service delivery in the provision of fit-for purpose products and services to end users and aspire to achieve the highest international standards as enhancing coordination amongst all stakeholders in the subsector.

1.4. Purpose of the Policy

The NMP has been developed to serve as an overarching guide on generation and provision of meteorological services and products for various users. Specifically the policy is aimed at:

- a) improving planning, programming, and implementation of weather and climate activities in Malawi;
- b) enabling generation of reliable, responsive, high quality, timely and up-to-date weather and climate services;
- c) ensuring timely dissemination of accurate and reliable sector relevant information for early preparedness;
- d) providing a framework for monitoring, evaluation, and reporting on interventions for the meteorological sector and
- e) providing a platform for stakeholder engagement in the meteorological sector.

2. BROAD POLICY DIRECTIONS

2.1. Policy Goal

The NMP aims to contribute towards enhanced meteorological services to support the socio-economic development of Malawi.

2.2. Policy Outcomes

The policy is expected to achieve the outcomes below:

- a) Effective and efficient generation, dissemination and utilization of reliable, responsive, high quality, up to date and timely meteorological services;
- b) Enhanced community resilience from weather and climate shocks; and
- c) Increased demand, utilization and cost recovery for meteorological services.

2.3. Policy Objectives

- a) To provide readily accessible and accurate weather and climate information for efficient planning, management and operation of relevant sectors;

- b) To guide and improve coordination of collection, management and dissemination of meteorological data and information among stakeholders;
- c) To ensure timely dissemination of meteorological information for early preparedness; and
- d) To improve capacity of the climate change and meteorological sector for effective and efficient delivery of meteorological services in the country.

3.0 POLICY PRIORITY AREAS

The policy has seven priority areas namely:

- i. Monitoring and prediction of weather and climate
- ii. Management of meteorological data and information;
- iii. Meteorological engineering, communication and Information Technology (IT) development;
- iv. Meteorological research services;
- v. Capacity building and awareness;
- vi. Financing the climate change and meteorological sector; and
- vii. Cross-cutting issues.

3.1. Policy Priority Area 1: Monitoring and Prediction of Weather and Climate

Meteorological observation is essential to understanding weather and climate systems and its influence on safety and protection of life and property. Recording of weather on a daily basis cumulatively gives us much needed information about climate and eventually detecting any changing climate of a particular location or country. Observation of weather is critical in terms of providing building blocks for early warning systems. Natural disasters, most of which are weather and climate related, cause instant poverty to a community or a country. The early warning information for disaster preparedness and for food security provided by the climate change and meteorological sector therefore involves the hourly monitoring of the atmosphere for severe weather likely to cause damage to infrastructure and loss of life such as tropical cyclones, tornadoes, floods, droughts and strong winds. The monitoring requires state of the art equipment which must be operational around the clock.

The department produces short range (48 hours), medium range (5 to 10 days) and seasonal weather and climate forecasts for both the general public and specialized users in agriculture, water sector, energy, disaster management, etc. While these forecasts have become popular due to the current extremes of weather being experienced due to climate change, there has been an outcry from both the general public and the specialized users about the accuracy and reliability

of these forecasts. To redress this problem there is need to replace certain equipment and instruments and to conduct refresher courses for weather observers and forecasters in order for them to catch up with the rapidly changing technology in the meteorological field.

Malawi therefore needs to develop robust meteorological observation systems that will support generation of meteorological data and information for planning, early warning systems and management of any changing climate. A country well informed about future climate change through projections and weather and climate predictions can become better prepared and mitigate risk of climate related disasters.

3.1.1. Problems/Issues

Currently, the climate change and meteorological sector faces challenges of meteorological observation, prediction and communication, due to inadequate equipment and staff. The system for meteorological observation and prediction is not robust enough to efficiently provide reliable, accurate and area specific weather and climate information to users.

3.1.2. Policy Statement

The policy will provide direction in the development, strengthening and institutionalization of meteorological observation and prediction to enhance accuracy, reliability and utilization of meteorological information and services in the country.

3.1.3. Objectives

- a) To provide improved meteorological data for national, regional and international programmes
- b) To enhance analysis of meteorological data, prediction of weather and climate and provision of area specific forecasts for planning, early warning programs and management of climate change.

3.1.4. Strategies

- a. Up-scaling of infrastructure for surface and upper air meteorological observations;
- b. Establish and strengthening the communication platforms for meteorological data and products;
- c. Increasing human capacity in meteorological observations, prediction and modelling;
- d. Enhance stakeholders' consultations to promote the spirit of volunteerism in weather and climate observations and reporting;

- e. Implement obligations in the international and regional conventions and protocols.

3.2. Policy Priority Area 2: Management of meteorological data and information

Once data has been monitored it has to be collected to one point for analysis. The products from the analysis, which are mostly in the form of forecasts, advisories and warnings, must be disseminated to the general public. All this calls for an elaborate communication system under the climate change and meteorological sector.

Understanding of different Meteorological contexts will inform planning of different programmes and activities for various sectors such as agriculture, transport, tourism, health, water, and disaster risk management. Meteorological data collected needs to be maintained and managed effectively to support easy retrieval and utilization by all users.

3.2.1 Problems/Issues

Currently, meteorological data cannot be easily accessed by users. Meteorological data is packed and stored in forms difficult to retrieve and use by users. Data storage facilities are generally in conditions that are not reliable and the risk of data loss is high.

3.2.2 Policy Statement

The policy will promote proper management, access and utilization of meteorological data and information.

3.2.3 Objective

To improve the management, storage and archiving, retrieval and utilization of meteorological data and information

3.2.4 Strategies

- a) Strengthen and establish meteorological data management and quality control system;
- b) Strengthen and establish a meteorological data storage and backup systems;
- c) Enhance the functionality of the meteorological library as a resource centre for accessing meteorological documentaries and books;
- d) Modernize the meteorological services archive infrastructure for enhanced data safety and security;
- e) Regular review the collection, communication and management meteorological data systems to ensure that national and international standards are adhered to.

3.3. Policy Priority Area 3: Meteorological engineering, communication and information technology (IT) development

Meteorological observations and data form the foundation for the monitoring and prediction of weather and climate as well as issuance of weather warnings and alerts. Once data has been monitored it has to be collected to one point for analysis. The products from the analysis, which are mostly in the form of forecasts, advisories and warnings, must be disseminated to the general public. All this calls for an elaborate communication system that comprises HF radios, dedicated telephone lines connecting the National Met Service with other regional and global Met Services, internet and a website. One of the most important ways to ensure that accurate and reliable meteorological information and services in Malawi are timely generated and disseminated nationally and internationally in accordance to WMO standards is to use cutting-edge observation, information processing and communication meteorological technologies. There is need to ensure that meteorological equipment is well maintained and regularly calibrated.

3.3.1. Problems/Issues

Meteorological observations and data form the foundation for the monitoring and prediction of weather and climate as well as issuance of weather warnings and alerts. However, there is marked disparity in the observation networks with most areas in the country having sparse networks that do not adequately represent the weather and climate conditions affecting most areas of the country. The sparse observation network ultimately affects the quality and range of services that are offered in the country. Communication and dissemination of the meteorological information is so poor that it does not meet the WMO standards. Use of cutting-edge meteorological technologies and automation of production and delivery of meteorological services is limited. More often, the climate change and meteorological sector uses manual systems in meteorological data processing, making it difficult to meet users' demands and WMO standards for effective meteorological services delivery.

3.3.2. Policy Statement

The policy will promote strengthening meteorological observation network, automation of meteorological information production and communication and dissemination through the use of cutting-edge observation, prediction, and communication and information technology equipment.

3.3.3. Objective

To strengthen meteorological observation station network and automate meteorological data collection, processing, communication and dissemination systems

3.3.4. Strategies

- a) Regularly review meteorological observation, communication, dissemination and data processing infrastructure available in the country
- b) Assess the available latest meteorological technologies on the market;
- c) Increase the density of observation network by installing more weather stations

- d) Automate meteorological data collection, processing, communication and dissemination system to meet WMO standards
- e) Upgrade and sustain meteorological engineering infrastructure in compliance with WMO standards
- f) Establish dissemination of weather and climate information agreements on weather and climate data and information
- g) Establish hosting agreements of meteorological infrastructure through private public partnerships; and
- h) Adopting new meteorological observation systems.

3.4. Policy Priority Area 4: Meteorological research services

The services provided by the climate change and meteorological sector are dependent on the sustained investments in research. Further improvement of the sector will require effective transitioning of research results into fully operational products and services with effective means to develop linkages with users useful for decision making. This policy recognizes and appreciates the need for enhanced research in the science of meteorology in order to generate more knowledge in weather and climate. Increased knowledge in meteorology will assist utilisation and application of meteorological services for socio economic development of the country.

3.4.1. Problems/Issues

With the realisation that climate is changing and that climate change is a critical issue where information and knowledge gaps still exists, there is need to further the science of meteorology in the country by generating more knowledge through research. Local communities have their own traditional knowledge systems about weather and climate yet most of these have not been utilized because they have not been validated in this country.

There is inadequate meteorological research and limited collaborative efforts with other institutions in carrying out research in the science of meteorology in the country to fill the knowledge gap in meteorology.

3.4.2. Policy Statement

The policy will promote meteorological research to generate additional knowledge in all aspects meteorology and its applications that include in climate change

3.4.3. Objective

To promote meteorological research, meteorological technological development and innovation to guide evidence based application of meteorological information.

3.4.4. Strategies

- a) Conduct research in weather and climate forecasting, and all aspects of meteorological applications such as aviation meteorology, agricultural-meteorology and hydro-meteorology
- b) Document and disseminate research findings in meteorology and its applications for informed decision making;
- c) Identify and document indigenous weather and climate indicators and knowledge,
- d) Enhance collaboration with national and international research institutions such as Malawi University of Science and Technology (MUST), International Research Institute (IRI) to advance the science of meteorology in Malawi

3.5. Policy Priority Area 5: Capacity building and Awareness

Adequate capacity building in the climate change and meteorological sector is crucial for effective and efficient delivery of meteorological services in the country. As such supportive meteorological infrastructure and human resource development should be continuously considered as a priority to better generate and share well-packaged user-friendly meteorological data and information to all key stakeholders including communities.

3.5.1. Problems/Issues

Despite efforts to improve the capacity of the climate change and meteorological sector there is still inadequate meteorological infrastructure, limited meteorological prediction skills and technology usage, inadequate meteorological data processing and information dissemination facilities, inadequate trained personnel, and high vacancy rate to effectively deliver meteorological services that meet the ever growing demand by users.

There is still low demand and utilization of meteorological services in the country resulting in increased exposure to weather and climatic hazards. The country is experiencing continued vandalism of meteorological equipment due to limited knowledge of importance and usage of meteorological information.

3.5.2. Policy Statement

The Policy will enhance and sustain public awareness on meteorological services and related infrastructure; and attainment of relevant capacities including knowledge and skills in collection, storage, packaging, monitoring, prediction and utilization of meteorological information.

3.5.3. Objective

To build capacity in meteorological services delivery and utilization in the climate change and meteorological sector.

3.5.4. Strategies

- a) Carrying out regular and comprehensive meteorological capacity needs assessment in climate change and meteorological sector
- b) Developing and implementing capacity building initiative in climate change and meteorological sector through regular meteorological trainings.
- c) Conducting awareness on the utilisation of meteorological services to various stakeholders and the public
- d) Mainstreaming the use of meteorological information in all sectors of the economy in the country
- e) Mainstreaming meteorology in all relevant learning institutions in the country
- f) Upgrading and rehabilitating a basic meteorological training school
- g) Enhancing collaboration and establishing linkages with relevant regional and international training institutions in meteorology and applied climatology.
- h) Advocating for reduction of high vacancy rate in the climate change and meteorological sector.
- i) Promoting Public Private Partnership for capacity building in climate change and meteorological sector

3.6. Policy Priority Area 6: Financing the climate change and meteorological sector

The climate change and meteorological Sector in the country continues to face financial challenges on delivery of meteorological services. Financial resources are required to support procurement and maintenance of meteorological equipment, capacity building and public awareness in meteorology and other initiatives essential for the sustenance and growth of meteorological services in the country.

3.6.1 Problems/Issues

Inadequate financial resources are the major challenge in the climate change and meteorological sector that limits growth and maintenance of delivery of meteorological services in the country.

3.6.2 Policy Statement

The policy will ensure full Government commitment to increased resource allocation and funding to climate change and meteorological sector for delivery of meteorological Services and attract development partners to supplement financing of meteorological services delivery in the country.

3.6.3 Objective

To motivate government to increase financial allocation to the climate change and meteorological sector in the national budget for delivery of meteorological services

3.6.4 Strategies

- a) Sensitizing government policy-makers and development partners on the need to prioritize funding to the climate change and meteorological Sector for meteorological services delivery.
- b) Raising awareness on the existing Strategic Plan for climate change and meteorological Sector to government and potential donors at national and international level
- c) Raising awareness on the socio-economic benefits of meteorological services and value addition of tailored meteorological services to the stakeholders
- d) Developing and implementing revenue generation from cost recoverable meteorological services such as aviation meteorological services, tailor-made climate services and meteorological instrument calibration;

3.7. Policy Priority Area 7: Cross cutting issues

Cross cutting issues should be considered in the production, communication and utilisation of meteorological services in the country. This will ensure inclusiveness in the sourcing and utilisation of meteorological services in the country leading to effective community response to weather and climate risks and uncertainties. Cross-cutting issues of concern in this policy include risk management, human and minority rights, gender, people with special needs, children and those living with HIV/AIDS.

3.7.1. Problems/Issues

Meteorological related activities do not actively consider mainstreaming cross-cutting issues. Human rights based approaches are rarely used in planning, implementation and monitoring of meteorology related activities. This leads to violation of several rights including right to development, right to access to meteorological information and freedom of association.

3.7.2. Policy Statement

The policy will promote mainstreaming of cross-cutting issues into all meteorological sector programs from planning through implementation to monitoring and evaluation.

3.7.3. Objective

To increase participation of vulnerable and disadvantaged groups including women, children, the elderly and the physically challenged in all meteorological related activities.

3.7.4. Strategies

- a) Adopting all inclusive approach in the provision of meteorological services in the country; and
- b) Developing all inclusive meteorological products and services such as use of sign language and braille in communicating meteorological information.
- c) Developing and implementing all inclusive training programmes in meteorology
- d) Ensure gender balance in meteorological training programmes, meteorological recruitment programmes and leadership in meteorological programme

4. IMPLEMENTATION ARRANGEMENTS

The implementation arrangements for this policy consist of three aspects: institutional arrangements, implementation plan and, monitoring and evaluation strategy.

4.1. Institutional Arrangements

The responsibility of managing weather and the associated changing climate which constitute the provision of meteorological services in the country lies with the Ministry of Natural Resources, Energy and Mining through the Department of Climate Change and Meteorological Services. Management and implementation of meteorological interventions are done in collaboration with line Ministries and Departments, the private sector, the media, Non-Government Organizations (NGOs), selected communities, and other relevant stakeholders. The key line Ministries and Departments include Office of President and Cabinet, Ministry Responsible for Finance, Ministry Responsible for Health, Ministry Responsible for Economic Planning and Development, Ministry Responsible for Agriculture and Food Security, Ministry Responsible for Transport and Public Works, Ministry Responsible for Irrigation and Water Development, The Ministry Responsible for Tourism, Department of Forestry, Department of Environment, Department of Mines, Geological Surveys Department, Department of Energy Affairs, Department of Disaster and Risk Management and Department of Civil Aviation.

4.1.1. Roles and Responsibilities of Key Stakeholders

Office of the President and Cabinet

The Office of the President and Cabinet (OPC) Policy will provide oversight in monitoring of implementation of the National Meteorological Policy.

In addition, since the OPC is responsible for disaster management affairs in Malawi, weather and climate information including various weather forecasts, seasonal rainfall forecasts, severe weather warnings and alerts will be a very key input for the development and implementation of national disaster contingency plans as part of disaster risk management and response through the Department of Disaster Management Affairs (DoDMA).

Ministry Responsible for Finance, Economic Planning and Development

The Ministry Responsible for Finance will be very keen on mobilizing resources for the policy implantation as well as strengthening public finance and fiscal management.

Ministry Responsible for Agriculture and Irrigation

The Ministry Responsible for Agriculture and Irrigation will be implementing the National Agriculture Policy, National Seed Policy and water related policies in line with the National Meteorological Policy

The Ministry Responsible for Transport

The Ministry Responsible for Transport will be implementing all related transport policies in line with the National Meteorological Policy.

The Ministry Responsible for Health

The Ministry Responsible for Health will be implementing all related health policies in line with the National Meteorological Policy for the development and implementation of weather related disease management strategies.

The Ministry Responsible for Tourism

The Ministry Responsible for Tourism will be implementing all related tourism policies in line with the National Meteorological Policy for the development and growth of tourism industry.

The Ministry responsible for Water Resources Management

The Ministry Responsible for water Resources Management will be implementing all related water policies in line with the National Meteorological Policy.

Local Communities and the General Public

Local communities will be the main users of meteorological data and information in the agricultural sector. Their decisions on when and what to plant with assistance from agricultural experts are based on weather patterns especially rainfall amounts and distribution in space and time. The local communities will assist collection and dissemination of meteorological data on volunteer basis. They will also provide appropriate feedback relating to the use of weather and climate information.

Private Sector

The private sector is crucial in promoting economic growth and job creation in Malawi. It may directly participate in research, technology advancement and user tailored products development related to various meteorological applications.

The Media

The media are important stakeholders in information dissemination and feedback generation. They will be instrumental in raising awareness and the dissemination of the much needed meteorological information.

Non-Governmental Organizations and Civil Society Organizations (CSO)

Some NGOs directly implement projects at community level. They are therefore useful conduits to promote effective utilization of climate change and meteorological services. In addition, CSOs may play an advocacy role to lobby Government to provide more resources to the meteorological sector and to sensitize communities on the value of meteorological information to their social and economic well-being.

Faith and Community Based Organizations

Faith based and community based organizations are in direct contact with local communities. Like NGOs, they may be instrumental in facilitating use and participatory monitoring of meteorological information at community level as well as sensitizing communities on the value of meteorological information to their social and economic well-being.

Training and Research Institutions

Recognizing knowledge and capacity gaps in the meteorological sector, training and research institutions would play critical roles of improving knowledge and skills for various stakeholders in generating evidence based knowledge for decision making in the sector.

Development Partners

Development partners support the Government and other organizations by providing resources to carry out developmental activities. In this policy, it is expected that they will continue with this role.

4.2. Implementation Plan

The implementation plan has been developed in line with standards and requirements of all government and international protocols that govern the implementation of meteorological services in the world such as WMO, ICAO, IPCC and UNFCCC. This is important in order to provide and deliver services that are universally credible and accepted. The plan has also been shaped by national guidelines and frameworks including the National Strategy for Sustainable Development, Malawi Growth and Development Strategy II, National Climate Change Policy, and National Climate Change Investment Plan. For each priority area, the plan has strategies, time frames and responsible institutions as indicated in Annex 1.

4.3. Monitoring and Evaluation (M & E) Plan

To monitor progress against the implementation of this policy a monitoring and evaluation plan has been developed as attached in Annex 2. The policy will be reviewed after 5 years.

5. ANNEX 1: IMPLEMENTATION PLAN

5.1. Policy Priority Area 1: Monitoring and prediction of weather and climate			
Policy Statement: The policy will provide direction in the development, strengthening and institutionalization of observation and prediction of weather and climate including climate projections to enhance accuracy, reliability and utilization of meteorological services in the country.			
Objectives	Strategy	Responsibility	Timeframe
To provide improved meteorological data for national, regional and international programmes	Up-scaling of infrastructure for surface and upper air observations	<ul style="list-style-type: none"> ▪ DCCMS (lead) ▪ Development partners 	2019-2023
	Strengthening the communication platforms for meteorological data and products	<ul style="list-style-type: none"> ▪ DCCMS (lead) ▪ Development partners ▪ NGOs 	2019-2023
To enhance analysis of meteorological data, prediction of weather and climate and provision of area specific forecasts for planning, early warning programs and climate change management	Increasing human capacity in weather and climate observations, prediction and modelling	<ul style="list-style-type: none"> ▪ DCCMS (lead) ▪ Development partners ▪ DHRMD 	2019-2023
	Enhance stakeholders' consultations to promote the spirit of volunteerism in weather and climate observations and reporting	<ul style="list-style-type: none"> ▪ DCCMS (lead) ▪ MNREM ▪ MoAIWD ▪ NGOs ▪ MoEST 	2019-2023
	Implement obligations in the international and regional conventions and protocols.	<ul style="list-style-type: none"> ▪ DCCMS (lead) ▪ MNREM ▪ WMO and ICAO ▪ Ministry of Foreign Affairs ▪ Ministry of Finance Economic Planning and Development 	2019-2023

5.2. Policy Priority Area 2: Management of meteorological data and information

Policy Statement: The policy will promote proper management, access and utilization of meteorological data and information.

Objective	Strategies	Responsibility	Timeframe
To improve the management, storage and archiving, and utilization of credible and high quality meteorological data and information	Strengthen meteorological data management and quality control system	<ul style="list-style-type: none"> ▪ DCCMS (lead) ▪ MNREM ▪ Development Partners ▪ Ministry of Information 	2019-2023
	Establish a meteorological data storage and backup system	<ul style="list-style-type: none"> ▪ DCCMS (lead) ▪ MNREM ▪ Development Partners ▪ Ministry of Information 	2019-2021
	Enhance the functionality of the meteorological library as a resource centre for accessing meteorological documentaries and books	<ul style="list-style-type: none"> ▪ DCCMS (lead) ▪ National Archives ▪ National Library Services 	2019-2021
	Modernize the meteorological services archive infrastructure for enhanced data safety and security	<ul style="list-style-type: none"> ▪ DCCMS (lead) ▪ Development Partners ▪ National Archives 	2019-2021
	Regular review of the collection, communication and data management systems to ensure that national and international standards are adhered to	<ul style="list-style-type: none"> ▪ DCCMS (lead) ▪ MNREM 	2019-2023

5.3. Policy Priority Area 3: Meteorological engineering, communication, dissemination and information technology (IT) development

Policy Statement: The policy will promote automation of meteorological information, production and communication through the use of cutting-edge observation, prediction, and communication and information technology equipment

Objective	Strategy	Responsibility	Timeframe
To automate meteorological data collection, processing, communication and dissemination systems	Regularly review meteorological observation, communication and data processing infrastructure available in the country and assess available technologies on the market;	<ul style="list-style-type: none"> ▪ DCCMS (lead) ▪ WMO ▪ Development Partners 	2019-2021
	Identifying and automating meteorological data collection, processing, communication and dissemination systems	<ul style="list-style-type: none"> ▪ DCCMS (lead) ▪ WMO ▪ Development Partners ▪ MoTPW ▪ Research Institutions 	2019-2023
	Upgrade and sustain meteorological engineering infrastructure in compliance with WMO standards	<ul style="list-style-type: none"> ▪ DCCMS (lead) ▪ Malawi Bureau of Standards ▪ Development Partners ▪ WMO 	2019-2023
	Establish hosting agreements of meteorological infrastructure through private public partnerships	<ul style="list-style-type: none"> ▪ DCCMS (lead) ▪ PPPC ▪ Mobile services providers ▪ Internet services providers ▪ Malawi Communications Regulatory Authority ▪ MNREM 	2019-2023

	Adopting new weather and climate observation systems.	<ul style="list-style-type: none"> ▪ DCCMS ▪ MNREM ▪ Development Partners ▪ Research institutions 	2019-2023
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5.4. Policy Priority Area 4: Meteorological Research Services			
Policy Statement The policy will promote research to generate additional knowledge in all aspects of meteorological science and applications			
Objective	Strategy	Responsibility	Timeframe
To promote meteorological research, technological development and innovation to guide evidence based application of weather and climate information.	Conducting research in weather and climate forecasting, indigenous weather and climate indicators and knowledge, and all aspects of meteorological applications such as aviation meteorology, agricultural-meteorology and hydro-meteorology	<ul style="list-style-type: none"> ▪ DCCMS (lead) ▪ NCST ▪ Research Centres/Institutions ▪ Academic Research Institutions ▪ Development Partners ▪ CSOs ▪ MoEST 	2019-2023
	Documenting and disseminating research findings for informed decision making	<ul style="list-style-type: none"> ▪ DCCMS (lead) ▪ NCST ▪ Research Centres/Institutions ▪ Academic Research Institutions ▪ Development Partners ▪ CSOs 	2019-2023
	Enhancing collaboration with national and international research institutions such as Malawi University of Science and Technology (MUST), International	<ul style="list-style-type: none"> ▪ DCCMS ▪ NCST ▪ Research Institutions ▪ Academic Research Institutions 	2019-2023

	Research Institute (IRI)	<ul style="list-style-type: none"> ▪ Development Partners ▪ CSOs ▪ MoEST 	
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5.5. Policy Priority Area 5: Capacity building and Awareness			
Policy Statement: The Policy will enhance and sustain public awareness and attainment of relevant capacities including knowledge and skills in collection, storage, prediction, packaging and utilization of meteorological information.			
Objective	Strategy	Responsibility	Timeframe
To build capacity in meteorological services delivery and utilization.	Carrying out regular and comprehensive capacity needs assessment in meteorological services	<ul style="list-style-type: none"> ▪ DCCMS (lead) ▪ NSO ▪ Development Partners ▪ Research Institutions 	2019-2021
	Developing and implementing capacity building initiatives in meteorology through regular meteorological trainings in weather, climate and climate change.	<ul style="list-style-type: none"> ▪ DCCMS (lead) ▪ MNREM ▪ DHRMD ▪ MoAIWD ▪ Development Partners 	2019-2021
	Conducting awareness on the utilisation of meteorological services to various stakeholders and the public	<ul style="list-style-type: none"> ▪ DCCMS (lead) ▪ Ministry of Information ▪ NGOs ▪ CSOs ▪ Development Partners ▪ Media 	2019-2021
	Mainstreaming the use of weather and climate information in all sectors of the economy	<ul style="list-style-type: none"> ▪ DCCMS (lead) ▪ MoAIWD ▪ DoDMA ▪ District Councils ▪ CSO ▪ Development Partners ▪ MoEST 	2019-2023

	Advocating reduction of high vacancy rate existing in the Department of Climate Change and Meteorological Services	<ul style="list-style-type: none"> ▪ DCCMS ▪ MNREM (lead) ▪ OPC ▪ DHRMD 	2019-2021
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5.6. Policy Priority Area 6: Financing the climate change and meteorological sector

Policy Statement: The policy will ensure full Government commitment to increased resource allocation and funding to climate change and meteorological sector for Meteorological Services delivery, and attract development partners to supplement financing of meteorological services in the country.

Objective	Strategies	Responsibility	Timeframe
To motivate government to increase financial allocation to climate change and meteorological sector in the national budget	Sensitizing government policy-makers and development partners on the need to prioritize funding to the climate change and meteorological sector for meteorological service delivery	<ul style="list-style-type: none"> ▪ DCCMS ▪ MNREM (lead) ▪ CSOs ▪ Ministry of Finance, Economic Planning and Development ▪ Development Partners 	2019-2021
	Raising awareness on the existing Strategic Plan of the climate change and meteorological Sector to government and potential donors at national and international level	<ul style="list-style-type: none"> ▪ DCCMS (lead) ▪ MNREM ▪ CSOs ▪ Development Partners 	2019- 2020
	Raising awareness on the socio-economic benefits of meteorological services and value addition of tailored services to the stakeholders	<ul style="list-style-type: none"> ▪ DCCMS (lead) ▪ MNREM ▪ Ministry of Finance, Economic Planning and Development ▪ Development Partners ▪ 	2019-2020

	Developing and implementing revenue generation from cost recoverable meteorological services such as aviation meteorological services, tailor-made climate services and meteorological instrument calibration	<ul style="list-style-type: none"> ▪ DCCMS (lead) ▪ MNREM ▪ Ministry of Finance, Economic Planning and Development ▪ Development Partners ▪ Private Sector 	2019-2021
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5.7. Policy Priority Area 7: Cross cutting issues			
Policy Statement: The policy will promote mainstreaming of cross-cutting issues into meteorological sector programs from planning through implementation to monitoring and evaluation			
Objective	Strategies	Responsibility	Timeframe
To increase participation of vulnerable and disadvantaged groups including women, children, the elderly and the physically challenged in all meteorological related activities	Adopting all inclusive approach in the provision of meteorological services	<ul style="list-style-type: none"> ▪ DCCMS (lead) ▪ MNREM ▪ NGOs ▪ FEDOMA ▪ Ministry of Health ▪ District Councils ▪ Ministry of Gender, Children Disability and Social Welfare ▪ Development Partners ▪ Ministry of Information and Communication Technology ▪ MoEST 	2019-2023
	Developing all inclusive weather and climate products and services such as use of sign language and braille in communicating weather and climate information.	<ul style="list-style-type: none"> ▪ DCCMS (lead) ▪ MNREM ▪ Development partners ▪ NGOs ▪ FEDOMA 	2019-2023

		<ul style="list-style-type: none"> ▪ Ministry of Health ▪ Ministry of Gender, Children, Disability and Social Welfare ▪ Private sector ▪ MoEST 	
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6.0 ANNEX 2: MONITORING AND EVALUATION PLAN

Policy Priority Area 1: Monitoring and prediction of weather and climate systems						
Outcome: Effective and efficient generation and utilization of reliable, responsive, high quality, up to date and timely meteorological services						
Objective	Output	Performance Indicator	Target	Baseline	Source of Verification	Assumptions/ Risks
Objective 1: To provide improved meteorological data for national, regional and international programmes	Network of meteorological observation stations improved	Distance between weather stations	20km radius	80km radius	Annual Performance Reports	Availability of funding for procuring and installation of stations
		No. of upper air weather monitoring stations	2	1	Annual Performance Reports	Availability of funding for procuring and sustained operations
		No. of weather RADAR operational	3	0	Annual Performance Reports	Availability of funding for procuring and installation

	Voluntary weather and climate monitoring and observations by various stakeholders promoted	No. of institutions making weather observations on voluntary basis	20	9	Annual Performance Reports	Availability of funds Willingness by institutions to volunteer
	National, regional and international obligations complied to	Level of compliance to international agreements	70%	30%	Publication and information from Conventional and protocol website	Resources for implementation of obligations
Objective 2: To enhance analysis of meteorological data, prediction of weather and climate and provision of area specific forecasts for planning, early warning programs and climate change management	Weather and climate prediction/projection and modelling improved	Accuracy of weather and climate prediction	90%	65%	Validation reports	Availability of improved prediction models and forecasters' skills

Policy Priority Area 2: Management of meteorological data and information						
Outcome: Effective and efficient generation and utilization of reliable, responsive, high quality, up to date and timely weather and climate services						
Objective	Output	Performance Indicator	Target	Baseline	Source of Verification	Assumptions/ Risks
To improve the management, storage and archiving, and utilization of credible and high quality meteorological data and information	Storage, use and management of meteorological data and information improved	No. of operational meteorological services archive/ libraries	2	1	Progress reports	Willingness of cooperating partners
		No. of operational climate database management systems	1	1		
		No. of assessments done on national observation, communication and data processing systems	5	0	Assessment reports	Availability of funds
	Stakeholders' access and utilization of meteorological data and information increased	% increase in number of people accessing weather and climate services and products	50 %	30%	Survey report	Willingness to provide feedback by users; availability of financial resources
		% of meteorological data digitised	90%	40%	Digitization Reports	Availability of financial resources and climatic data manuscripts

Policy Priority Area 3: Meteorological engineering, communication and information technology (IT) development						
Outcome: Effective and efficient generation, communication, dissemination and utilization of reliable, responsive, high quality, up to date and timely weather and climate services;						
Objective	Output	Performance Indicator	Target	Baseline	Source of Verification	Assumptions/ Risks
To automate meteorological data collection, processing, communication and dissemination systems	Technical and infrastructural capacity in meteorological engineering and ICT improved	Percentage of servicing and calibrating equipment that is operational	80%	30%	Procurement reports	Availability of funds; Expertise to maintain/upgrade
		Percentage of equipment that is timely rehabilitated, serviced and maintained	80%	30 %	Maintenance/upgrading reports	
		No. of private institutions supporting hosting of meteorological equipment	5	2	MoUs	
		No. of new monitoring systems adopted	3	1	Installation reports	Availability of competent and innovative technicians; Funds availability
		No. of weather and climate services automated	6	2	Installation reports	
		Internet bandwidth expansion	10mbps	1mbps	Procurement report	
		Power backup systems installed	25	2	Procurement report	

Policy Priority Area 4: Meteorological Research Services						
Outcome: Effective and efficient generation, communication, accessibility and utilization of reliable, responsive, high quality, up to date and timely weather and climate services;						
Objective	Output	Performance Indicator	Target	Baseline	Source of Verification	Assumptions/ Risks
To promote meteorological research, development and technological innovation to guide evidence based application of weather and climate information	Increased climate and weather research and application	No. of meteorology related research conducted	15	5	Publications	Availability of competent personnel to undertake research;
		No. of meteorological research papers published and results disseminated.	10	0		
		No. of institutions collaborating in meteorological research	8	3		
		No. of weather and climate services innovations and developments informed by local research	3	0		

Policy Priority Area 5: Capacity building and Awareness						
Outcome: Enhanced community resilience from weather and climate shocks.						
Objective	Output	Performance Indicator	Target	Baseline	Source of Verification	Assumptions/ Risks
To build capacity in meteorological services delivery and utilization.	Capacity of key stakeholders in production and utilization of weather and climate information improved	No. of meteorological training needs assessments	2	0	Training Plan	Availability of financial resources
		No. of meteorological officers and volunteers observers trained	500	160	Training reports	
		No. of weather and climate services adopting quality management system	3	0	Implementation evidence	Top management support
		No. of stakeholders and users capacitated through training, awareness and sensitizations in weather and climate services	5000	Less than 1000	Awareness and trainings reports	
		No. of meteorological communication and dissemination systems used	15	9	Inventory of systems	
	Integration of climate information and services in development plans done	No. of institutions in meteorology capacity building	5	2	Letters of agreements	Availability of funds
No. of development plans integrating weather and climate developed		14	2	Development plans supported		

Policy Priority Area 6: Financing the climate change and meteorological sector						
Outcome: Increased demand, utilisation and cost recovery for weather and climate services by users						
Objective	Output	Performance Indicator	Target	Baseline	Source of Verification	Assumptions/ Risks
To motivate government to increase financial allocation to climate change and meteorological sector in the national budget	Budgetary allocation and access to more sustainable funding sources increased	Percentage of budgetary allocation to climate change and meteorological services increased	0.0002	0.00011	National budgetary allocation records; Inventory of products; Sales receipts	Available funds
		No. of value added weather and climate products developed and sold	6	1		
		No. of customer care services reviewed and improved	1	1	Campaign materials	Availability of funds; Willingness of the government to authorize the campaigns
		No. of sensitization campaigns with development partners and the central government on (i) the value of weather and climate services and (ii) the Strategic Plan for support	20	3		

Policy Priority Area 7: Cross Cutting Issues						
Outcome: Enhanced community resilience from weather and climate shocks						
Objectives	Output	Performance Indicator	Target	Baseline	Source of Verification	Assumptions/ Risks
To increase participation of vulnerable and disadvantaged groups including women, children, the elderly and the physically challenged in all weather and climate related activities	Participation of women and other disadvantaged groups in meteorological programmes and projects increased	No. of programmes involving women and other disadvantaged groups	All programmes and projects	30 %	M&E Reports Reports from Existing projects and programmes	Availability of project funds; willingness of other groups to include gender; Willingness of the vulnerable groups to participate
	Weather and climate Services accessed by vulnerable and disadvantaged groups	No. of weather and Climate services needs of vulnerable groups documented Percentage of vulnerable and disadvantaged groups with access to weather and climate services	1 60	0 10	Survey	Willingness of vulnerable and disadvantaged groups to access weather and climate information; Confidentiality of some of the issues such as HIV/AIDS