



REPUBLIC OF ZAMBIA



2025 NATIONAL METEOROLOGY POLICY



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FOREWORD



Weather and climate play a critical role in the socio-economic sectors of any country. The adverse effects of weather and climate have resulted in the loss of lives as well as damage to property and the environment. On the other hand, good weather and climate ensure that people are well fed, the cost of production is lower in many economic sectors, transport and recreation activities are also undertaken without much hindrance or challenges.

The Government of the Republic of Zambia is committed to facilitating enabling policies, legal and regulatory reforms for promoting the sustainability of a green economy and environment, while at the same time, mitigating the effects of climate change. It is committed to providing the necessary monitoring, conserving and protective oversight role, while also ensuring that there is sustainable management of the environment for national development.

This National Meteorology Policy proposes a broad range of objectives and measures to address key meteorological issues and challenges. It further seeks to provide a framework for an integrated approach to planning and implementation of various measures and recommends a legal and institutional framework, as well as governance measures to support the achievement of the desired goals and objectives.

This Policy presents a coordinated approach towards enhanced monitoring and evaluation, resource pooling, effective and efficient use of resources, as well as governance of meteorological matters in Zambia. It is envisaged that this Policy will enable the Government to meet its mandate in a more structured, efficient and effective manner.

Honourable Mike Elton Mposha, MP

MINISTER OF GREEN ECONOMY AND ENVIRONMENT

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MINISTRY OF GREEN ECONOMY AND ENVIRONMENT

WORKING DEFINITIONS

Product	Something produced to be sold, shared with value to the user
Automatic Weather Station	A weather/climate station that is installed to automatically transmit or record weather/climate elements
Manual Weather Station	Weather/climate station manned by trained observers
Aviation Services	Services that are produced and shared for the safe operation of aircrafts
Weather	The state/changing of the atmospheric condition of a place and time
Climate	The average weather of a place for a long period of time at least 30 years or more
Meteorology	The study/science of the atmosphere
Climatology	The study/science of the behaviour of the atmosphere and changes in climate variables or weather conditions, averaged over a period of time
Commercialisation	The process by which National Meteorological and Hydrological Services (NMHSs) develop and offer specialised value-added weather and climate products and services for specific sectors on a cost recovery or profit-making process.

Cost Recovery

The ability to recover (deduct) the cost of investment in a business transaction

Climate Variability

The way aspects of climate differ from an average (such as temperature and precipitation).

Agro-Climatology

The study of climate aspects which are relevant to the problems of agriculture

Agrometeorological

A localised product co-produced and containing meteorological and agricultural information or advisories

Service

Provision of meteorological information in a way that assists decision-making by individuals and Organisations

Weather Forecast

The prediction of the state/changing of the atmospheric conditions of a place and time

ACRONYMS

AMSS	Automatic Message Switching System
AWS	Automatic Weather Station
CDT	Climate Data Tool
CLICOM	CLimate COMputing system
CP	Cooperating Partners
CSOs	Civil Society Organisation
DMMU	Disaster Management and Mitigation Unit
DRR	Disaster Risk Reduction
ENACTS	Enhancing National Climate Services
FCBO	Faith and Community-Based Organisations
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
8NDP	Eighth National Development Plan
GSM	Global System for Mobile
ICAO	International Civil Aviation Organisation
ICT	Information Communications Technology
ISO	International Organisation for Standardisation (ISO) certification
MDD	Management Development Division
MOJ	Ministry of Justice
MWS	Manual Weather Stations
NGOs	Non-Governmental Organisations
NMP	National Meteorology Policy
NMHS	National Meteorological and Hydrological Services
PSMD	Public Service Management Division
SCRALA	Strengthening Climate Resilience of Agricultural Livelihoods in Agro-Ecological Regions
SDGs	Sustainable Development Goals
TRALARD	Transforming Landscapes for Resilience and Development
UNDP	United Nations Development Programme
WB	World Bank
WMO	World Meteorological Organisation
WRF	Weather Research and Forecasting
ZAPD	Zambia Association of People Living with Disabilities
ZASTI	Zambia Air Services Training Institute
ZESCO	Zambia Electricity Supply Corporation
ZNFU	Zambia National Farmers Union
ZMD	Zambia Meteorological Department

1 INTRODUCTION

Meteorological services play a crucial role in supporting socio-economic sectors by enabling informed decision-making, improving operational efficiency, and mitigating risks associated with weather and climate variability. Timely and accurate meteorological information contributes to economic stability and sustainable development by helping various stakeholders optimize their activities and safeguard resources.

However, the provision of meteorological services in Zambia faces several challenges, including low investments and funding levels resulting in inadequate and poorly maintained equipment, deteriorating observation infrastructure, and shortages of qualified professional and technical personnel. Further, meteorological services are provided free of charge as there is no legal provision for commercialisation and cost recovery of weather and climate services.

Additionally, extreme weather, climate change and variability have significantly impacted a wide range of sectors, disrupting socio-economic stability and development. The increasing frequency and severity of events such as droughts, floods, flash floods, heavy rainfall, high temperatures, and strong winds have led to widespread challenges across agriculture, energy, water resources, transport, health, tourism, disaster management, and urban planning.

These adverse weather conditions contribute to food and water insecurity, energy shortages, infrastructure and property damage, loss of life, displacement of communities, unemployment, disrupted trade and supply chains, increased disease outbreaks, and overall economic decline. Additionally, sectors such as aviation, manufacturing, and financial services face heightened risks due to operational disruptions and the rising costs associated with climate-related damages and mitigation efforts.

Given the growing frequency and intensity of these climate-related hazards, the need for accurate, reliable, and accessible meteorological information has become more critical than ever. Enhanced forecasting and climate data are essential for building resilience, ensuring adaptive capacity, and fostering sustainable development across all sectors.



The demand for weather and climate information has steadily increased over the years, driven by advancements in technology that have expanded access to meteorological, hydrological, and environmental data. Recognizing this evolving landscape, it became imperative to review the National Meteorology Policy (NMP) of 2013 to align with current needs and address persistent challenges. The revised policy aims to resolve key issues, including gaps in equipment, technological integration, data processing capabilities, and management information systems, ensuring the effective and efficient provision of meteorological services.

Insights from the implementation of the 2013 policy provided a strong foundation for developing this updated framework. Additionally, the new 2025 National Meteorology Policy incorporates experiences from past decades of climate variability and extreme weather events, while integrating national, regional, and international development frameworks and initiatives. The policy formulation process was further enriched through consultations with key stakeholders at both provincial and national levels, ensuring a well-rounded approach reflective of the country's meteorological needs.

The policy is structured into five sections:

- Introduction;
- Situation Analysis;
- Vision, Rationale, and Guiding Principles;
- Objectives and Measures; and
- Implementation Framework

2 SITUATION ANALYSIS

2.1 Meteorological Services, Commercialisation and Cost Recovery

Meteorological services are fundamental for informed decision-making and operational efficiency across a wide array of socio-economic sectors. These include, but are not limited to, agriculture and fisheries, health, water and sanitation, energy, transport (air, land, and water), infrastructure development, and disaster risk reduction. This analysis outlines the current state and key challenges characterising the provision of these services.

Currently, the Zambia Meteorological Department (ZMD) operates as a government department under the Ministry of Green Economy and Environment. As a government department, ZMD's financial management, budget allocation, personnel recruitment, and operational flexibility are subject to standard government procedures. In terms of financing, ZMD has mainly depended on government financing, and this has impacted negatively on investment in infrastructure, technology acquisition, staff training and the ability to respond swiftly to changing demands and technological advancements.

For a long time, specialised weather and climate services, including those for the aviation sector and other commercial entities, have been provided free of charge. This practice is increasingly recognised as unsustainable and negatively impacts the ability to invest in and provide quality services. To respond to these challenges, the World Meteorological Organisation (WMO) increasingly advocates for National Meteorological and Hydrological Services (NMHSs) to have greater operational and financial autonomy. WMO encourages its members to explore business and institutional models, such as semi-autonomous agencies or fully corporatised entities, where appropriate. A number of countries in the region, such as Zimbabwe, Uganda, Namibia, South Africa and Kenya, have implemented cost recovery and commercialisation mechanisms to ensure sustainable financing and provision of weather and climate services. In addition, studies indicate that the successful implementation of cost recovery and commercialisation mechanisms requires a paradigm shift in the setup of institutions providing meteorological services.

The rationale behind WMO's push for greater autonomy includes enhanced service delivery, improved financial sustainability, increased operational efficiency and partnerships.

While operating as a government department provides a clear mandate for delivering essential public services, the current ZMD structure presents inherent challenges to the sustainable development of infrastructure, technology, and specialised services, and limits the full benefits that could be derived from cost



recovery and commercialisation efforts, as seen in the experiences of more autonomous NMHSs in other regions.

2.2 Demand for Weather and Climate Information

Demand for weather and climate forecast information has grown significantly over the past few decades and is projected to accelerate further. This increasing demand is driven by several factors, including the rising frequency and intensity of extreme weather events, population growth, expansion of new settlements, increased economic activities, and other environmental risks. There is a particular and growing need for tailored, area-specific, and sector-specific information to support targeted planning and adaptation strategies.

2.3 State of Meteorological Infrastructure, Technology, and Capacity

The effective provision of meteorological services is heavily reliant on adequate infrastructure, technology, and skilled personnel. Key issues identified include:

- **Inadequate Observation Network:** The existing network of 295 weather stations (42 manual, 253 automated) and 500 voluntary rainfall stations falls significantly short of the required WMO standards of one weather station per 25 km and one rainfall station per 10 km, resulting in a substantial deficit of over 900 weather stations. This leaves large parts of the country without adequate coverage.
- **Condition of Stations and Equipment:** Many manual weather stations are in poor condition, with dilapidated buildings, obsolete equipment, and insufficient staffing. The country lacks essential early warning equipment such as storm warning radar, lightning detectors, air quality sensors, marine meteorology sensors, and upper air observation equipment. Obsolete and outdated equipment is prevalent, with mercury-based instruments still in use at manual stations despite international recommendations for phasing them out (Minamata Convention, 2013). Irregular repair, maintenance, and calibration further exacerbate equipment issues.
- **Technology and Data Processing:** While data processing tools like PUMA 2015, CDT, ENACTS, and WRF are utilised, their effectiveness is hampered by inadequate high-speed internet and insufficient computing facilities. This limitation contributes to the production of generalised, rather than specific, weather and climate information.
- **Data Exchange Systems:** The reliance on old and outdated GSM communication and Automatic Message Switching System (AMSS) for data exchange between stations, the Head Office, and international centres presents significant challenges and delays.

- **Management Information Systems (MIS):** Despite progress in digital data systems, there is inadequate availability and utilisation of ICT for observation, visualisation, and dissemination. Limited computing capacity and slow internet hinder effective data collection, exchange, management, and archiving. A large volume of historical data remains in paper form. Climate database management systems (CLICOM and CLIMSOFT) are either outdated or require continuous development and infrastructure investment for full operationalisation. Data security is a concern due to inadequate protection against threats.
- **Personnel Capacity and Skills:** There are limitations in the number of personnel, particularly for maintaining 24-hour airport observations according to WMO and ICAO standards. Personnel competences, especially for aeronautical services, require enhancement to meet international standards. There is also a shortage of specialised training needed to generate area and sector-tailored information.

2.4 Sectoral Impacts of Inadequate Meteorological Services

The deficiencies in meteorological service provision have significant adverse impacts across various climate-sensitive sectors. While meteorological services are provided to numerous sectors, including agriculture, fisheries, health, water and sanitation, energy, transport, infrastructure, mining, tourism, and disaster management, the provision is often inadequate. This inadequacy stems from the limited capacity to provide information that is:

- (i) **Area-Specific and High-Resolution:** Crucial for localised decision-making in agriculture, forestry, infrastructure, health, and DRR.
- (ii) **Timely and Consistent:** Essential for operational planning in transport, mining, and energy.
- (iii) **Translated and Accessible:** Particularly for rural farmers and vulnerable populations.
- (iv) **Sector-Specific and Tailored:** Needed for optimal resource use, risk management, and planning in all listed sectors, as current information is often too general.

These gaps lead to suboptimal resource management, increased vulnerability to extreme weather events, operational disruptions, economic losses, and compromised safety and efficiency across the economy.

2.4.1 Agriculture, Livestock and Fisheries

The effective management of agricultural, livestock, and fisheries systems is critically dependent on access to timely and accurate weather and climate information. This information is essential for optimising the use of resources such as water, land, and fertiliser, thereby significantly impacting productivity, sustainability, and profitability within these sectors.

2.4.1.1 Challenges in Information Accessibility and Application

A primary challenge is the inadequacy of weather and climate information available to farmers. Furthermore, the information that is available is often not translated into formats easily understood by local farming communities across various localities. While seasonal rainfall forecasts are translated into seven local languages, a broader communication gap persists, hindering effective farm-level decision-making. Rural farmers, in particular, experience limited access to crucial meteorological data.

2.4.1.2 Impact of Climate Variability and Extreme Weather

The increasing frequency and intensity of extreme weather events, including droughts, floods, and unseasonal temperature shifts, pose significant challenges. Farmers must understand these evolving climatic trends to make informed decisions regarding crop selection, planting and harvesting schedules, and market engagement strategies. A comprehensive understanding of climate change risks and opportunities is vital for developing effective adaptation and mitigation measures.

2.4.1.3 Crop Management

Weather and climate information is indispensable for robust crop management, informing:

- (i) **Optimal Growing Conditions:** Determination of specific moisture and temperature requirements for various crops.
- (ii) **Risk Management:** Anticipation and preparedness for pest and disease outbreaks, which are frequently influenced by climatic conditions.

- (iii) **Market Forecasting:** Utilisation of weather trend analysis for strategic decisions on crop cultivation and optimal selling periods.

2.4.1.4 Impact of Extreme Events

- (i) **Heavy Rainfall and Flooding:** Can lead to crop submergence, soil erosion, nutrient leaching, widespread crop failure, and contamination of crops and soil. These impacts severely affect crop production, overall productivity, and contribute to food insecurity.
- (ii) **Drought and Prolonged Dry Spells:** Result in crop stress, increased susceptibility to diseases, and ultimately, significantly reduced yields.

2.4.1.5 Livestock and Fisheries Management

- (i) **Livestock:** Access to adequate water is paramount for livestock survival, particularly during drought conditions. Information on precipitation, humidity, and soil moisture assists farmers in planning for water availability. Weather patterns also influence the prevalence of certain livestock diseases. Extreme weather conditions, such as high and low temperatures, floods, and droughts, can lead to pest attacks, loss of pasture, and substantial livestock losses, thereby impacting national food security and productivity.

Fisheries: Meteorological services are vital for early warning systems related to food security in the fishing industry. Changes in weather directly affect fisheries. Low water temperatures can reduce fish feed intake and impede growth. Conversely, high temperatures increase oxygen consumption in fish while simultaneously decreasing dissolved oxygen content in the water, especially in shallower bodies, making oxygen a critical limiting factor. Optimal water temperatures are necessary for normal fish growth. Furthermore, changes in wind direction and speed can create hazardous conditions on water bodies, endangering the lives of fishermen.

2.4.1.6 Overarching Deficiencies

Despite the recognised importance of weather and climate information for the agriculture sector (encompassing crops, livestock, and fisheries), its provision remains inadequate. Key deficiencies include a lack of area-specific weather information tailored to local needs. Rural farmers also face significant limitations in accessing available information. This situation is exacerbated by the limited adoption of adaptation measures, such as alternative irrigation systems and the cultivation of drought or pest-resistant crop varieties, thereby negatively impacting



the health and well-being of crops and livestock, and consequently, national food security.

2.4.2 Forestry

The sustainable management of forestry resources, including the establishment of new plantations and the monitoring of vegetation growth in existing forests, requires accurate and reliable weather and climate information. The availability of such data can significantly impact the long-term sustainability and profitability of forests and the forest industry. Despite its importance, the provision of this specialised service to the forestry sector is inadequate, primarily due to a lack of area-specific information, which hinders optimal planning and management practices.

2.4.3 Health

There is an increasing demand for precise weather and climate information from the health sector, driven by the escalating health problems associated with climatic variables such as rainfall, temperature, and humidity. Weather patterns play a significant role in determining the incidence and severity of diseases and conditions like malaria, cholera, typhoid, and malnutrition. The Ministry of Health (MOH) collaborates with the Zambia Meteorological Department (ZMD) to obtain information on rainfall, temperature, and humidity for informed decision-making. However, the provision of such information is often inadequate due to a limited capacity to provide area-specific data. Furthermore, access to this crucial information is not always readily or consistently available, impacting timely public health interventions.

2.4.4 Infrastructure Development

The development of resilient infrastructure necessitates area-specific and high-resolution weather and climate data to ensure structures can withstand extreme conditions such as high temperatures, strong winds, floods, and heavy rainfall. It is not uncommon for facilities like schools, health centres, and housing infrastructure to suffer damage, such as blown-off roofs or collapses, and for bridges and roads to be washed away during severe weather events. These



occurrences negatively affect the delivery of public services and lead to significant economic losses. The lack of tailored meteorological data compromises the long-term viability and safety of infrastructure projects.

2.4.5 Transport

Zambia's transport sector, encompassing land, air, and water, relies on meteorological data for safe and efficient operations. In air transport, meteorological information is crucial for pre-flight planning, take-off, landing, and enroute navigation. Similarly, water transport requires accurate weather forecasts to enhance navigational safety and efficiency. The inadequate provision of specific and timely weather information can lead to accidents, loss of life and property, economic losses, and disruptions or delays in transport services. A persistent challenge is the limited capacity to provide consistent and area-specific weather and climate information tailored to the diverse needs of the transport sector.

2.4.6 Energy

The country has witnessed an increase in energy demand due to population growth and expanded economic activities. This has necessitated the development of alternative energy sources, including wind, solar, and hydropower, all of which are intrinsically dependent on weather and climate factors. Inadequate or overly generalised weather and climate information can lead to misdirected investments in energy generation projects and inefficient utilisation of energy resources. The information currently provided to the energy sector often lacks the specificity required for optimal planning, development, and management.

2.4.7 Mining

The mining sector requires precise weather and climate information to prepare for and avoid disruptions in its activities. Inadequate meteorological information can negatively affect operations, increasing the risk of accidents, loss of life, property damage, and operational disruptions. These factors can ultimately reduce productivity and escalate production costs. The weather information currently provided is often too general to meet the specific operational and safety requirements of the mining sector.

2.4.8 Tourism

The tourism sector, a rapidly growing contributor to national and local economies, is highly sensitive to weather and climate. Tourists rely on weather forecasts and climate information both before and during their travels to plan activities and make informed decisions. For the industry to thrive, it requires access to relevant meteorological information. This enables effective preparation for opportunities and challenges arising from weather and climate variability. Climatic parameters, including rainfall, temperature, humidity, radiation, and extreme weather events like tropical cyclones, are key to facilitating access to specific tourism destinations and ensuring the viability of various tourist activities. However, the provision of weather and climate information tailored to the needs of the tourism sector has not been adequately met.

2.4.9 Water

Zambia is endowed with approximately 40% of the water resources in the Southern African Development Community (SADC) region. The utilisation of weather and climate information is therefore critical for the water sector, supporting hydrological characterisation, water supply management, flood management and control, irrigation, and drainage, among other activities. This information is also necessary for identifying populations vulnerable to weather and climate hazards and for implementing risk management and emergency preparedness practices. Despite the provision of general weather forecasts, there is still limited capacity to generate high-quality, reliable data that comprehensively meets the specific needs of the water sector. This inadequacy negatively affects the efficient and effective management of both surface and groundwater resources, thereby hindering the sustainable management of the country's water resources.

2.4.10 Disaster Risk Reduction (DRR)

The World Meteorological Organisation (WMO) estimates that 90% of all-natural disasters globally are attributable to weather conditions. In Zambia, common disaster risks include droughts, floods, epidemics, pests, environmental degradation, and accidents. The ability to adapt to the impacts of weather and climate is therefore crucial for containing the risks arising from natural disasters.



Over the last three years, the country has made progress in moving from providing general meteorological information to offering district-specific weather and climate information aimed at addressing disaster-related problems. However, the mechanism to consistently provide actionable, area-specific information for effective early warning and response remains a challenge. This limitation restricts the capacity of relevant authorities and communities to respond to and contain the adverse effects of disaster occurrences, thereby increasing community vulnerability and leading to increased loss or damage to property, infrastructure, livelihoods, and lives.

2.5 Climate Change and Variability

Climate change and variability have resulted in an increased severity and frequency of extreme weather events across Zambia, including floods, droughts, extreme temperatures, and heavy rainfall, particularly over the past three decades. Observed historical trends indicate significant shifts: the national mean annual temperature has increased by approximately 1.3°C since 1960, which translates to an average warming rate of 0.29°C per decade. Concurrently, mean annual rainfall has exhibited a decreasing trend, declining by an average of 1.9 mm per month per decade since 1960. These adverse climatic changes and their associated impacts are further compounded by challenges such as inadequate research and development focused on climate change, low utilisation of existing research findings, and insufficient skills and adoption of modern technologies. These factors collectively hinder the development and implementation of effective adaptation and mitigation strategies necessary to build resilience against climate change.

2.6 Dissemination and Access to Information

Dissemination challenges limit access to weather and climate information, particularly for rural populations.

- (i) **Limited Coverage and Platforms:** Few people access information due to inadequate communication platforms, with rural areas being most affected.
- (ii) **Challenges with Collaboration:** While ZMD collaborates with stakeholders (DMMU, Ministry of Agriculture, community radio), challenges include incomplete coverage of dissemination networks, lack of resources for

translation into local languages and discussion forums, and the high cost of perpetual licenses for SMS portals.

- (iii) **Cost of Media Partnerships:** Private radio and television stations often charge for disseminating information, making it costly and unsustainable. There is also a gap in trained media presenters capable of interpreting and translating meteorological information.
- (iv) **Misinformation:** Increased use of social media has led to the proliferation of unreliable and unauthenticated meteorological information from unqualified individuals. There are currently no legal provisions for ZMD to regulate this practice.
- (v) **Gender and Disability Gaps:** Vulnerable groups are disproportionately affected by climate variability. Significant gender differences exist in access to information and technology (e.g., mobile internet use), creating information and digital technology gaps. Persons with disabilities are often marginalized in the packaging, interpretation, and dissemination of information.

2.7 Stakeholder Engagement and Collaboration

Collaboration with stakeholders is crucial but faces challenges:

- (i) **Weak Local Coordination:** Collaboration among key local stakeholders is weak, leading to isolation, limited information sharing, duplication of efforts, and potentially conflicting information.
- (ii) **Community Participation Challenges:** Collaboration with communities (e.g., for rainfall data collection) is hindered by unsustainable equipment maintenance due to vandalism and inadequate resources. The discontinuation of project-based incentives has made it challenging to sustain voluntary data recording and transmission by local communities and private stakeholders. Integration of traditional knowledge is limited.
- (iii) **Regional and International Collaboration:** While benefiting from guidelines, regulations, training, and potential equipment donations from bodies like WMO, ICAO, and SADC, delays in remitting required subscriptions limit access to significant benefits available to paid-up Member States, including continuous professional development.



2.8 Research and Development

While ZMD conducts meteorological research and collaborates with institutions, linkages are weak. This limits the utilisation of climate data by end-users for planning. Research and Development (R&D) efforts are also hampered by inadequate infrastructure, finance, and human resources.

3 VISION, RATIONALE AND GUIDING PRINCIPLES

3.1 Vision

“Accurate, adequate and timely weather and climate services for sustainable development.”

3.2 Rationale

Meteorology is central in the socio-economic development of a country as it provides support to operations of various sectors such as agriculture, mining, tourism, environment and natural resources, transport, energy, water, health, as well as infrastructure development and maintenance. Over the years, in Zambia, the provision of meteorological services has evolved and expanded to include other socio-economic sectors. However, the development of the meteorology sector in the country has lagged and not in tandem with the increased demand for meteorology services from various sectors. The lag has been compounded by inadequacies in policy and legal provisions, coupled with budgetary constraints for improved capacities. The lag has also been due to inadequate investment in modern and advanced technologies and infrastructure, as well as weak monitoring and forecasting capacity, including early warning of extreme weather events, hence the need to revise the policy.

The revision of the policy was necessitated by the need to address the increasing demand for weather and climate information due to challenges posed by climate change and variability that have negatively impacted the social and economic sectors and the environment in general. The negative impacts are evidenced by recurring extreme weather events such as high temperatures, floods, droughts, frequent prolonged dry spells and heavy rainfall. Some of these events have resulted in pests and diseases, thus impacting human and animal health. These negative impacts have the potential to reverse the progress towards the attainment of the Sustainable Development Goals, Vision 2030, as well as the Eighth National Development Plan (8NDP).



Further, the review of the policy was necessitated by the need to strengthen the sustainable financing and provision of meteorological services by implementing commercialisation and cost recovery mechanisms. This will be critical in addressing the financial challenges that have been hindering the smooth and quality provision of meteorological services. It is against this background that the revised National Meteorology Policy will enhance the provisions of meteorological services, thus contributing to national development.

3.3 Guiding Principles

The following principles shall be applied in achieving the purpose of this Policy:

(i) ***Accountability and Transparency***

The Policy will ensure meteorological services are provided in a responsible and timely manner by following WMO and ICAO standard operating procedures and regular provision of information to all stakeholders for the decision-making process;

(ii) ***Partnership***

The Policy will promote effective stakeholder collaboration and partnership in an integrated approach;

(iii) ***Excellence***

The Policy will facilitate efficient and effective processing, generation and dissemination of timely, accurate weather and climate information for planning and decision making;

(iv) ***Good Governance***

The implementation of the policy will be done in line with the existing legal and institutional frameworks in a manner that will be free of abuse;

(v) ***Human Dignity***

The Policy will be implemented by ensuring that weather and climate services and national early warning systems are provided timely and accurate in order to protect human rights;

(vi) ***Equity***

The Policy will ensure effective, impartial and fair access to timely and accurate weather and climate services without discrimination.

(vii) ***Sustainable Development***

The Policy will ensure the provision of accurate weather and climate information to all sectors to inform planning and decision making without compromising the aspirations of the present and future generations.

4 POLICY OBJECTIVES

In order to ensure that the vision of the meteorology sub-sector in the country is realised, the Policy objectives will be to:

- a) Commercialise specialised weather and climate services for sustainable and efficient operations.
- b) Improve the provision of timely and accurate meteorological services to all socio-economic sectors for the attainment of sustainable development;
- c) Increase knowledge, awareness and utilisation levels in weather and climate information in order to have an informed public;
- d) Strengthen national, regional and international coordination and collaboration; and
- e) Strengthen research and development in order to develop sector-specific evidence-based solutions and applications

5 POLICY MEASURES

The following measures will be undertaken for each of the Policy objective:

Objective 1

To commercialise specialised weather and climate services for sustainable and efficient operations.

Measures

- (i) Establish a legal framework to support the commercialisation of specialised weather and climate services; and
- (ii) Establish commercialisation and cost recovery mechanisms for specialised weather and climate services.

Objective 2

To improve the provision of timely and accurate meteorological services to all socio-economic sectors for the attainment of sustainable development.

Measures

- (i) Strengthen human resource capacity;
- (ii) Expansion and modernisation of weather observation infrastructure
- (iii) Enhance capacities in weather infrastructure and observation station network
- (iv) Enhance data collection, transmission, and forecasting
- (v) Enhance the management information system;

Objective 3

To increase knowledge, awareness, and utilisation levels in weather and climate in order to promote informed decision-making.

Measures

- (i) Strengthen the mechanism for information sharing and dissemination;
- (ii) Strengthen early warning and climate advisory mechanisms across all sectors;

- (iii) Promote access to and utilisation of ICT platforms for weather and climate information;
- (iv) Enhance inclusion of persons with disabilities in the dissemination of weather and climate information; and
- (v) Promote the integration of indigenous knowledge in weather and climate issues.

Objective 4

To strengthen national, regional and international coordination and collaboration in meteorology.

Measures

- (i) Strengthen mechanisms for sharing weather and climate information at national, provincial, district and community levels;
- (ii) Enhance systems and practices for sharing weather and climate information at regional and international levels; and
- (iii) Enhance collaboration with training institutions on weather and climate at local, regional and international.

Objective 5

To strengthen research and development in order to develop sector-specific evidence-based solutions and applications.

Measures:

- (i) Promote research and uptake of research findings;
- (ii) Enhance capacities to develop local technological solutions; and
- (iii) Establish a research fund for weather and climate research and development.

6 IMPLEMENTATION FRAMEWORK

The successful implementation of the NMP shall depend on the following implementation framework:

6.1 Institutional Arrangement

The following will be the institutional arrangement:

a) Ministry responsible for meteorology

The Ministry will be responsible for the overall coordination of the implementation of the Policy. The cross-cutting nature of meteorological applications require that the Ministry provides meteorological services to all sectors of the economy. In this regard, it will oversee and collaborate with institutions that are key in the provision of weather and climate information.

b) Other Government Ministries and Institutions

Other Government Ministries and institutions shall play their respective roles in the implementation of the NMP in line with their respective portfolio mandates as follows:

(i) Cabinet Office

Shall provide oversight on the implementation, monitoring and evaluation of the policy.

(ii) Office of the Vice-President

Collaborate in communicating early warnings of weather-related disasters to the public as well as preparedness in case of prediction of such disasters. In addition, will be responsible for disaster management, development and implementation of national disaster contingency plan as part of disaster risk management.

(iii) Ministry responsible for information and media

Shall collaborate by raising awareness and disseminating weather and climate information as well as providing the platform for feedback.

(iv) Ministry responsible for finance and national planning

Shall facilitate and provide financial resources to enable successful implementation of the policy as well as mainstream weather and climate information into the national development plans.

(v) Ministry responsible for agriculture

Shall collaborate in data collection, interpretation, application, and dissemination of weather and climate information as well as through co-production of advisories.

(vi) Ministry responsible for fisheries and livestock

Shall collaborate in data collection, interpretation, application, and dissemination of weather and climate information as well as through co-production of advisories to support aquaculture and livestock production.

(vii) Ministry responsible for education

Shall collaborate by hosting weather stations in various learning institutions and ensure safety of equipment in order to prevent vandalism. In addition, the Ministry will strengthen the provision of meteorology education from early childhood to tertiary level.

(viii) Ministry responsible for transport

Shall collaborate in the utilisation of meteorological information to air navigation, land and water transport among others.

(ix) Ministry responsible for health

Shall collaborate in the utilisation of weather and climate alerts and advisories to enhance preparedness and response against weather related diseases as well as through the development of management and surveillance strategies.

(x) Ministry responsible for tourism

Shall collaborate in data collection, interpretation, application and dissemination of weather and climate information as well as through co-production of advisories to support the development and growth of tourism and wildlife sector.

(xi) Ministry responsible for water development

Shall collaborate in co-production of hydro-meteorological information and the utilisation of weather and climate information for effective water resource management.

(xii) Ministry responsible for infrastructure development

Shall collaborate through the utilisation of weather and climate information for planning, designing and construction of climate resilient infrastructure.

(xiii) Ministry responsible for physical planning

Shall collaborate through the utilisation of weather and climate information for rural and urban planning.

(xiv) Ministry responsible for science and technology:

Shall collaborate by enhancing the provision of meteorological services through the adoption and application of science and technology.

Other line Ministries will collaborate in accordance with their portfolio functions as outlined in the Government Gazette;

(xv) Smart Zambia Institute

Shall collaborate with the ministry in enhancing ICT infrastructure and internet connectivity for improved provision of meteorological services.

c) Cooperating Partners

Cooperating Partners will support the effective implementation of this Policy through the provision of technical assistance and financial resources.

d) Private Sector

The private sector is expected to contribute to the implementation of the policy by participating in research, development of technology and utilisation of weather and climate information for socio-economic development.

e) Training and Research Institutions

These will collaborate by providing meteorological training and undertaking research to improve provision of meteorological services for informed decision making.

f) Other key stakeholders

Key stakeholder which include but not limited to: Non-Governmental Organisations (NGOs), Civil Society Organisations (CSOs), Faith and Community Based Organisations (FCBOs), traditional leaders, farmers, local communities and the general public are expected to play a role of supporting the implementation of the policy in line with their mandates.

6.2 Legal Framework

The legal framework supporting the provision of meteorological services include: Civil Aviation Act No.5 of 2016, Disaster Management Act No.13 of 2010, Environmental Management (Amendment) Act. No. 8 of 2023 and Water Resources Management Act No. 21 of 2012, among others.

6.3 Resource Mobilisation and Financing

The implementation of the policy will require mobilisation of resources from both local and external sources. Government shall ensure that annual budgetary allocations are provided for implementation of measures for the policy objectives to be achieved.

The role of cooperating partners and other development partners is also expected to be essential in supplementing Government efforts during the implementation of the policy.

6.4 Monitoring and Evaluation

The implementation of this Policy will be monitored by the Ministry responsible for meteorological services in collaboration with other line Ministries and other stakeholders. During the implementation of the Policy, periodic reviews will be undertaken to assess progress in programme implementation. Further, a mid and end-term evaluations shall be undertaken to determine the impact of implementing the Policy.

6.5 IMPLEMENTATION PLAN MATRIX

Policy Objective 1	Policy Measures	Activities	Indicator	Yr1	Yr2	Yr3	Yr4	Yr5	Budget (ZMW)	Implementing Institution/s
To improve the provision of timely and accurate meteorological services to all socio-economic sectors for the attainment of sustainable development	Strengthen human resource capacity	Facilitate Short Term Training of staff in instrumentation, electronics, telecommunications, information technology, hydrometeorology, weather forecasting, Agrometeorology, numerical weather prediction, aeronautical, climatology and satellite meteorology	Number of staff trained		10	10	10	10	1,366,645	ZMD(Lead) Universities and colleges
		Facilitate Long-Term Training of staff in instrumentation, electronics, telecommunications, information technology, hydrometeorology, weather forecasting, Agrometeorology, numerical weather prediction, aeronautical, climatology and satellite meteorology	Number of staff trained		10	10	10	10	3,653,148	ZMD(Lead) Universities and colleges

Policy Objective 1	Policy Measures	Activities	Indicator	Yr1	Yr2	Yr3	Yr4	Yr5	Budget (ZMW)	Implementing Institution/ s
	Expansion and modernisation of weather observation infrastructure	Expand establishment	Number of positions created			160			1,474,909	MGEE (Lead) PSMD, MDD
		Procure and install storm warning radar	Number of storm warning Radar procured and installed	1	1	1	1	2	426,435,000	MGEE Cooperating Partners
		Procure and install automatic weather stations	Number of Automatic weather stations Procured and Installed		10	10	15	15	337,312,233	MGEE Cooperating Partners
		Procure and install digital none mercury equipment	Number of Digital Equipment procured and installed		42				32,506,000	MGEE Cooperating Partners
		Procure and install rainfall stations	Number of rainfall stations procured and installed		500	500	500	500	559,259,811	MGEE Cooperating Partners
		Procure and install upper air observation stations	Number of upper air observation stations procured and installed		1	2	2		175,000,000	MGEE
		Procure consumables for upper air stations	Number of consumables procured by type		365	365	365	365	195,247,910	MGEE

Policy Objective 1	Policy Measures	Activities	Indicator	Yr1	Yr2	Yr3	Yr4	Yr5	Budget (ZMW)	Implementing Institution/s
		Procure, install and commission calibration equipment	Number of calibration equipment procured and installed and commissioned		10				39,250,000	MGEE CP
		Procure and install a lightning detection system	A lightning detection system procured and installed		1				40,300,000	MGEE CP
	Enhance capacities in weather infrastructure and observation station network.	Procure motor vehicles for operations and maintenance of observation infrastructure	Number of motor vehicle procured and observation infrastructure maintained		10	2	2	4	29,717,860	MGEE Cooperating Partners
		Procure motor bikes for operations and maintenance of observation infrastructure	Number of motor bikes procured and observation infrastructure maintained		15	15	15	15	2,500,000	MGEE Cooperating Partners
		Procurement of fabrication equipment and tools	Number of fabrication equipment and tools		10				2,500,000	MGEE CP
		Undertake station inspections, calibration and standardization	Number of standardized		250	250	250	250	3,289,714	MGEE

Policy Objective 1	Policy Measures	Activities	Indicator	Yr1	Yr2	Yr3	Yr4	Yr5	Budget (ZMW)	Implementing Institution/s
			stations inspected and calibrated							
		Procure spare parts for weather stations	Number of spare parts procured by type	250	250	250	250	250	1,220,430	MGEE CP
		Rehabilitate ZMD office buildings	Number of ZMD office buildings rehabilitated		8	9	9	9	10,750,000	MGEE
		Construct a calibration laboratory	Calibration laboratory constructed		1				1,500,000	MGEE Ministry of Infrastructure Cooperating Partners
	Enhance data collection, transmission, and forecasting	Implement Quality Management Systems (QMS) for the calibration laboratory and subscription	Calibration laboratory accredited to ISO17025		1				2,100,000	MGEE
		Procure data bundles to operationalise all Automatic Weather Stations (AWS) communication systems	Number of Automatic Weather Stations (AWS) communication		250	250	250	250	366,129	MGEE CP

Policy Objective 1	Policy Measures	Activities	Indicator	Yr1	Yr2	Yr3	Yr4	Yr5	Budget (ZMW)	Implementing Institution/s
			systems operationalised							
		Procure and install visualisation, forecasting and analysis platform	Visualisation, forecasting and analysis platform procured and installed by type		1				52,750,000	MGEE CP
	Enhance management information system;	Procure and install a climate database management system	Climate database management system installed		1				39,000,000	MGEE CP
		Procure computers	Number of computers procured		50	50	50	50	1,314,082	MGEE SMART Zambia CP
		Upgrade network infrastructure, Web-Hosting and Telecommunication facilities for data exchange	Number of weather stations with telecommunication facilities upgraded		42				2,728,999	MGEE SMART Zambia CP
		Procure and install modern communication and Automatic Message Switching System (AMSS) for international weather data exchange	International communication and message Switching System (AMSS) for data		1				52,250,000	MGEE CP

Policy Objective 1	Policy Measures	Activities	Indicator	Yr1	Yr2	Yr3	Yr4	Yr5	Budget (ZMW)	Implementing Institution/ s
			procured and installed							
		Implement Quality Management Standards (QMS) for Meteorological services	Number of airports certified with QMS ISO 2015	4	6	8	10	10	14,403,781	MGEE CP
		Develop Cost Recovery Mechanisms	Cost Recovery Mechanisms developed		1				2,200,000	MGEE (Lead) Cabinet Line Ministries Stakeholders
		Undertake bench marking Visits on cost recovery implementation	Number of bench marking on cost recovery visits undertaken		2	1			2,216,260	MGEE (Lead)
Sub-Total									2,032,612,911	

Policy Objective 2	Policy Measures	Activities	Indicator	Yr1	Yr2	Yr3	Yr4	Yr5	Budget (ZMW)	Implementing Institution/s
To commercialise specialised weather and climate services for sustainable and efficient operations	To commercialise specialised weather and climate services for sustainable and efficient operations	Develop the Meteorology Bill	Meteorology Act in place	1					2,300,000	MGEE/MoJ
	Establish commercialisation and cost recovery mechanisms for specialised weather and climate services	Stakeholders mapping	Number of sectors identified	7						MGEE
		Bench marking visits on commercialisation mechanism	Number of countries visited		3				1, 700, 000	MGEE
		Stakeholder consultation workshops	Number of workshops conducted		10				800,000	MGEE
		Development of the commercialisation mechanism	Number of commercialisation mechanisms developed		2	2	2	1	700, 000	MGEE
		Validation and consolidation of the final draft of commercialisation mechanisms	Number of meetings conducted		2	2	2	1	3, 200, 000	MGEE

		Sensitisation of key sectors	Number of Sectors sensitised		2	2	2	1	200, 000	MGEE
		Operationisation of the commercialisation Mechanism for sectors	Number of commercialisation mechanisms operationalised		2	2	2	1	1, 000, 000	MGEE ZACL
Sub total										9,900,000
Policy Objective 3	Policy Measures	Activities	Indicator	Yr1	Yr2	Yr3	Yr4	Yr5	Budget(ZMW)	Implementing Institution/s
To increase knowledge, awareness, and utilisation levels in weather and climate in order to promote informed decision-making	Strengthen the mechanism for information sharing and dissemination	Undertake Stakeholder mapping and identification exercise	Number of stakeholder mapping and identification exercise undertaken		1		1		167,345	MGEE Stakeholders
		Conduct Information Needs Assessment	Information Needs Assessment conducted		1				80,000	MGEE/stakeholders
	Conduct stakeholder awareness meetings on weather and climate information sharing	Number of stakeholder awareness meetings on weather and climate information		1	1	1	1	1	911,973	MGEE /Stakeholders

		sharing conducted								
	Engage, develop and sign collaboration agreements with public and private media institutions for dissemination of weather and climate information	Number of collaboration agreements signed	2	2	2	2	2	1,053,894	MGEE	Media houses
	Conduct awareness /advocacy to planners and decision makers at national, provincial and district levels on integration of climate information in development planning	Number of Provincial/District Planners and decision makers reached	1				1	5,270,893	MGEE	Line Ministries
	Produce audios and videos on weather forecasts for social media platforms	Number of audios and videos produced	40	40	40	40	40	2,523,038	MGEE	
	Conduct training workshops on climate information production	Number of In-house training workshops conducted	1	1	1	1	1	1,443,913	MGEE	
	Produce sector specific weather and climate information bulletins for various sectors	Number of bulletins with specific weather and	36	36	36	36	36	9,461	MGEE	

[illegible]

		information using various ICT platforms								
	Develop Applications for translation and dissemination of weather and climate information Applications	Number of Applications developed for translation and dissemination of weather and climate information	1				1	189,343	MGEE SMART Zambia ACADEMIA	
	Undertake translation of weather forecasts	Number of forecasts translated by language	835	835	835		835	7,064,506	MGEE	
	Produce localised Weather messages	Number of localised forecasts produced by type	40	40	40		40	7,358,860	MGEE MOA	
Enhance inclusion of persons with disabilities in the dissemination of weather and climate information	Undertake packaging/translation of weather and climate information according to different disabilities	Number of packaged/translated Weather and climate information in braille	1	1	1		1	664,400	MGEE MOE ZAPD	
	Undertake dissemination of weather and climate information to people living with disabilities at	Number of dissemination programmes undertaken	1	1	1		1	5,839,781	MGEE MOE ZAPD	

Policy Objective 4	Policy Measures	Activities	Indicator	Yr1	Yr2	Yr3	Yr4	Yr5	Budget(ZMW)	Implementing Institution /s
To Strengthen national, regional and international coordination and collaboration in meteorology	Strengthen mechanisms for sharing weather and climate information at national, provincial, district and community levels	Conduct stakeholder identification exercise on national climate and weather services	National stakeholder identification exercise undertaken on national climate and weather services		1				430,000	MGEE
		Develop a National Framework for weather, water and climate Services	National Framework for weather, water and climate Services developed	1					1,250,000	MGEE Line ministries CP
		Conduct Stakeholder Meetings	Number of Stakeholder Meetings conducted		2	2	2	2	8,876,014	MGEE Stakeholders
	Enhance regional and international engagements in meteorological services with stakeholders	Pay annual subscriptions and arrears to WMO, African Ministerial Conference on Meteorology (AMCOMET) and Meteorology Association for Southern Africa (MASA)	Number of annual subscriptions paid	3	3	3	3	3	4,450,291	MGEE

	Participate in WMO, AMCOMET, MASA African Union (AU), and Regional Association One (RA1) Meetings	Number of Meetings attended.	5	5	5	5	5	5,833,957	MGEE WMO AMCOMET RA1 MASA AU
	Participate in Conference of Parties (COP) meeting	Number of COP Meetings attended	1	1	1	1	1	4,994,017	MGEE Line Ministries CP COP
	Host Southern Africa Regional Climate Outlook Forum (SARCOF) meeting	Number of SARCOF Meetings hosted.	1				1	1,200,000	MGEE (Lead) WMO, SADC
	Sub-Total							27,034,279	

Policy Objective 5	Policy Measures	Activities	Indicator	Yr1	Yr2	Yr3	Yr4	Yr5	Budget(ZMW)	Implementing Institution/s
To strengthen research and development in order to increase utilisation of meteorological services and productivity in socioeconomic sectors.	Promote research and uptake of research findings	Conduct research on Meteorology and related fields	Number of researches on Meteorology and related fields conducted		1	1	1	1	412,600	MGEE CP
		Organize conferences, workshops and seminars to present research findings	Number of research findings shared		1	1	1	1	676,715	MGEE Stakeholders
		Engage media houses to disseminate research findings through press releases, interviews and articles.	Number of Media houses engaged		1		1		105,100	MGEE Media CP
	Enhance capacities to develop local technological solutions	Undertake collaborative research activities with learning and other research institutions	Number of research activities undertaken		2		2		39,456	MGEE Stakeholders
		Develop the technological solutions	Number of technological solutions identified		2		2		1,284,180	MGEE Academia
			Number of technological solutions developed							

		Develop research skills in meteorology and other related sciences	Number of Staff trained in research skills		2	2	3	3	708,750	
Sub-Total										
TOTAL										
3,226,801										
2,118,605,794										

