THE UNITED REPUBLIC OF TANZANIA
MINISTRY OF WORKS, TRANSPORT AND COMMUNICATIONS
TANZANIA METEOROLOGICAL AGENCY

Strategic Plan for Tanzania Meteorological Agency 2017/18-2021/22

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FOREWORD

This Strategic Plan for 2017/18–2021/22 is a key framework document for TMA and stakeholders for mainstreaming of weather and climate into national development plans and strategies for the next five years. It provides a roadmap and sets priorities to guide the activities of the Tanzania Meteorological Agency to enable key players to improve their climate sensitive decision-making, products and services. The plan foresees increased demand for high-quality and timely weather and climate services to enhance community resilience, contribute to socio-economic growth and protect life and property from severe weather and extreme climate events.

Weather and climate services have a significant contribution to the achievement of the SDGs, the National Development Vision 2025 and the National Five-Year Development Plan. As the National Five Years Development Plan focuses on transforming the economy of the country towards middle income economy and semi-industrialisation, the country will need to make effective use of weather and climate services since the success of the industries will depend on the availability of inputs which are influenced by both weather and climate. The information will also be useful for locating suitable areas for development based on weather and climate patterns.

The United Republic of Tanzania is among the African developing countries that are vulnerable to the impacts of climate variability and climate change. The frequency and severity of floods and drought events are on the increase resulting in loss of life and devastating impacts on the economy. The vulnerability is exacerbated by the fact that a significant part the economy is dependent on rain-fed sensitive sectors including agriculture and food security and livestock development. The construction and transport sectors have also been affected by severe weather and extreme climate events with significant loss particularly related to destruction of the infrastructure.

In the face of increasing challenges including increased climate variability and change and rapid technological changes, TMA needs to serve the public and users whose activities are climate sensitive by understanding and providing for their weather and climate-related needs. This requires adequate weather and climate observations, management and transmission of data, various data services; climate system monitoring; practical applications and services for different user groups; forecasts on daily, monthly, seasonal and inter-annual time scales; climate projections; policy relevant assessments of climate variability and change; and the research that makes all these possible. These are the issues being addressed by this Strategic Plan.

The government through my Ministry will continue to support TMA in her endeavor to provide effective weather and climate services to the country. It is my sincere hope that stakeholders will collaborate with TMA in various ways as users or development partners to ensure that the intended goals are achieved.

Hon. Prof. Makame Mnyaa Mbarawa
Minister of Works, Transport and Communications

PREFACE

The Tanzania Meteorological Agency Strategic Plan for the period 2017-2018 -2021/22 highlights the future direction of the Agency. This Strategic Plan will ensure that resources remain focused on the most important issues. Moreover, it intends to accomplish the agreed vision, mission, core values, objectives and targets, which will guide effective implementation of the Agency activities with available resources. The plan takes into account of other relevant strategies including the National Five Years Development Plan to ensure weather and climate services contribute towards achieving National Development programs.

During the implementation of the previous Strategic Plan, the Tanzania Meteorological Agency encountered many challenges while providing meteorological and related services the community. Despite the challenges, TMA continued to provide quality meteorological services to its stakeholders for socio-economic benefits. To sustain the services, TMA continued to build the capacity of various professional, technical, administrative and managerial staff through training both locally and internationally. The rationale of this undertaking was to enhance capability and competence of employees in achieving customer service and stakeholder satisfaction and contributing towards sustainable socio - economic development of the country.

Among notable achievements during the period, include the attainment of QMS (ISO 9001:2008) certification in aeronautical meteorological services, installation of weather radar facility at Mwanza and implementation of a severe weather forecasting and warning system for the Lake Victoria region. In addition, TMA continued to play its role as a National Tsunami warning centre including conduction of simulated tests for dissemination of Tsunami warning information.

One of my personal goals for this new Plan which I also seek to communicate across the Agency, is to enhance our engagement with external users of the Agency's products and services to get their input and feedback so as to ensure that the products we provide are relevant, usable and meet their expectations.
The implementation of the plan will involve shaping internal business support systems and administrative arrangements to be uniform, effective and efficient across the Agency. It will also entail streamlining systems for recruitment of staff and upgrading of financial systems.

In order to enhance visibility, TMA will continue to contribute and participate in a number of local and international conferences, seminars and workshops. Also, as the Permanent Representative of Tanzania with the World Meteorological Organization (WMO), TMA will contribute in various technical programs of WMO.

Underlying it all is our commitment to stakeholder and user-focused service quality, where the decision-making needs of the stakeholders and users are paramount in the execution of our weather and climate services. I wish to thank our stakeholders for their continued support and cooperation. Special thanks go to the management and staff of TMA for promoting teamwork that enabled us to make remarkable achievements in the last Strategic Plan.

We will strive to collaborate with our stakeholders and users to utilize available opportunities and face the challenges ahead to achieve our goals for the benefit of all Tanzanians.

Dr. Agnes Lawrence Kijazi
Director General, Tanzania Meteorological Agency

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Acronyms and Abbreviations

AMCOMET	African Ministerial Conference on Meteorology
AMSS	Automatic Message Switching System
AWS	Automatic Weather Station
AWOS	Automated Weather Observing System
BEAHC	British East Africa High Commission
BEAMD	British East African Meteorological Department
CAG	Controller and Auditor General
CCIAM	Climate Change Impacts Adaptation and Mitigation
CFO	Central Forecasting Office
CPC	Climate Prediction Centre
CPT	Climate Prediction Tool
DARE	Data Rescue
DFID	UK Department for International Development
DFS	Director of Forecasting Services
DPFS	Data Processing and Forecasting System
DG	Director General
DMO	Digital Meteorological Observation
DRA	Director of Research and Applied Meteorology
DRR	Disaster Risk Reduction
DTS	Director of Technical Services
EA	East Africa
EAC	East African Community
EACSO	East Africa Common Services Organization
EAHC	East Africa High Commission
EAMD	East Africa Meteorological Department
FYDP	Five Year Development Plan
GCM	General Circulation Model
GeoCOF	Geospatial Climate Outlook Forecasting
GFCS	Global Framework on Climate Services
GTS	Global Telecommunications System
HRM	High Resolution Model
ICAO	International Civil Aviation Organization
ICT	Information and Communication Technology
IOC	Intergovernmental Oceanographic Commission
IPCC	Intergovernmental Panel on Climate Change
ISO	International Standards Organization
JNIA	Julius Nyerere International Airport
LAN	Local Area Network
MAIS	Meteorological Aviation Information System
MASA	Meteorological Association of Southern Africa
MESA	Monitoring for Environment and Security in Africa
MFA	Manager Finance and Accounts
MHEWS	Multi-hazard early Warning System
MLS	Manager Legal Services
MOU	Memorandum of Understanding
MPME	Manager Monitoring and Evaluation
MPMU	Manager Procurement Management Unit

MQARM	Manager Quality Assurance and Risk Management
MTN	Main Trunk Network
MIC	Manager International Cooperation
MLS	Manager Legal Services
NCEP	National Centre for Environmental Prediction
NACTE	National Council for Technical Education
NMHS	National Meteorological and Hydrological Service
NMS	National Meteorological Service
NMTC	National Meteorological Training Centre
NSP	National Strategic Plan
NWP	Numerical Weather Prediction
OTC	On the Job Training Course
PESTLE	Political, Economic, Social-cultural, Technological, Legal and Environmental
PMO	Prime Minister's Office
PMU	Procurement Management Unit
PS	Permanent Secretary
PUMA	Preparation for the Use of METEOSAT Second Generation in Africa
PWS	Public Weather Services
QMS	Quality Management System
RBSN	Regional Basic Synoptic Network
REA	Rural Energy Agency
RIDSP	Regional Infrastructure Development Master Plan
RTH	Regional Telecommunications Hub
SADC	Southern African Development Community
SLA	Service Level Agreement
SOPs	Standard Operating Procedures
SP	Strategic Plan
SSB	Single Side Band
SWIO	South West Indian Ocean
SWOC	Strength, Weakness, Opportunity and Challenges
SYSTAT	Statistical Analysis
TAA	Tanzania Airports Authority
TANESCO	Tanzania Electric Supply Company
TCAA	Tanzania Civil Aviation Authority
TAREA	Tanzania Renewable Energy Association
TMA	Tanzania Meteorological Agency
TPDC	Tanzania Petroleum Development Corporation
TTCL	Tanzania Telecommunications Company Ltd
UNSDGs	United Nations Sustainable Development Goals
VPO	Vice President's Office
VSAT	Very Small Aperture Terminal
WIGOS	WMO Integrated Global Observing System
WIS	WMO Information System
WISER	Weather and climate Information Services for Africa
WMO	World Meteorological Organization
WRF	Weather Forecasting and Research
WWW	World Weather Watch
ZNZ	Zanzibar
ZMA	Zanzibar Maritime Authority

EXECUTIVE SUMMARY

The purpose of the Plan is to have a coordinated modality of implementation of collectively agreed strategies to ensure that weather and climate services play an effective role in the socio-economic development of Tanzania, the protection of life and property and the sustainable protection of the environment in the country.

The overall objective of the SP is to outline strategies for strengthening of the Institutional, Human, Infrastructure and Services to ensure the Tanzania Meteorological Agency (TMA) contributes effectively to the national development goals of Tanzania.

The Plan provides guidance of how the strategic objectives will be achieved, while anticipating increased demand for high-quality weather and climate services to enhance community resilience, contribute to economic growth and protect life and property from extreme weather and climate events.

It also provides a roadmap on how the long-term goals, the programmatic goals and the specific strategies should be pursued in line with the national, Regional and International Plans including the; 5 Years National Development Plan 2016/17-2020/21, EAC Meteorological Development Plan, SADC long-term plans, the MASA Strategic Plan 2011-2015, Integrated African Strategy on Meteorology (Weather & Climate Services) 2013-2017 and the WMO Strategic Plan (2016-2020).

The Strategic Planning Methodology

The assignment was undertaken in three major phases as follows:

a) **The preparatory phase** which was mainly associated with the: establishment of the strategic planning process a plan for accomplishing the assignment was developed and agreed upon. It was agreed that the TMA SP be developed along the Theory of Change Model following closely the guide provided by WMO.

b) **The Assessment and Analysis Phase** which entailed looking inside and outside the organization to assess the level of availability of infrastructure, equipment and tools as well as human resources capacity; to establish the gaps and capacity development required for delivery of services. It also involved the assessment of the impacts of the prevailing and foreseen environment and other factors that are likely to influence the performance of the organization. The following tools were used for the Assessment and Analysis Phases: Strengths, Weaknesses, Opportunities and Challenges (SWOC) Analysis; Political, Economic, Social, Technological, Legal and Environmental (Ecological) (PESTLE) Analysis; Stakeholders Assessment and Baseline Analysis.

c) **The Design Phase** which involved developing of the Strategic Plan using the Guidelines and template provided by WMO whereby after the assessment phase the Organizational Vision, Mission and Core Values were developed and agreed upon followed by developing a Strategic framework for the Agency and its Monitoring and Evaluation framework.

Key Achievements

During the period 2013/14 to 2015/16 TMA made significant achievements in various areas of its mandate including raising the Agency visibility, improved observing and forecasting infrastructure as well as data availability, which led to improved quality of weather and climate forecasts, early warnings and services delivery. Some of the notable achievements include:

The Agency performed well in rendering public weather services including weather forecasts, advisories and warnings thereby getting written and oral messages of commendations and expression of appreciation by the Public, Government and Members of Parliament. In a nationwide assessment of governance, TMA was also rated among the best-managed Government organizations, a clear indication of sound leadership and efficient resources management practices.

The Agency was able to maintain its ISO 9001-2008 Certification by getting clean certificates from external audits made during the period. This is an indication of maintaining high quality national and international standards in the provision of Aeronautical Meteorological services.

On the international arena the Agency in collaboration with relevant authorities made it possible during COP 19 for His Excellency Dr Jakaya Mrisho Kikwete the then President of the United Republic of Tanzania and Mr Michel Jarraud the then Secretary General of WMO to meet and hold discussions on matters of mutual interest in the presence of Dr. Agnes Kijazi, the Permanent Representative of URT with WMO. Such high level consultations though rare lead to enhanced political support to TMA.

The Agency made significant improvement in data availability from synoptic stations to the CFO whereby the efficiency rose from 95% to 99% for all RBSN stations. There was also an improvement in the data exchange with RTH Nairobi. The Agency managed to migrate to Table Driven Code format before WMO deadline in December 2014.

TMA acquired High Performance Computing facility (computer cluster) located at JNIA thus improving computing capacity particularly for Numerical Weather Prediction (NWP). During the period under review TMA procured one weather Radar which was installed at Mwanza. New equipment for the upper air station was installed at JNIA while the upper air station at Tabora was revived and is now ready for operations.

The Agency collaborated with the University of Dar es Salaam to initiate a BSc Meteorology degree course, thus reducing the cost of training of Meteorologists, previously made outside the country. TMA provides part time lecturers for this programme.

An environmental scan was conducted in order to obtain facts and analyse trends that provide a reliable impression of where TMA stands in the business of provision of weather and climate services and the internal and external forces and factors that may influence its future and the attainment of its goals. It was agreed that the tools to be used for this exercise include: The SWOC analysis, PESTLE analysis, the stakeholder assessment/analysis; the Baseline Analysis of Institutional, Infrastructure and Human resources capacity; and Emerging Issues were assessed and recommendations made.

The plan takes into account the evolving needs, requirements and challenges of TMA based on the baseline analysis findings namely: Strengthening of observational network, including Automatic Weather Stations (AWSs), Radars and rainfall stations; Modernization of telecommunications nationally and with RTH Nairobi; Improvement of Meteorological Services to the Aviation and Marine users; Upgrading of Data Base management including Data Rescue; Calibration of instruments; Training of Class I meteorologists and in Numerical Weather Prediction and climate modelling including assessment of high resolution climate scenarios; Modernization of real time Data processing and Forecasting, post-processing and service production systems; improved capacity for generation of tailor-made sector specific products; and Improvement of service delivery framework.

Noting that TMA had used the same vision and mission statements for the last two consecutive Strategic Planning periods it was decided to agree on new ones bearing in mind the current and anticipated political and socio-economic focus.

The new vision is" ***To stand out as a centre of excellence in the provision of world class weather and climate and other related services thereby contributing to sustainable socio-economic development*** "

While the mission is "***To provide quality, reliable, and effective weather and climate services thereby contributing to the safety and socio-economic well-being of people and to the national development agenda".***

Strategic framework for addressing gaps

TMA has a potential to improve provision of information and services to decision makers, socio-economic sectors and the public that could lead to informed decision making, improved agricultural production, food security, health, water resources management, transport and tourism as well as contribute to disaster risk reduction.

This strategic plan identifies a number of strategies including objectives, strategies and activities based on recommendations made following the literature review and Environmental Scan. The agreed strategic goals of the plan are: *Efficient functioning of the Organization realized to deliver quality and reliable services; Modernization of infrastructure achieved to support delivery of efficient and reliable services; Human resources capacity enhanced to provide efficient services; Quality weather and climate forecasts and information produced and delivered to meet stakeholders' needs; The public and other stakeholders informed to realize the safety and social economic benefits of weather and climate services; and Research and climate change science issues addressed for climate resilient development and adaptation to climate change.*

Implementation strategy and action plan

A comprehensive implementation strategy has been developed to ensure the Strategic Plan is implemented, communicated/disseminated coupled with strategies for its monitoring and evaluation and reporting. An action plan has also been developed.

A summary of resource requirements amounting to Tanzania Shillings 85,495,000,000 for the implementation of the TMA Strategic Plan 2017/18-2020/21 to achieve various goals is highlighted as follows: Efficient functioning of the Organization realized to deliver quality and reliable services

(Tz Shs. 3,540,000,000); Modernization of infrastructure achieved to support delivery of efficient and reliable services (Tz Shs. 55,095,000,000); Human resources capacity enhanced to provide efficient services (Tz Shs.14,775, 000,000); Quality weather and climate forecasts and information produced and delivered to meet stakeholders' needs (Tz Shs.3,120,000,000); The public and other stakeholders informed to realize the safety and social economic benefits of weather and climate services (Tz Shs1,695,000,000); and Research and climate change science issues addressed for climate resilient development and adaptation to climate change (Tz Shs. 7,270,000,000).

Financing the Strategic Plan

The financing of the Strategic plan is expected to be mainly from three main sources of revenue including: **Financing by the Government which** has been the major source of revenue for development as well as operational running costs of TMA. The Government is expected to continue to facilitate TMA to be able to provide public goods services such as establishing basic infrastructure for weather and climate monitoring as well as facilities for processing and generation of forecasts and warnings for the public.

This source of revenue is expected to support about seventy percent (70%) of the budget requirement for implementing the Strategic Plan. **Financing by revenue accrued from cost recovery for provision of services** for commercial enterprises and value added products is expected to contribute about 25% of the requirements. **Other Financing Sources are expected to be obtained as** support in form of scholarships as part of human capacity development from development partners. Furthermore, it is expected that TMA is also expected to continue to benefit from collaborative projects initiated to support Climate Change adaptation initiatives and those under coordination of WMO, UNDP and AMCOMET among others. Such projects are expected to assist in enhancing human resource capacity, enhance monitoring and modelling capability of the Agency. Support is also expected from bilateral agreements with development partners and regional economic groups' initiatives such as SADC and the EAC among others. Other sources are expected to contribute about five percent (5%) of the budget requirement. The engagement of the private sector is recommended particularly in the area of observational network expansion.

Monitoring and Evaluation

A monitoring and evaluation framework based on a Results Based Management model for implementation of the SP has also been developed to ensure the implementation of the plan is well monitored to allow for necessary measures to be taken timely to ensure the intended objectives are achieved. A framework for reporting has also been developed to ensure relevant reports are available to the relevant recipients timely.

1. INTRODUCTION

1.1. Purpose of Strategic Plan

This Strategic Plan (SP) is a key framework document for TMA and stakeholders for mainstreaming of weather and climate into national development policies and plans. The purpose of the Plan is to have a coordinated modality of implementation of collectively agreed strategies to ensure that weather and climate services play an effective role in the socio-economic development of Tanzania, the protection of life and property and sustainable protection of the environment in the country.

The overall objective of the SP is to outline strategies for strengthening of the Institutional, Human, Infrastructure and Services to ensure TMA contributes effectively to the national development goals of Tanzania. The Plan provides guidance of how the strategic objectives will be achieved, while anticipating increased demand for high-quality weather and climate services to enhance community resilience contribute to economic growth and protect life and property from extreme weather and climate events.

It also provides a roadmap on how the long-term goals, the programmatic goals and the specific strategies should be pursued in line with the National, Regional and International Plans including; 5 Years National Development Plan, EAC Meteorological Development Plan, SADC long-term plans, MASA Strategic Plan, Integrated African Strategy on Meteorology (Weather & Climate Services) and the WMO Strategic Plan.

The Plan also takes into account the emerging issues and evolving needs, requirements and challenges of TMA based on the situational diagnostic analysis findings including strengthening of observational network i.e. Automatic Weather Stations (AWSs), remote sensing stations (Radar and Satellite); Upgrading of Meteorological Data Management; Calibration of Meteorological Instruments; Training in Numerical Weather Prediction; Modernization of real time Data processing and Forecasting, data management and service production systems;; Improved capacity for climate modeling including assessment to high resolution climate scenarios; Improvement of Aviation and Marine Weather Services and Modernization of telecommunications systems for data exchange; Improved capacity for generation of tailor made sector specific products and service delivery framework.

The Plan has been developed with the participation of the Management and staff of TMA as well as key stakeholders. It is anticipated that there will be increase in operational effectiveness through implementation of the organization's mandate, mission and proper utilization of resources and hence increased organizational efficiency.

1.2. Strategic Planning Methodology

1.2.1 Data collection and review of documents

The methodology for undertaking the assignment included a desk study whereby relevant documents from TMA, WMO, Government and other sources were reviewed. Key documents include: Tanzania Meteorological Agency previous Strategic Plans; Annual Business Plans and Progress Reports for the relevant period; Stakeholder assessment Reports; other relevant international, regional and national Strategies such as the United Nations Sustainable Development Goals (UNSDG), WMO Strategy 2016-2019, AMCOMET Integrated Strategy for Africa, Meteorological Association of Southern Africa (MASA) Strategic Plan, EAC Climate Change Strategy, SADC Regional Infrastructure Development Master Plan -RISDP 2012-2027, MKUKUTA, National Vision 2025, and National Five Year Development Plan (FYDP II), 2016/17 – 2020/21.

The methodology also included consultations with key stakeholders from within and outside the TMA in order to establish policy directives, to determine current status, identify challenges and capacity gaps and develop strategies to address them taking into account of stakeholders' views. An evaluation of the implementation of the previous Strategic Plans was conducted and the recommendations arising have been used in the development of this Plan. A structured questionnaire has been developed to assess the functioning of basic infrastructure and systems components and other services of TMA. A series of Interviews and meetings with management and staff of TMA as well as stakeholders were undertaken as necessary in order to ensure the strategy process is well informed and owned by relevant players on important aspects of the SP. Information was also derived from recent stakeholder and user consultations and survey reports.

1.2.2 The Strategic Planning Phases

The assignment was undertaken in three major phases as follows:

a) **The preparatory phase** which was mainly associated with the: establishment of the strategic planning process. This phase included obtaining relevant documents for review, agreeing on the proposed work plan and ensuring availability of resources to support the development processes. During this phase it was also agreed that the Strategic Plan be developed along the Theory of Change Model.

b) **The Assessment and Analysis Phase,** which entailed looking inside and outside the organization to assess the level of availability of infrastructure, equipment and tools as well as human resources capacity to establish the gaps and development needs required for delivery of services. It also involved the assessment of the impacts of the prevailing and foreseen environment and other factors that are likely to influence the performance of the organization. The following tools were used for Assessment and Analysis Phase: Strengths, Weaknesses, Opportunities and Challenges (SWOC) Analysis; Political, Economic, Social, Technological, Legal and Environmental (Ecological) PESTLE Analysis and Stakeholders Assessment.

c) **The Design Phase** which involved developing of the Strategic Plan in accordance with the Guidelines of the Government and WMO whereby after the assessment phase the Organizational Vision, Mission and Core Values were developed and agreed upon followed by developing a Strategic framework for the Agency and its Monitoring and Evaluation framework.

2. BACKGROUND

2.1. Organization History

Organized meteorological services in Tanzania started in 1930 as a result of the so-called East African Conference of Governors held in January 1929. The meteorological services then were provided under the British East African Meteorological Services (BEAMS), a joint service covering Kenya, Tanganyika, Zanzibar, Uganda and Northern Rhodesia (Zambia). During this period two meteorological stations were established at Kaze Hill, Tabora and Chukwani, Zanzibar whereby the Headquarters were at Tabora.

Later the services were organized under the British East Africa High Commission (BEAHC), where the meteorological services were provided under East Africa Meteorological Department (BEAMD). The meteorological services of that time were mainly intended for the provision of meteorological data necessary for civil and military aviation. After independence of Tanganyika, Kenya, Uganda and Zanzibar the East Africa High Commission (EAHC) was formed. In 1963, the EAHC changed into the East Africa Common Services Organization (EACSO) whereby the East African Meteorological Department (EAMD) carried out meteorological services with headquarters in Nairobi, Kenya.

In 1967 the East African Community (EAC) took over the services of EACSO and the East African Meteorological Department (EAMD) continued to operate with the same structure. The East African Meteorological Department (EAMD) was responsible for coordinating and implementing meteorological activities in East Africa. Following the demise of the EAC in June 1977, each of the three states had to establish its own meteorological services. As a result, the Directorate of Meteorology was established as a specialized department responsible for the provision of meteorological services in Tanzania by an Act of Parliament (Act.No.6 of 1978). The Directorate took over all meteorological activities in the country.

The Directorate of Meteorology was transformed into an Executive Agency, Tanzania Meteorological Agency (TMA) in 1999 and was officially launched on 3rd December 1999. TMA was established by the Executive Agencies Act No 30 of 1997, (Cap.245 R.E. 2002). The transformation was meant to ensure good governance, efficiency and operating in a business fashion leading to improved service delivery. TMA is mandated to provide among others meteorological services to the general public, government, institutions, and individual users of tailor made services for maintaining safety and security of people and their properties, and support sustainable social economic development.

Since its establishment TMA has continued to make significant strides towards improving the quality of weather and climate services through deployment of available resources. These include; being among the first National Meteorological and Hydrological Service (NMHS) in sub-Sahara to attain ISO 9001:2008 Certification for provision of Aeronautical Meteorological Services.

However, TMA is challenged with rapid changing technology and an increasing demand for the delivery of quality and reliable sector specific weather and climate services to ensure food security, improved environment and water resource management, disaster risk reduction and better health amidst increased frequency and severity of extreme weather and climate events related to the impacts of climate variability and change.

2.2. Organization Structure

The Tanzania Meteorological Agency is a semi-autonomous, self-accounting Government Agency. The current TMA organization structure was approved in November 2015, the structure comprise of MA has started to implement a new structure which was approved in November 2015. The organisation structure is comprised of the Minister responsible for Meteorology, the Ministerial Advisory Board. The Director General is the Chief Executive Officer who is responsible to the Permanent Secretary of the Ministry of Works, Transport and Communications.

The Agency is sub-divided into five divisions, which are headed by Directors. A Director also heads the Zanzibar Office. The five divisions are:

a) Director General's Office responsible for compliance with International affairs, planning and monitoring, auditing, finance, procurement, provision of services at Zanzibar and legal issues.

b) **The Forecasting Services Division** whose objective is to observe, process, forecast and disseminate weather and climate information nationally and internationally;

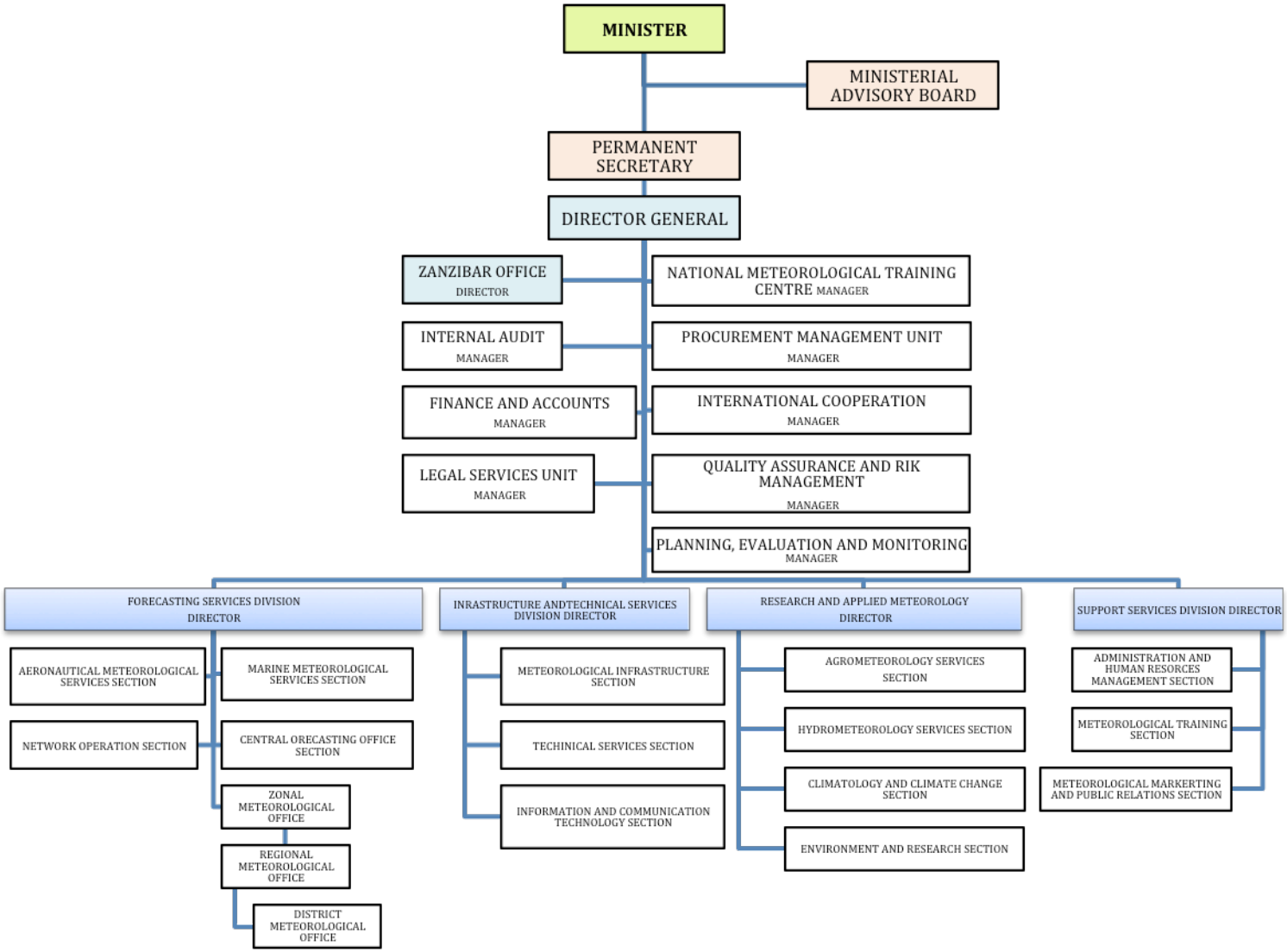
c) **The Infrastructure and Technical Services Division** responsible for promotion and facilitation of international standards and comparability of instruments and methods used by TMA to improve the quality of products and services of TMA;

d) **The Research and Applied Meteorology Division** whose objective is to ensure availability of quality climate data for research and other activities on weather and climate related fields and coordinate activities in applied meteorology for effective decision making; and

e) **The Support Services Division** responsible for providing expertise and services on administration, human resources management, meteorological training, marketing and public relations.

The divisions are further subdivided into sections headed by Managers. The Organizational Structure of TMA is as shown in Figure 1 below:

Figure1: Organisation Structure of TMA



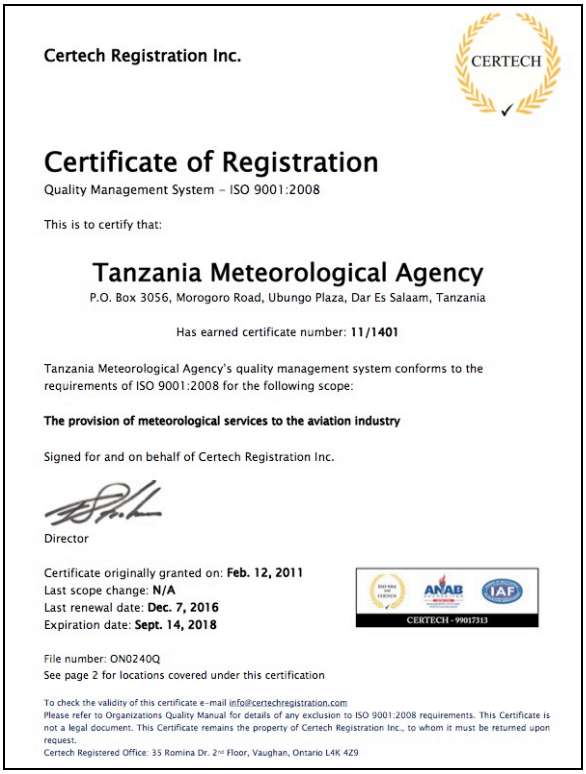
2.3. Review of Key Achievements

During the period 2013/14 to 2015/16 TMA made significant achievements in various areas of its mandate including raising the Agency visibility, improved observing and forecasting infrastructure as well as data availability. This has led to improved quality of weather and climate forecasts, early warnings and services delivery. The specific major highlights of achievements made are as given in the following sub-items.

2.3.3 Institutional

The Agency performed well in rendering public weather services including weather forecasts, advisories and warnings thereby getting written and oral messages of commendations and expression of appreciation by the Public, Government and Members of Parliament. This has created a good image of the Agency and raises expectations for even better performance in the future. The Agency has also made achievement in the area of good governance by obtaining clean audit certificates throughout the period and was also rated among the best-managed Government organizations a clear indication of sound leadership and efficient resources management practices.
The Agency was able to maintain its ISO 9001:2008 Certification by getting clean certificates from external audits made during the period. This is an indication of maintaining high quality national and international standards in the provision of Aeronautical Meteorological services. Fortunately these quality attributes has trickled down in improving services for other sectors. Figure 2 shows the ISO 9001-2008 awarded to TMA.

Figure 2: ISO Certificate for the Tanzania Meteorological Agency



Certech Registration Inc.

CERTECH

Certificate of Registration

Quality Management System – ISO 9001:2008

This is to certify that:

Tanzania Meteorological Agency

P.O. Box 3056, Morogoro Road, Ubungo Plaza, Dar Es Salaam, Tanzania

Has earned certificate number: 11/1401

Tanzania Meteorological Agency's quality management system conforms to the requirements of ISO 9001:2008 for the following scope:

The provision of meteorological services to the aviation industry

Signed for and on behalf of Certech Registration Inc.

Director

Certificate originally granted on: **Feb. 12, 2011**
Last scope change: **N/A**
Last renewal date: **Dec. 7, 2016**
Expiration date: **Sept. 14, 2018**

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2.3.1. International Cooperation

The following are the notable achievements under the international arena:

Due to good performance of TMA internationally, Tanzania has benefited from various WMO core programs such as GFCS, CCIAM, CIRDA and others.

i. During COP 19 His Excellency Dr. Jakaya Mrisho Kikwete the President of the United Republic of Tanzania and Mr Michel Jarraud the Secretary General held discussions on matters of mutual interest. Such high level consultation has increased political will to support TMA.

ii. TMA increased the number of experts and active members participating and contributing in WMO Technical Commissions/Task Teams and Task Forces and other International bodies. Currently TMA has 16 of its staff serving as members in various WMO Commissions, Task Forces, Working Groups and Focal Points with some performing leadership roles.

2.3.2. Forecasting Services

2.3.3.1 Central Forecasting Office

The Agency made improvement on the accuracy and timely provision of weather forecasts and severe weather alerts thus increased the visibility and level of confidence by customers and end users. A severe weather forecasting desk has been established at the CFO to ensure close monitoring and timely issue of warnings and related information to authorities and the public. TMA was designated as a Regional Forecasting support Centre to provide forecast guidance over the Lake Victoria basin, for the NMHSs around the Lake Victoria in the EA Region.

2.3.3.2 Aeronautical Meteorological Services

The Agency continued to provide aeronautical meteorological services to 17 national airports and 3 international airports in conformity with the ICAO and WMO standards and recommended practices. The ISO certification was maintained throughout the period. TMA also established aeronautical meteorological services at the newly established Songwe Airport. Development and establishment of Meteorological Aviation Information System (MAIS) and other service delivery infrastructure has improved acess and dissemination of Aeronautical Meteorological Information to Customers and users in the aviation industry.

2.3.3.3 Marine Services

TMA improved Marine services by providing quality products to the marine industry including briefing services to crew at Zanzibar, Dar es Salaam, Kigoma for Lake Tanganyika, Kyela for Lake Nyasa and Mwanza for Lake Victoria ports.

Furthermore, TMA was awarded two certificates of appreciation, one certificate being for contribution towards the development of marine sector by Zanzibar Maritime Authority (ZMA) on 21st September 2013 and another certificate from Disaster Management Department under the Second Vice President Office, Zanzibar Revolutionary Government recognizing the TMA contribution for disaster management.

2.3.3.4 Numerical Weather Prediction and Verification

TMA acquired High Performance Computing facility (computer cluster) located at JNIA thus improving computing capacity particularly for Numerical Weather Prediction (NWP). TMA also have implemented a system of weather verification, which includes verification of Terminal Aerodrome Forecasts as required by ICAO and WMO.

2.3.3.5 Data exchange and availability

There was an improvement in data availability nationally for the Synoptic RBSN stations from 95% to 98.8%. There is also increase in data transmission efficiency between Central Forecasting Office and Nairobi RTH following the upgrading of TRANSMET and revival of AFTN system.

The Agency managed to migrate to Table Driven Code format before WMO deadline in December 2014. At present BUFR conversion, compilation and transmission process can be done automatically without human interruption hence improved BURF data exchange in accordance to WMO regulations. The automation was achieved through effective utilization of the Agency's own expertise and innovation.

During the period under review, TMA developed application software for real time data collection and Monitoring using the Digital Meteorological Observations (DMO) and adopted a Climate Monitoring Tool (CMT) from CPC- NCEP respectively, which have been tested and found to be suitable for operational use.

2.3.3. Meteorological Network and maintenance

During the period under review TMA procured one (1) weather Radar which was installed at Mwanza; 47 Automatic weather stations; established 1 new synoptic station at Songwe, 1 climate station and 6 automatic rainfall stations. New equipment for the upper air station was installed at JNIA while the upper air station at Tabora was revived and is now ready for operations.

The TMA workshop at JNIA was upgraded, enabling it to manufacture some of meteorological instruments including Stevenson Screen, rain gauges, evaporation pans and meteorological masts.

2.3.4. Public Weather Services

The Public Weather studio was modernized by migrating from analogue to digital system to meet National requirements and improve communication between TMA and media houses. The number of media houses involved in dissemination of weather information has increased from 7 radio stations and 6 TV stations to 41 radio stations and 8 TV stations. This has widened the audience of recipients of weather and climate information in the country. TMA has made arrangements with various TV and radios stations to increase frequency of weather information dissemination that ensure regular updates are communicated to users. Weather and climate information isalsoavailablethrough TMA website, mobile phones and social media including Face book, YouTube and Twitter for widerdissemination.

2.3.5. Training

Among the remarkable achievements made was to obtain a ***"cross border NACTE registration "***for Kigoma Training Centre that has enabled the graduates of the Centre to qualify to join other academic institutions for higher learning.

The Agency collaborated with the University of Dar es Salaam to initiate a BSc Meteorology degree course, thus reducing the cost of training of Meteorologists, previously made outside the country. TMA provides part time lecturers for this programme.

2.3.6. Lessons Learnt

During the implementation of the last Strategic Plan TMA made notable achievements whereby the key lessons learnt include:

i. Effective governance and leadership made significant improvement in the quality of the services provided including improving on the accuracy and mode of delivery of forecasts and other products.
ii. Efficient utilization of available resources and compliment them with resources obtained through bilateral and international cooperation projects and programmes. Resources obtained assisted the Agency to obtain meteorological instruments and build human resources capacity that supported it to excel in service provision, thereby enhancing the visibility of the Agency and perception of stakeholders.
iii. Collaboration leads to access to technical support
iv. Investing in awareness leads to institutional visibility

3. ENVIRONMENTAL SCAN

An environmental scan was conducted in order to obtain facts and analyse trends that provide a reliable impression of where TMA stands in the business of provision of weather and climate services. It was agreed that the tools to be used for this exercise to include: The SWOC analysis, PESTLE analyse, and the stakeholder assessment as shown in the following sections.

3.1 SWOC Analysis: Assessment and Analysis of Organizations Strengths, Weakness, Opportunities and Challenges

SWOC analysis was conducted as a beneficial decision-making tool to establish important overview of the TMA's strengths, weaknesses, opportunities and challenges by providing well-rounded information that prompted well-informed strategic decisions, particularly when formulating new strategies for improving service delivery.

Based on the evaluation of the previous SPs and the Baseline Analysis of TMA, a SWOC analysis was conducted with results shown in table 1. According to SWOC analysis, TMA faces number of challenges, which require well-defined strategies to address them. The Agency has weaknesses ranging from inadequate funding, infrastructure and capacity to respond to rapid technological change. On the other hand TMA has strengths, which can be used by utilizing existing opportunities to overcome some of the challenges. There are also various opportunities, which can be used by the TMA to improve service delivery. However, there are threats, which have to be taken into account to ensure they don't act as barriers for development.

Table 1: SWOC Analysis for TMA

STRENGTHS	WEAKNESSES
1. Establishment of TMA as a designated Government Agency for weather and climate services. 2. Semi-autonomous entity 3. Membership of TMA to WMO and various regional bodies and institutions such as EAC, and MASA with its affiliation to SADC policy organs 4. Participation in international exchange of meteorological data and products 5. Custodian of national climate databank 6. Recognition of TMA as an authoritative voice on public forecasts and warnings 7. Good governance and rule of law 8. Well trained, competent professional staff 9. Good collaboration with stakeholders 10. Improved Quality data and Services	1. Inadequate meteorological infrastructure and observational network 2. Inadequate communication means 3. Inadequate capacity of calibration of meteorological instruments 4. Limited engagement and partnership with Stakeholders 5. Inadequate capacity to respond to rapid technological change. 6. Inadequate human resources capacity
OPPORTUNITIES	**CHALLENGES**
1. Support by government and international development partners 2. Availability of modern technologies 3. Global recognition and investment on climate change 4. Institutional Research and development collaboration 5. Increased public awareness on weather and climate issues 6. Private Sector Partnership 7. Emerging weather and climate sensitive sectors and stakeholders e.g. Oil and Gas *8. Increased demand of climate data and tailor-made services* 9. Bilateral and multilateral cooperation 10. Good Political-will	1. Existence of other sources of Meteorological information and services 2. High cost of meteorological equipment, instruments and consumables 3. Insufficient financial resources 4. Rapid technological change 5. Outdated Meteorological Act 6. Inadequate meteorological professional human resources supply 7. Climate variability and change 8. Low uptake and mainstreaming of weather and climate information

3.2 Pestle Analysis

The PESTLE analysis which stands for Political, Economic, Social-cultural, Technological, Legal and Environmental (Ecological) factors has been used as part of the environmental assessment tools for considering the external business environment of TMA. The underlying thinking of the PESTLE analysis is to assist TMA to react to changes in its external environment.
The analysis was conducted initially involving internal stakeholders including the Executive management. It was improved further by evaluating external stakeholder's perspective. The PESTLE analysis is complementary to the information obtained from the SWOC analysis, which was also conducted as a tool for environmental scanning. A summary of the analysis results is presented in Table2:

Table 2: The PESTLE ANALYSIS

Issue	Impact on TMA
1. Political	
• Increased Government awareness on weather and climate	• Consideration of the TMA among priority sectors for resource allocation
• Increased revenue collection by the Government	• Smooth implementation of planned programs and projects due to availability of budgeted funds.
• National strategy for Growth and Poverty Reduction and Economic growth	• Consideration of weather and climate as an important factor in poverty reduction
• National Vision 2025	• Modernization of TMA infrastructure and associated equipment and increased competent human resources.
	• Improved services due increased availability of funds
• Focus on Industrialization	• Increased demand of weather and climate information for industrial production
• Membership to regional bodies such as WMO,EAC,SADC etc	• Meteorological Data exchange and access to joint programs/projects implemented under the coordination of the bodies.
• Indigenous knowledge and Cultural beliefs	• Intergrate indigenous knowledge in forecasting processes to improve outputs and dealing with other beliefs to ensure understanding of value of modern forecasts
2. Economic Factors	
• Growing demand for increased funding priorities against limited resources	• Less funds allocated for weather and climate sensitive projects
• Reduced donor funding	• Implementation of a few projects
• Access to credit from financial institutions	• Difficult to access credit. TMA is a nonprofit making institution
• Presence of 2nd National Five Year	• Opportunity for resources availability

Development Plan 2016/17-2020/21	for mainstreaming weather and climate in relevant programs
• Inflation Rates	• Could increase investment and operation costs
• Interest Rates	• Could reduce the ability of paying back borrowed funds due to high interest rates.
• Exchange rates	• Affect international financial transactions and budget implementation
• Growth of economic sectors	• Increase demand of TMA services thereby increase revenue
3. Social – Cultural Factors	
• Improved health care	• More demand for sector specific weather and climate data and information to fight against weather and climate related diseases.
• Poverty and low education in urban and rural areas	• Impacts negatively on forests, water sources and environment, leading to increased variability of local climate
• Availability of academic institutions which offer Meteorological Studies	• Increased Meteorological professionals human resources supply
• Increased awareness on use of weather information for safety of life and property	• More demand for accurate and timely weather information.
• Growing awareness and demand for renewable energy sources	• More demand for site-specific weather information for assessment of renewable energy for the country.
• Sustainable Development Goals (SDGs)	• Quality weather and climate services required to support realization of SDGs
4. Technology	
• Improved water, energy and other civil infrastructure.	• Increased need for adequate weather and climate data and information for infrastructure planning and operation
• Improved communication links/ infrastructure	• Investment in modern equipment/instruments for exchange of weather and climate data and information.
• Internet access due to fiber optic cable network.	• Relevant and modern equipment for receiving weather data and information
• Emergence of New Digital Technology for Weather Observation	• Efficient data acquisition and exchange
• Ban of mercury based instrument by Minamata Convention	• Affects observation operations thus necessitates replacement of all mercury based instruments
5. Legal Factors	
• Enactment of the New Meteorology Act •	• Improved governance and service delivery

• Ratification of international Treaties and Protocols on environment and climate change	• Access to technical and human resources capacity assistances • Adherence to treaties and protocols
• Revised Public Procurement Act, 2011 as amended	• Efficient procurement process management and proper utilization of resources
• Formulation of the National Meteorological Policy	• Clear direction on provision and use of meteorological services in the country
• Relevant Policies • National Transport Policy 2003, Air Transport Policy, National Agricultural Policy 2013, National Environment Policy, Construction Policy 2003.	• Mainstreaming weather and climate issues in relevant National Policies during formulation and revision.
6. Environmental Factors	
• Climate variability and change	• Increased demand for weather and climate information for mitigation and adaptation to climate variability and change
• Endangered species	• Increased demand of weather and climate information needed for protection of endangered species
• Increased awareness and support for renewable energy	• Weather and climate data and information needed for assessing the potential and generation of renewable energy
• Environmental Regulations that require/imply change of technology	• Resources to migrate to new technology

3.3 Stakeholders Analysis

A stakeholder analysis was done using a variety of approaches including questionnaires, one to one interviews and relevant recent stakeholder survey reports. A wide range of stakeholders was considered in order to obtain a good understanding of their interests in, expectations and potential contribution to TMA. A summary of the analysis results is presented in Table 3:

Table 3: STAKEHOLDER ANALYSIS MATRIX FOR TMA

No.	STAKEHOLDERS	INTERESTS	EXPECTATIONS	POTENTIAL
1.	Agriculture & food Security	• Forecasts of daily to seasonal timescale • Warnings of extreme weather and climate conditions • Onset and cessation of rainfall seasons • Understanding of the possible harmful effects of precipitation (e.g. hail storms) • Advice on possibility of drought conditions • Advice on long-term climate change • Training on interpretation of weather and climate information • Weather information for determination of insects and birds migration harmful to crops	• Timely, accurate and wide coverage of weather information.	• Collaboration in weather observations and research • Getting feedback and assessment
2.	**Energy sector including TANESCO**	• Radiation/Sunshine hours for solar energy production • Weather information for renewable energy • • Rainfall information for river discharges • Meteorological information for natural gas production • Evaporation information for hydropower production • Climate change information for energy production planning • Daily to seasonal forecasts with updates and warnings of droughts and floods	• Accurate, long term weather data and climate information	• Financial contribution for services provided by TMA • Contribution of weather and climate services for efficiency in production of energy
3.	**World and Regional Meteorological Centres**	• Real-time meteorological data exchange (e.g. temperature, rainfall, pressure, wind etc.) • Non-real time meteorological data exchange (e.g. dekadal, monthly)	• Timely, accurate, wide coverage and sustainable weather	• Access weather and climate data and information from other parts of the world. • Contribution of research and

		• Warnings of extreme weather conditions • Regional monitoring of large scale meteorological phenomenon (e.g. tropical cyclones, tsumani, volcanic ash) • Sharing knowledge, experience and expertise	observations	technology. •Technical and human resources capability assistance
4.	**Mining, Gas and Oil exploration Sector**	• Weather forecasts and warnings • Length of dry/wet season • State of the sea (relevant to salt producers, oil and gas exploration and extraction) • Specific meteorological data (e.g. humidity, temp., winds)	• Accurate weather forecasts, data and climate information	• Financial contribution
5.	**Military**	• Aeronautical Meteorological Services • Meteorological conditions for ranging • Weather information for specific military activities • Training on observation and forecasting • Forecasts of extreme weather • Provision of balloons for targets	• Accurate weather forecasts	• Collaboration in weather observations and exchange of personnel
6.	**Civil Aviation**	• Take-off and landing weather information • TAFS and En-Route forecasts • Forecasts/reports related to search and rescue • Meteorological information for parking of aircraft • SIG MET and Warnings • METAR and SPECI reports • Training & rating of civil aviation personnel in aeronautical meteorology • Meteorological Information for Airports design and construction • Volcanic Ash Warnings/ advisory information	• Accurate weather forecasts and information for economic and safety aspects	• Enhance safety • Efficient Aviation operations

7.	**Industrial sector**	• Meteorological information for pollution abatement • Meteorological information for construction purposes • Meteorological information for location determination • Meteorological information for efficient use of machinery • Meteorological information for waste disposal • Timely provision of weather and climate data and information	Accurate and reliable information	• Revenue on cost recovery basis • Collaboration in establishing stations • Efficiency in operations and production.
8.	**Mass Media**	• Weather forecasts – daily to seasonal • Meteorological data which meets the needs of their customers • Warnings of severe weather conditions • Explanation of unusual weather related events • Easily understood information	• Providing weather information	• Dissemination of warnings and weather information to public and other stakeholders • Enhanced public awareness on weather and climate services
9.	**Tourism**	• Weather conditions • Sunshine hours • Temperatures and humidity • Information on winds (surfing, gliding, balloons) • Weather information affecting wildlife movements • Seasonal outlooks	• Accurate and timely weather information	• Collaboration in weather observations in national parks and game reserves
10.	**WMO Member Countries, SADC and EAC**	• Exchange of data and forecasts • Severe weather warnings (storms etc.) • Exchange of experts • Information on research findings • Effective communication links • Technical cooperation	• Fulfilling national and international obligations • Coordination of regional projects • Climate	• Cooperation in exchanging weather information and research

		• Training needs and agreements • Technology transfer • Information on trans-border air pollution •	monitoring centres • Early warnings for food security •	
11.	**Water Sector**	• Rainfall information • Evaporation information • Temperature information • Meteorological information for rainwater harvesting and water resources structures (e.g. dams) • Meteorological information for flood forecasting • Meteorological information for irrigation planning • Seasonal outlooks and updates	• Accurate weather information and forecasts for planning their operations.	• Cooperation in weather observations.
12.	**Environmental sector**	• Meteorological information for impact assessment • Global warming and climate change data and information • Atmospheric pollution data • Relevant Meteorological research findings	• Climate data	Access of international funding for climate change projects. Cooperation in establishing air pollution monitoring stations.
13.	**Marine Sector**	**Shipping industry** • Information on tropical cyclones • Daily weather forecasts, state of sea and Forecasts of wind, Waves and tides • Provision of weather instruments (for marine observations) • Severe Weather Warnings including Tsunami **Fishing industry** • Weather forecasts • Information on the state of the sea (winds, storms and currents) • Information about tides	• Accurate weather information in oceans and lakes	• Marine Observations at sea/Lakes and revenue in form of cost recovery • Safe Navigation

		• Distribution of sea surface temperature for identification of fishing grounds • Up-welling and sea currents (to help identify fish concentrations) • Warnings of tropical storms and cyclones • Weather reports for seaweed farmers • Phases of the moon (fish concentrations)		
15.	**Health Sector**	• Meteorological information which will help to predict outbreak of diseases (e.g. cholera, malaria and other air borne diseases) • Meteorological information for the proper storage of medicines • Levels of acidity in the atmosphere • Air-quality information for health purposes • Ozone depletion information for skin cancer diseases • Reports/forecasts of hours of sunshine	Reliable data and sector specific information and products	Collaboration in research
16.	**Construction**	• Rainfall intensity • Temperatures • Information on the strength and direction of prevailing winds • Consecutive wet days and dry days within the forecast seasons for activities planning • Information on humidity • Site specific Weather forecasts • Climatologically information for design of construction projects	Timely and accurate information and warnings	Revenue on cost recovery basis
17.	**Search and rescue teams**	• Meteorological information for aviation accidents • Location of hazardous weather conditions • Meteorological information for ship accidents • Severe Weather forecasts • Tropical cyclone information	Timely and accurate information and warnings	Feedback Collaboration

		• Timely Weather information		
18.	**Sports and recreation Organisations**	• Weather forecasts for sport programs • Information on tides, waves, currents, storms (for surfing, boat trips) • Information on winds/temperatures for gliding and hot air balloons	Timely and accurate information Tailor made information	Feedback and revenue on cost recovery basis
19.	**Schools and Academic Institutions**	**Academic Institutions** • Professional training • Field work (on the job training for meteorologists) • Local weather Monitoring • Warnings of adverse weather • Cooperation on research **Schools** • Instruments to be used for teaching purposes • Guidance on Location/establishment of weather stations • Education about the science of meteorology • Weather forecasts for sports • Forecasts of extreme weather conditions to assist planning, closures etc. • Weather information for activities in schools	Training and joint research	Collaborative research and in observations
20.	**Universities and Research Institutions**	• Meteorological information relevant to agricultural, medical, marine, fisheries, water resources, environment and livestock research • Access to research produced by TMA Professional training	Training and joint research	Collaborative research and in observations
21.	**General Public**	• Warnings and advisories of severe weather and extreme climate conditions • Daily to seasonal forecasts and outlooks • Drought and Floods alerts	Accurate and understandable forecasts and information	Feedback

		• Sunrise/sunset times • Reliable weather information		
22.	**Insurance companies and banks**	• Meteorological information which is relevant to assessing investment proposals • Meteorological information to assess risks for insurance purposes • Short and long term forecasts • Historical meteorological data • Current weather information • Assistance in settlement of insurance claims	Accurate and reliable information	Revenue on cost recovery.
23.	**Government, Ministries and Institutions**	**Government** • Weather/seasonal forecasts and climate services for General Public • Warnings and advisories of severe weather and extreme climate conditions • Custodian of weather and climate data **Ministries and institutions** • Sector specific tailor made weather products and services	Safety of life and properties Informed decision making	Feedback and Financial support
24.	**Employees/ Workers council**	• Improvement in workers welfare • Enhanced productivity and/or services • Advancements and promotions of employees • Training and retraining • Good remuneration package • Participation in decision making • Modern working tools • Good governance	Involvement in planning and operations. Motivating working conditions	Teamwork Efficient provision of services
25.	**Ministry responsible for Meteorology**	• Provision of cost effective service • Reliable and timely meteorological services	Well managed , efficient institution	Institutional support

		• Effective Planning and budgets • Good governance • Effective country representation in international arena (e.g. WMO, SADC, EAC, AMCOMET etc) • Assessments of the impact of weather and climate on Construction, Transport and Communications within Tanzania • Implementation of Meteorological Policy and Agency Act.	meeting its mandate	
26.	**Ministerial Advisory Board**	• Well managed and efficient institution • Implementation of WMO congress and its constituent commission's recommendations • Proposals for improved meteorological and operational services • Information on development plans, annual programs and financial estimates • Information on improved functioning of National Meteorological Centre • Information on the overall performance of the Agency • Compliance to business ethics • Information on technological development	Efficient and well managed institution	Motivating decisions
27.	**Suppliers of equipment and consumable materials**	• Payment for Supplies Procured • Accurate specification of required instruments and equipment • Adherence with set Procurement Policies and Regulations	Timely payment and ethical and efficient PMU Collaboration	Quality value for money supplies
28.	**Professional Meteorological Societies**	• Exchange of meteorological information including research, historical data and publications • Local weather forecasts • Supply of meteorological data	Enhanced collaboration	Collaborative research

		• Training of personnel • Joint research activities • Weather information related to pest migration (locusts, birds, army worms etc.) •		
29.	**Disaster Management Department, Local Government Authorities including DART , Red Cross, etc.) (DRR)**	• Rainfall and temperature information • Weather forecasts and severe weather and extreme climate advisories and warnings(floods, droughts and strong winds) • Good communication channels • Seasonal rainfall outlooks and updates Tropical cyclone warnings and tsunami warnings	Accurate and timely warnings and information	Collaboration in DRR initiatives. Feedback
30	**Civil Society organizations**	• Rainfall and temperature information • Weather forecasts and severe weather and extreme climate advisories and warnings(floods, droughts and strong winds) • Good communication channels • Seasonal rainfall outlooks and updates • Tropical cyclone warnings and tsunami warnings	Accurate and timely warnings and information	Collaboration in DRR initiatives. Feedback
31.	**Judiciary/Courts of Law**	• Expert witnesses to report on weather and climate conditions requested	Accurate and timely warnings and information	Institutional visibility
32.	**Private Sector**	• Weather and climate data, forecasts, outlooks and tailor made products • Partnerships	Reliable data, information and products	Partnerships for provision of services e.g. (observations especially AWS).

3.4 Baseline Analysis of Institutional, Human and Infrastructure Capacity

A baseline analysis for TMA was conducted to establish the current status of various components that relate to the goals and objectives of the Strategic Plan. The information obtained shall be useful when evaluating the effectiveness of implementation of the Plan. A summary of the findings is given in the following sections.

3.4.1 INSTITUTIONAL FRAMEWORK

TMA has continued to function well in its current institutional framework. It has made significant achievements in the quality of service provision as highlighted in item 2.3. The successes made by the Agency after transformation from its previous framework of a government department are a clear justification for its continuation, with improvements as demanded by the emerging determinants.

The institutional framework functional status of the Agency was reviewed whereby a number of policies, legislative and funding issues were discussed and proposals made to enable TMA improve its performance in future as follows.

a) Development of National Meteorological Policy and New Meteorology Act

The drafts for both the Meteorological Policy and the New Meteorology Act have already been prepared and are in the final stages of development before approval and implementation. There is an urgent need of having a National Meteorological Policy and legislation of new Meteorological Act in order to harmonise with other relevant policies and Acts hence enable the meteorology sector to effectively contribute to the realization of the National Development Goals.

Recommendation:

There is a need for the Parent Ministry to expedite the process of approval of the draft National Meteorological Policy and legislation of the New Meteorology Act to enable the Meteorological sector function more effectively thus fulfil its mandate.

b) Mainstreaming of Weather and Climate services

TMA provides data, information and services to many stakeholders however there does not seem to be any reflection of the requirement of those services in the sector policies of those stakeholders, thus making the mainstreaming of weather and climate into sectoral planning difficult.

Recommendation:

TMA collaborates with its stakeholders to ensure weather and climate services requirements are well reflected in relevant sector Policies and activities.

c) Funding and Financial matters

National Meteorological Institutions are supposed to receive about 70 percent of its financial requirements from the government as a subvention in support of basic infrastructure and

provision of public good services which form the major component of services provided. The remaining part is obtained from revenue accrued from cost recovery for specialized value added services rendered to customers.

It is noted however that the funds available for TMA from the above sources are not adequate for the Agency to fulfil is mandate. While budgetary allocations from the government have been on a decreasing trend, some stakeholders have either been reluctant to pay for services or accept to revise rates for equitable distribution of revenue recovered from clients.

In view of the aforesaid it is recommended that:

i) TMA in collaboration with its stakeholders conduct an awareness/sensitization workshop for Decision Makers on the role and economic benefit of meteorological services nationally and internationally.
ii) The government in recognition of the critical role played by the Meteorology Sub-sector in national development places the Meteorology sub- sector among priority sectors for budget allocation purposes .
iii) TMA h strengthens its resource mobilization strategies aiming at increasing its customer base and associated revenue.

d) Quality Assurance and Risk Management

The Agency has a Unit whose main objective is to ensure compliance of meteorological services to the recommended National and International Quality and Risk Management Framework requirements and staff competence. TMA undertakes various activities to accomplish the Quality and Risk Management objective including:

i. Ensure compliance of meteorological services to the recommended National and International Quality and Risk Management Framework requirements and standards.
ii. Develop and review standards for staff competence assessment.
iii. To facilitate internal and external audits exercise on TMA activities that is under Quality and Risk Management System.
iv. Work towards total quality Management System for the whole Agency activities.

TMA has made significant achievements including the successful obtaining the first ISO 9001-2008 Certification for Aeronautical Meteorological Services in 2011 and TMA continued to retain the certificate since then through five external Audits conducted. Following the successful implementation of the Quality Management System for Aeronautical Meteorological Services the Agency aspires to implement Total Quality Management for the Agency activities.

Challenges and Capacity Development Needs

- Limited capacity in calibration of some instruments such as anemometers, thermometers.
- Need for replacement of some instruments due to emerging environmental and technological changes.
- Need to migrate from the current applicable ISO 9001-2008 standards to ISO 9001-2015 by September 2018.
- Need to have adequate meteorological instruments and equipment

Recommendations:

For TMA to improve on the attained standards of operations and services provision the following interventions are recommended:

i. ***TMA undertake migration from the currently applicable ISO* 9001-2008 *standards to ISO 9001-2015 by September 2018.***
ii. ***Strengthen the TMA calibration workshop to enable meteorological instruments calibration.***
iii. ***Implementation of a Total Quality management System for all TMA activities***

3.4.2 HUMAN RESOURCE CAPACITY

3.4.2.1 Human resources

The operation of Weather and Climate services requires a strong human resources base. TMA has 600 employees distributed across the country including at its Headquarters, Central Forecasting Office and outstation offices, of which 463 (77%) are male and 137 (23%) are female employees.

These consist of 452 meteorological professionals and 148 Non-Meteorological professionals, technical and administrative support staff located across the United Republic of Tanzania. To maintain a round-the-clock weather watch nationwide and to provide ongoing observations and forecasts every day of the year, a significant proportion of staff works on shift basis.

TMA continued to enjoy the organizational benefits of an effective, trained and committed workforce, in spite of prevailing challenges and growing demands for services.

Staff turnover rate at TMA has been at a rate of **3%**. The turnover includes retirement of employees from service, death and employees terminating their employment probably seeking for greener pastures.

3.4.2.2 Staff Training and Capacity Building

TMA has established a training program with the objective of meeting current and emerging needs for its workforce with appropriate professional, specialized technical and management skills. Currently training programs is mainly on:

i. Provision of Class III and II Meteorological Technician courses at its National Meteorological Training Centre based in Kigoma;
ii. Facilitating Degree courses for Meteorological Personnel in the country and overseas;
iii. Provision of operational training courses for aviation forecasting and Agro-meteorological weather observers;
iv. In-service training to maintain professional and technical skills; and
v. Facilitating management and development training.
vi. On-job training courses and competency assessment to employees are being carried out every time there is need to advance their skills and acquire the experience needed for operational work.
vii. QMS implementation training is also provided to the staff in the Agency including but not limited to Management team, internal auditors and as well as to technical staff at their respective stations wherever deemed necessary.

viii. TMA in collaboration with WMO and other development partners support some the staff to undertake BSc in Meteorology, and other postgraduate programmes outside the country.

Challenges:

i. WMO requires all meteorological personnel providing aeronautical meteorological services at airports to have at least a BSc. Degree in Meteorology. This necessitates the Agency to work towards meeting that requirement.

ii. Following the approval of the new organization structure TMA needs to allocate adequate resources to make essential recruitment to fill vacant posts for enhanced efficiency in service delivery.

iii. There is a need to Sustain succession plan particularly for professional staff cadres

iv. The infrastructure at Kigoma Training Centre needs improvement including construction of a students' hostel.

Recommendations

In order for TMA to be efficient in service delivery, it is important that adequate human resources capacity is established and maintained. In order to address the current challenges it is recommended as follows:

i. Strengthen the training programme of personnel, particularly meteorologists to ensure the Agency meets competence requirements of personnel by ICAO and WMO.

ii. Need to have Strategic Human Resource planning for enhanced efficiency.

iii. Sustain the succession plan particularly for professional staff cadres to ensure continuity of services.

iv. Diversify National Meteorological Training Centre (NMTC) courses to attract weather and climate related emerging opportunities

3.4.3 INFRASTRUCTURE CAPACITY

TMA requires adequate infrastructure (office accommodation, equipment and instruments) in order to monitor the weather and climate and process the data to produce required information, products and services. TMA is obliged to fully comply with national and international recommended standards and practices in establishing, operating and maintaining meteorological infrastructure in the country. Details of the current infrastructure operated by TMA are described in the following sections.

3.4.3.1 TMA Central Forecasting Office and Headquarters

Currently TMA headquarters operates in a rented office accommodation using a significant amount of resources as rental charges. Plans are underway to build own accommodation.

3.4.3.2 Observation Network

a) Synoptic Stations

TMA operates 29 synoptic stations of which 17 stations operate for 24 hours, 6 stations for 15 hours and the remaining 6 stations operate for 12 hours.

b) Climatological Stations

There are 157 climatological stations in Tanzania owned and operated by government institutions and the private sector. The Agency trains meteorological observers and provides expertise in instrument maintenance to ensure that the desired standards are met.

c) Rainfall stations

There are 2056 registered rainfall stations of which 1524 are operational. They are owned and operated by government and private sector institutions.

d) Marine-Meteorological stations

TMA plans to establish four Marine stations along the Indian Ocean and inland Lakes. Currently there is no fully-fledged marine station in Tanzania though TMA offers briefing on weather information for Indian Ocean, Lake Nyasa and Victoria.

e) Agro-meteorological Stations

TMA in collaboration with the Ministry of Agriculture, Livestock and Fisheries operate 15 agro-meteorological stations.

f) Automatic Weather Stations (AWS) and Automatic Weather Observing System (AWOS)

AWS are automated version of the conversional instruments station designed to save human labour and to enable measurements from remote areas, while AWOS are primarily AWS equipped with additional sensors for aviation purposes.

Currently there are 18 Automatic Weather Stations (AWS) located at various stations in the country of which 2 are AWOS. An additional16 AWS procured through CIRDA project are under installation while 20 have been ordered.

g) Upper-Air Observation Network

Currently TMA has two upper air stations located at Julius Nyerere International Airport (JNIA) Dar es Salaam and Tabora both not operational for technical reasons. The Plan is to have four upper air stations.

h) Remote sensing

In order to strengthen its capability of monitoring meteorological conditions TMA plans to acquire 10 lightning detectors to reinforce on existing facilities.

i) Weather Radars

The government has facilitated TMA to establish two Weather radars are at Dar es Salaam and Mwanza. Plans are to have a network of 7 Weather Radars.

j) Satellite ground receiving station-PUMA

TMA uses a new generation of Satellite Receiving Station, Data Processing and Display that make great use of advanced techniques of spectrum combination made available by modern Meteosat

Second Generation (MSG) spacecraft. TMA has procured latest version of data processing and display systems used as a Forecasting workstations-(SYNERGIE), at CFO, JNIA, Mwanza, KIA and Zanzibar stations. A summary of the established, operational and planned stations is given in Table 4:

Table 4: Present and planned meteorological observational stations network

Description	Number of stations			
	Current	Operational	Optimal	Deficit
Conventional Surface synoptic stations	28	28	40	12
AWS Surface synoptic stations	28	17	115	87
Agrometeorological stations	15	15	20	5
Ordinary climate stations	150	60	250	100
Rainfall stations	2056	500	1000	500
Automatic Rainfall stations	-	=	2500	2500
Marine weather station	0	0	12	12
Upper air stations	1	1	4	3
Pilot Balloon	0	-	5	5
Weather Radar	2	2	7	5
Lightning	0	0	10	10
Orbiting satellite receiver			1	1

Recommendations to address capacity development needs are as follows:

i. ***It is recommended that adequate funds be allocated to TMA to enable the Agency construct own office accommodation so as to enhance efficiency in service delivery and save the rentals for use in other development projects.***
ii. ***It is recommended that the government allocate adequate funds to TMA for implementing an optimal observing network of stations as indicated in Table 4.***
iii. ***TMA collaborates with the IOC to facilitate acquisition of Mooring/Fixed Buoys in SWIO in the Tanzania waters.***
iv. ***It is recommended that software be developed for assimilation or integration of AWS data into the current operational real-time data processing system so as to optimize its use.***
v. ***Plans be made to rehabilitate the infrastructure of Kigoma Training Centre and some stations.***
vi. ***Arrangements be made to acquire transport for Agro-met Stations personnel as most are located far from residential areas and lack public transport.***
vii. ***Training of Engineers on maintenance of AWSs needs to be undertaken and ensure there are funds for spare parts for the equipment including Radars***
viii. ***There is a need for modernization of the electronic and ICT workshops equipping them with necessary tools for efficient maintenance of meteorological infrastructure***
ix. ***Training of engineers on maintenance of meteorological infrastructure should be done on continuous basis to ensure sustainability of services.***
x. ***The instruments workshop needs to be modernized, equipped with necessary tools to ensure maintenance, fabrication and calibration of instruments are done effectively to ensure set standards are maintained.***

3.4.4 METEOROLOGICAL TELECOMMUNICATION SYSTEM

3.4.4.1 Telecommunications facilities

Transmission and global exchange of weather data in TMA has three levels of communication links, namely transmission from observation stations to collecting zonal offices then from zonal offices to Central Forecasting Office (CFO) and from CFO to Regional Telecommunication Hub Nairobi, Kenya. The heart of all communication links at CFO is the TRANSMET, an Automatic Message Switching System (AMSS) which route data to and from different circuits and channel linked to it such as forecasting tools (SYNERGIE), satellite receiver (RETIM), RTH Nairobi circuit, KIA etc.

Information and Communication Technology is being deployed at CFO for data flow and access from TRANSMET to forecasting tools (SYNERGIE), from RETIMs to TRANSMET through Local Area Network (LAN). TMA uses telephones, Single Side Band radios (SSB's), Mobile phones, Internet and e-mail, and VSAT Telecommunication System for data transmission and acquisition on a real-time basis. However there are some challenges experienced including outages of power at

Data quality control is done manually. TMA conducts a national monitoring of availability of data at the CFO from observation stations whereby statistics indicate that the annual average of data availability for the period ending March 2015 stood at 98.8%, specifically for data exchanged on the WIS/GTS network. However the WMO monitoring results on the availability of SYNOP reports from RBSN stations for the monitoring period: 1 to 15 October 2015 indicated 74%, showing that there exist some deficiencies in the handling of data between centres which need to be addressed.

3.4.4.2 Capacity Development Needs

i. There is a need to strengthen the internet availability at the CFO, Zanzibar Office, zonal offices and observing stations to ensure efficient exchange of data and products between centres.
ii. In order to ensure continuous availability of data TMA should have a back-up/alternative internet available for use in case of breakdown or outage of the default provider's internet. This is important taking into account that the CFO is a tsunami focal point for Tanzania mandated to receive warnings and alerts and act on them instantly.
iii. There is a need of introducing Document/Information management systems that will allow paperless work and reducing time to exchange information and instructions hence improving service delivery and timely decision making. Areas to be improved: registry, PMU and Accounts.(Taking the full advantages of information management and communication systems for timely decision making and service delivery)
iv. Modernize management functions by introducing relevant Financial, Procurement and Management Information systems that will allow paperless work and improve efficiency of exchange information and instructions hence improving service delivery and timely decision making. Improve the infrastructure and tools at Kigoma Training Centre

3.4.5 REAL-TIME DATA PROCESSING AND FORECASTING SYSTEMS AND PUBLIC WEATHER SERVICES

3.4.5.1 Data Processing Systems

TMA deploys real time observational data to process and issue short, medium and long-range forecasts. Data Processing and Forecasting System (DPFS) is done by using statistical and NWP

techniques. SYNERGIE is also widely used to visualize weather systems and model outputs from various centres. Currently the forecasting process is semi-automated with manual plotting of data and analysis. The processes need to be modernized with automation to optimize on the use of available locally observed data.

3.4.5.2 Numerical Weather Prediction (NWP)

Numerical Weather Prediction is modern weather forecasting technique that is very effective in short range and medium range forecasting. It demands high speed computing capability. TMA is currently running two Numerical Weather Prediction (NWP) models, Weather Forecasting and Research (WRF) and High Resolution Model (HRM). Due to limited computing resources, TMA opted to generate forecasts for shorter range with low horizontal resolution to minimize model run time.

Long-range forecasts (Monthly and seasonal outlook) are produced using Statistical tool (CPT, SYSTAT, GeoCOF and analysis of online GCM).

3.4.6 DISSEMINATION OF WEATHER AND CLIMATE INFORMATION

3.4.6.1 Public Weather Services

Public Weather Services (PWS) include packaging and dissemination of weather forecast information, advisories and warning to the general public and other sectors through various communication channels such as TVs, Radios, Newspapers and Internet. TMA weather studio is equipped with facilities for dissemination of weather forecast information through Television (TV). The recorded daily weather forecasts information are sent via internet to the media for broadcast to general public through various media channels. However, the current studio needs to be modernized and expanded.

3.4.6.2 Capacity development needs include the following:

i. Analysis and General weather forecasting needs automation in plotting, analysis and packaging of products using state of art technologies.
ii. There is need for development of a seamless forecasting and Multi-Hazard Early Warning System (MHEWS) based on Standard Operating Procedures (SOPs) plus impact-based forecasting and risk-based warnings
iii. There is need to introduce a “Product Development Service” to liaise with the Marketing and Public relations section to transform user requirements in to products, update and market the existing weather and climate products to potential customers and users.
iv. Develop and implement a Service Delivery Strategy as part of implementation of the GFCS concept in the country.
v. Improve dissemination by engagement of more media including community radios.
vi. The weather studio needs to be modernized and space expanded including facilities for teleconference.
vii. There is a need for improving the Internet bandwidth availability and computing capacity for the NWP to enable running of higher resolution models.
viii. Training is required on climate modelling and downscaling of global and regional model outputs for national use.

3.4.7 NON REAL TIME DATA PROCESSING AND ARCHIVING AND APPLICATIONS SERVICES

TMA receives non-real time data from observers across the country on special prepaid forms once on every month. The data are quality controlled and made available for various uses including research in climate variability and change.

TMA has a very large archived data on hard copies. Meteorological weather returns from stations received through post office, emails and telephone calls, sorted, documented and quality checked, and put into safe archival electronically in a Climate Data Management System known as CLIDATA and paper form stored in special strong rooms.

3.4.7.1 Applied Meteorology Services

The Agency provides Applied Meteorological services to various users including Climate Change, Agriculture, Water resources management and Environment among many others.It is noted that TMA is a focal point for Tanzania with the IPCC. The Agency participates actively in the IPCC activities and has continued to collaborate with national authorities and international institutions on matters related to Climate Change. A number of projects including CCIAM have been implimented in the country with TMA's participation.

As impacts of climate variability and climate change continue to grow in frequency and severity the Agency needs to enhance its initiatives in the areas of monitoring, modelling and research as a contribution towards making the country more resilient of these impacts.

Products and activities undertaken on routine basis products include:

i. 10 day bulletins
ii. Production of Annual national Climate Status
iii. Monitoring of Air quality analysis through rain water analysis
iv. Partcipate in awareness creation during various exhibitions
v. Advisories on impacts related to seasonal forecasts/outlooks
vi. Coordinate production of TMA Research Journal

Generation of sector specific /tailor-made products for various clients is done in collaboration with users as well as other sections in the Agency. CLIDATA software is used for non-real-time data processing and management. A software known as Archidata is being used in Agro-Hydromet operations for which regular updates will be required.

Recommendations:

i. ***In order to meet an increasing demand of sector specific tailor made products TMA should strengthen the capacity for generation and packaging of tailor made products through training of experts and acquiring necessary tools including software***.
ii. TMA should strengthen the capacity in the areas of climate change monitoring, modelling and research as a contribution towards making the country more resilient.

3.5 Emerging Issues

3.5.1 Introduction

This Strategic Plan is based on the main challenges facing the meteorological sub-sector in contributing to the National Development programs with links to several global, regional, sub-regional and national strategies and action plans including the WMO Strategic Plan 2016-2019; the AMCOMET Integrated African Strategy on Meteorology; The SADC Regional Infrastructure Development Master Plan (RIDMP) and takes into account the SADC RIDSP; (ii) GOPA Report (2010); (iii) Some National Meteorological Services Strategic Plans; (iv) The East African Community Five Years Meteorological Development Plan and Investment Strategy; The East African Community Five Years Meteorological Development Plan And Investment Strategy; The Meteorological Association of Southern Africa Strategic Plan, National Development Vision 2025 and National Five year development Plan 2016/17 – 2020/21. Highlights of the relevant links are summarised below.

3.5.2 5.2 The WMO Strategic Plan 2016-2019

The WMO Strategic Plan sets the directions and priorities to guide the activities of Members and all WMO constituent bodies to enable all Members to improve their core information, products and services, maintain necessary infrastructures, and to directly benefit from advancements in science and technology. The WMO Strategic Plan emphasizes the following **key priorities**, which outline the benefits and improvements to the capacity of all Members*: Disaster Risk Reduction, WMO Integrated Global Observing System, and Global Framework for Climate Services, Aviation meteorological services, Aviation meteorological services, Capacity Development and Governance which are all relevant to the TMA Strategic Plan hence taken into account.*

3.5.3 The AMCOMET Integrated Strategy for Africa

The African Ministerial Conference on Meteorology (AMCOMET) was established as a high-level mechanism for the development of meteorology and its applications in Africa. It is committed to strengthen and sustain National Meteorological and Hydrological Services (NMHS) by providing them with the necessary resources and adequate institutional frameworks to enable them to fully perform their roles as a fundamental component of national development infrastructures. As a key joint initiative of the African Union and the World Meteorological Organization (WMO), AMCOMET leads the planning and response efforts, through *the Integrated African Strategy on Meteorology (Weather and Climate Services)* (the Integrated African Strategy), to ensure that National Meteorological and Hydrological Services in Africa can better address climate variability and change. TMA's Strategic Plan relates to the efforts being made by AMCOMET.

3.5.4 The SADC Regional Infrastructure Development Master Plan (RIDMP)

The overall objective of the Meteorology Sector Chapter of the SADC Regional Infrastructure Development Master Plan (RIDMP) is to outline strategies for strengthening of the Meteorology Infrastructure and Services to ensure the sector contributes effectively to the development goals of SADC as spelt out in the RIDMP and the SADC Protocol on Transport, Communication and

Meteorology, focusing on assisting Member States strengthen observation networks, telecommunications and data exchange, data processing and data management, weather and climate prediction and capacity building for service delivery. The TMA Plan makes links to relevant strategies in this Plan.

3.5.5 The Meteorological Association of Southern Africa Strategic Plan

The Meteorological Association of Southern Africa (MASA) has the function of a steering institution to facilitate speedy improvement of relevant meteorological activities for the SADC region. The Mission of the MASA is: "To *strengthen and coordinate SADC NMSs operations to provide quality products and services in support of socio-economic development and protection of life and property from weather and climate related natural disasters through: enhancement of observation networks, institutional development, human capital development, capacity building, collaboration and strategic partnership, and mobilizing resources"* all of which have links to the Strategies of TMA.

3.5.6 Five Year Meteorological Development Plan and Investment Strategy

The implementation of the Five Year Meteorological Development Plan and Investment Strategy emphasizes on the enhancement of the capacities of NMSs to deliver meteorological services and products efficiently in support of safety of lives and property and conservation of the environment for sustainable development of the Partner States. TMA has actively participated in the development of the Plan, which is well linked to the TMA Strategic Plan.

3.5.7 National Five Year Development Plan (NFYDP) 2016/17 – 2020/21

As part of its implementation strategy the NFYDP plans to have in place participatory climate change adaptation measures at catchment/ water user association level; introducing and adopting crop and livestock varieties suited to adverse conditions brought about by climate change; strengthening climate change projection and early warning and Natural disaster response, coordination frameworks. Also the focus of the National Vision 2025 on transforming towards middle-income economy and semi industrialization needs effective use of weather and climate information for optimal operations and production. The TMA Strategic Plan is also taking these into account.

3.6 Conclusions from Environmental Scan

The Government of Tanzania recognizes the importance of weather and climate services for socio economic development and for protection of life and property from weather and climate related disasters. As a result TMA has been designated as a sole Agency for providing weather and climate services. The Government is in the process of further strengthening TMA by reviewing its institutional arrangements through provision of a new Policy and Act and facilitate enhanced mainstreaming of weather and climate services into other sectors.

Membership of Tanzania to WMO and other regional and international institutions such EAC and SADC is beneficial to TMA. TMA can take advantage of global recognition and investment in weather and climate change issues and also availability of modern technology to improve its services.

The Strategic Plan will take into account the above opportunities and enhance the ability of TMA to meet increasing need by the Government, the public and other stakeholders of accurate and dependable weather and climate services. For the purpose of meeting increasing demand for user specific products and services, TMA needs to enhance capacity to process real and non-real time weather data and information. Furthermore there is a need to modernize and increase TMA infrastructure to observe, receive, process and transmit weather and climate data and information. It is also necessary to enhance training of meteorological personnel and other supporting cadre to efficiently and effectively provide weather and climate services. Investment in research and climate change monitoring and modelling will contribute to mitigation and adaptation measures.

Inadequate funding for projects and other activities is a major challenge facing TMA. This requires financial resource mobilization within and outside the country. There is a need to further create awareness and sensitization of relevant authorities to consider weather and climate as an essential service that needs consideration among priority sectors in budget allocation.

4. ORGANIZATIONAL VISION, MISSION AND CORE VALUES

4.1. Vision

Following an engagement and consultative process involving TMA Management, staff and stakeholders, TMA agreed on the VISION and Mission Statements that reflect the long term desire of its sate. The agreed vision and mission statements are presented in items 4.1.1 and 4.2 respectively.

4.1.1 Vision Statement

To stand out as a centre of excellence in the provision of world-class weather and climate and other related services thereby contributing to sustainable socio-economic development.

4.2. Mission

To achieve its vision TMA adopted the following mission Statement**:**

4.2.1 Mission Statement

To provide quality, reliable, and effective weather and climate services thereby contributing to the safety and socio-economic well-being of people and to the national development agenda.

4.3. Organizational Mandate

The mandate of TMA is to observe and forecast the weather and climate of the United Republic of Tanzania and provide among others, weather and climate services to the general public, government, institutions, and individual users of tailor made services for maintaining safety and security of people and their properties, and meet national and international socio-economic obligations.

4.4. Core Values

TMA has agreed on the Core Values below, taking into account the current and expected trend of national political and economic focus.

i. Accountability.
ii. Good governance
iii. Quality service
iv. Timeliness
v. Team work
vi. Customer focus
vii. Cost effectiveness

5. STRATEGIC FRAMEWORK

5.1. Strategic Goals, Objectives and Strategies

5.1.1. Goals

In order to achieve its Vision and Mission, TMA used the recommendations arising from the Evaluation of the previous SPs and Environmental Scan to identify a number of critical issues to be dealt with in the next five years i.e. 2017/18-2021/22.

The goals that the Tanzania Meteorological Agency has determined to focus on are:

Strategic Goal 1. Efficient functioning of the Organization realized to deliver quality and reliable services.

Strategic Goal 2. Modernization of infrastructure achieved to support delivery of efficient and reliable services

Strategic Goal 3. Human resources capacity enhanced to provide efficient services

Strategic Goal 4. Quality weather and climate forecasts and information produced and delivered to meet stakeholders' needs

Strategic Goal 5. The public and other stakeholders informed to realize social economic benefits of weather and climate services

Strategic Goal 6. Research and climate change science issues addressed for climate resilient development and adaptation.

5.1.2 Strategic Objectives

In keeping with the goals outlined in this plan the Tanzania Meteorological Agency has developed specific objectives to be achieved throughout the period 2016/17 – 2020/21 life span of the Strategic Plan. The objectives for the key areas are:

Strategic Goal 1: Efficient functioning of the Organization realized to deliver quality and reliable services.

Objective 1: To establish policy and strengthening of legal framework for effective weather and climate services

Objective 2: To strengthen Quality Assurance, Competence Assessment and Risk Management System to ensure quality and efficient weather and climate services.

Objective 3: To implement and enhance Agency monitoring and evaluation system.

Objective 4: To strengthen resource mobilization strategies

Objective 5: To enhance regional and international cooperation in weather and climate services

Objective 6: To enhance corporate governance and internal control

Objective 7: To strengthen financial and procurement management systems

Strategic Goal 2: Modernization of infrastructure achieved to support delivery of efficient and reliable services.

Objective 1: To strengthen, modernize and expand meteorological infrastructure for improved services delivery.

Objective 2: To modernize the real time data monitoring, data exchange, processing and forecasting systems.

Objective 3: To strengthen the capacity for calibration and maintenance of instruments and equipment

Objective 4: To strengthen the Information and Communication Technology systems for efficient services delivery

Strategic Goal 3: Human resources capacity enhanced to provide efficient services

Objective 1: To develop the human resources capacity of TMA for efficient provision of services.

Objective 2: To enhance the capacity of Kigoma Meteorological Training Centre for professional training in meteorology and related courses.

Objective 3: To develop and implement Strategic Human Resource Plan and welfare programmes for efficient service delivery.

Strategic Goal 4: Quality weather and climate forecasts and information produced and delivered to meet stakeholders' needs

Objective 1: To strengthen the production and delivery of quality weather and climate forecasts, warnings and information.

Objective 2: To strengthen the provision of aeronautical and marine meteorological services.

Objective 3: *To enhance and sustain* station networks operational environment

Objective 4: To strengthen the provision of Hydro-meteorological and Agro-meteorological services

Strategic Goal 5: The public and other stakeholders informed to realize social economic benefits of weather and climate services

Objective 1: To strengthen the capacities for generation of tailor made weather and climate services.

Objective 2: To promote awareness and sensitization of the public and other stakeholders on use of weather and climate services for safety and socio-economic benefit.

Objective 3: To develop and implement framework for services delivery.

Strategic Goal 6: Research and climate change science issues addressed for climate resilient development and adaptation.

Objective 1: To strengthen capacity of TMA in research and application services

Objective 2: To promote research for better understanding of weather and Climate systems, climate variability and change.

Objective 3: To strengthen the capacity of TMA in Climate Data Management systems

5.1.3 Strategies

In order to achieve the intended outcomes from agreed objectives various strategies will be implemented. TMA has identified various high level strategies associated with respective goals and objectives and related outputs and outcomes as indicated in Table 5.

Table 5: High-level planned strategies with associated respective strategic goals and objectives.

Goal 1. Efficient functioning of the Organization realized to deliver quality and reliable services.					
Objectives	**Strategies**	**Outputs**	**Time Frame**	**Outcome**	**Responsibilities**
Objective 1.1: To establish policy and strengthening of legal framework for effective weather and climate services	Facilitation of the development of National Meteorological Policy and legislation of the new Meteorology Act	**1.1.1** Meteorological Policy and Act in place. **1.1.2** Policy Implementation Strategy and Act Regulation in place	December 2017	**1.1** Improved effective weather and climate services	PS DG/MPM
	Collaboration with stakeholders to ensure weather and climate services requirements are well reflected in relevant sector Policies and activities.	**1.1.3** Weather and climate issues mainstreamed into relevant sectors.	June 2019		DG
	To implement the National Meteorological Policy and the new Meteorological Act	**1.1.4** National Meteorological Policy and Meteorological Service Act implemented	June 2019		DG/LO
Objective 1.2: To strengthen Quality Assurance, Competence Assessment and Risk Management System	Migrate from the currently ISO 9001-2008 to ISO 9001-2015 standards	**1.2.1** ISO 9001-2015 certification attained	June September 2018	**1.2** Improved quality assurance and competence of staff and Adherence to ISO standards	DG & MQARM
	Sustain Operational Competence Assessment System	**1.2.2** Competent personnel as per WMO Standards in place	June 2021		DG-MQARM
	Increase implementation scope of Quality Management System for TMA	**1.2.3** Increased scope of Aeronautical Meteorological services Quality Management System	June 2020		DG-MQARM

	Operationalise Risk Management System	**1.2.4** Increased Efficiency of operations and service delivery	June 2021		DG
Objective1.3: To implement and enhance monitoring and evaluation system.	Strengthen the Planning and budgeting System for improved service delivery	**1.3.1** Improved management of resources	June 2021	**1.3** Improved decision making and plans implementation performance	DG- MPM
	Strengthen a Monitoring and Evaluation System	**1.3.2** A monitoring and Evaluation System strengthened	December 2021		DG – MPM
Objective 1.4: To strengthen resource mobilization strategies.	To establish and implement a resource mobilization plan	**1.4.1** Resource mobilization plan in place and Increased resources availability	December 2021	**1.4.** Increased availability of financial resources	DG
	Sensitize stakeholders to mainstream weather and climate data and information in their priority plans for budget allocation.	**1.4.2** Joint operation in programs related to meteorological infrastructures	December 2021		DG
	Enhance and implement a cost recovery framework for provision of services	**1.4.3** Cost Recovery Framework sustained and operational	June 2019		DG
		1.4.4 Capacity of resource mobilization improved and increased revenue	June 2018		DG
Objective 1.5 To enhance regional and international cooperation in weather and climate services	Improve partnerships and cooperation with, countries organizations and universities in relevant programmes	**1.5.1** Broader Network of partnerships and enhanced technical cooperation.	June 2020	**1.5** Improved cooperation, partnership and gains from collaborative programmes	MIA
	Improve regional and international data exchange	**1.5.2** Enhanced regional and international data and products exchange	June 2021		MIA
	Fulfill regional and international obligations	**1.5.3** International obligations fulfilled.	June 2021		MIA

Objective 1.6: To enhance corporate governance and internal control	Improve oversight and internal control system	**1.6.1** Improved efficiency and accountability in resources utilization	June 2020	**1.6** Enhanced control culture and organisation efficiency	M-IA
Objective 1.7: To strengthen financial and procurement management systems	Enhance Procurement management systems	**1.7.1** Efficient Procurement management Systems	December 2018	**1.7** Improved efficiency in services delivery	MPS
	Strengthening Financial management systems	**1.7.2** Efficient financial Management Systems	June 2020		MFA

Goal 2. Modernization of infrastructure achieved to support delivery of efficient and reliable services.

Objectives	Strategies	Outputs	Timeframe	Outcome	Responsibilities
Objective 2.1: To strengthen, modernize and expand meteorological infrastructure for improved services delivery.	To have Central Forecasting Office own building	**2.1.1** CFO **own building** in place for improved services	December June 2020	**2.1** Improved working environment and increased availability of data	DG, Parent Ministry
	Expand network of meteorological stations and maintain an optimal number of stations	**2.1.2** Increased number of modern meteorological observing stations	June 2021		DTS/DFS
		2.1.3 Fixed Buoys operating in the Indian ocean	December 2019		DFS/DTS
		2.1.4 Strengthened Radar Network	June 2021		DFS/DTS
		2.1.5 Established Meteorological Satellite receiving	June 2021		DFS/DTS
Objective 2.2: To modernize the real time data monitoring, data exchange, processing and forecasting systems.	To establish a modern real time data monitoring system	**2.2.1** Modern real time data monitoring system in place	June 2019	**2.2:** Improved access to timely weather and climate information and quality of forecasts	DTS&DFS

	To strengthen data processing and forecasting systems	**2.2.2** Modern Plotting, analysis and packaging system Operationalised	June 2019		DTS&DFS
	Modernize the data and products exchange systems.	**2.2.3** Modern data and products exchange systems in place	June 2019		DTS&DFS
***Objective 2.3*:** To strengthen the capacity for calibration, maintenance and production of instruments and equipment	Strengthen the capacity of TMA to calibrate instruments	**2.3.1** Calibration equipment and calibrated meteorological instruments in place	June 2018	**2.3:** Improved efficiency using standard equipment, instruments and quality working tools	DTS
	Enhance production and maintenance capacity for meteorological instruments.	**2.3.2** Improved capacity of Fabrication and maintenance of meteorological instruments			
Objective 2. 4: To strengthen the Information and communication Technology Systems for efficient services delivery	Enhance the capacity and utilization of the information and communication systems	**2.4.1** Modern information and communication systems in place	June 2021	2.4 Improved service delivery through utilisation of ICT	

Goal 3. Human resources capacity enhanced to provide efficient services

Objectives	Strategies	Outputs	Timeframe	Outcome	Responsibilities
Objective 3.1: To develop the human resources capacity of TMA staff for efficient provision of services.	Strengthening and implementing employment, training and remuneration programmes	**3.1.1** Competent human resources increased and sustained	2020	**3.1:** Improved capacity to deliver services	DSS/MTRG
	Develop and implement a succession plan for the TMA	**3.1.2** Succession plan in place	June 2018		DSS/MHR
Objective 3.2: To enhance the capacity of Kigoma Meteorological	Strengthening training capacity of Kigoma Meteorological Training Centre	**3.2.1** Improved training system at Kigoma Meteorological Training Centre	June, 2019	**3.2:** Increased number of meteorological professionals	PRINCIPAL

Training Centre for professional training in meteorology and related courses.	Improving the infrastructure of Kigoma Training Centre.	**3.2.2** Improved Infrastructure at Kigoma Meteorological Training Centre	June, 2019		PRINCIPAL
	Diversify National Meteorological Training Centre programs	**3.2.3** Short and long term diversified programmes in place	June, 2018		PRINCIPAL
Objective 3.3: To develop and implement Strategic Human Resource Plan and welfare programmes for efficient service delivery.	Develop a strategic human resource plan and welfare programmes	**3.3.1** Human resources plan in place and welfare programmes developed and implemented	June 2021	Efficient Human Resources service delivery by motivated staff	DSS/MHR

Goal 4. Quality weather and climate forecasts and information produced and delivered to meet stakeholders' needs

Objectives	Strategies	Outputs	Timeframe	Outcome	Responsibilities
Objective 4.1 To strengthen the production capacity and delivery of quality weather and climate forecasts, warnings and information.	Strengthening the production capacity of impact-based weather and climate forecasts and risk-based warnings	**4.1.1** Impact-based weather and climate forecasts and risk-based warnings strengthened	June 2019	**4.1:** Improved capacity to deliver impact-based forecasts and risk-based warnings	DFS DZNZ
	Develop Multi-Hazard Early Warning (MHEWS) Systems	**4.1.2** Operational MHEWS in place	June 2018		
Objective 4.2: To strengthen the provision of aeronautical and marine meteorological services.	Enhance staff competence and provide quality Aeronautical meteorological services	**4.2.1** Competent staff and quality Aeronautical Meteorological services sustained.	June 2022	**4.2:** Improved capacity to deliver quality aeronautical and marine meteorological services	DFS
	Develop and enhance production of quality marine meteorological services	**4.2.2** Quality marine meteorological services provided	June 2018		DFS

	Implement aeronautical meteorological safety oversight	**4.2.3** Oversight safety assessment implemented	June 2018		DG-MQARM
Objective 4.3: To strengthen the provision of Hydro-meteorological and Agro-meteorological services	Strengthen the capacity for production of specialized Hydro-meteorological and Agro-meteorological services	**4.3.1** Specialized Hydro-meteorological and Agro-meteorological services in place	June 2021		DRA
Objective 4.4: To enhance and sustain station networks operational environment	Ensure conducive environment for Meteorological station operations	**4.4.1** Efficient Meteorological station operations	June 2021		DFS

Goal 5. The public and other stakeholders informed to realize the social economic benefits of weather and climate services

Objectives	Strategies	Outputs	Time frame	Outcome	Responsibilities
Objective 5.1*:* To strengthen the capacity for generation of tailor-made weather and climate services.	Enhance the capacity of non-real time data management	**5.1.1** Improved data management systems	June, 2020	**5.1** Improved capacity to deliver tailor made services and products	DFS/DRA
	Enhance production and packaging of tailor-made products	**5.1.2** Packaged tailor-made products in place	June 2018		DFS-DRA
	Enhance competence of staff in dissemination of tailor made meteorological services and products	**5.1.3** Competent staff in place and improved dissemination of tailor made meteorological services and products.	June 2018		
Objective 5.2**:** To promote awareness and sensitizing the public and other stakeholders on the use of weather and climate services for socio economic activities.	Sensitizing and building awareness to stakeholders on the benefit of using weather and climate services for socio economic activities.	**5.2.1** Increased awareness on the use of TMA's services	June, 2020	**5.2** Increased demand and uptake of weather and climate services	DFS/DRA
	Expand and strengthening engagement with media channels	**5.2.2** Increased media channels and frequency of dissemination	June 2019		DFS/DRA

Objective 5.3. To develop and implement framework for Services Delivery	Establish and Operationalise Service Delivery framework	**5.3.1** Service Delivery Framework in place	June 2018	**5.3:** Improved service delivery mechanism	DRA/DFS

Goal 6. Research and climate change science issues addressed for climate resilient development and adaptation.

Objectives	Strategies	Outputs	Timeframe	Outcome	Responsibilities
Objective 6.1: To strengthen the capacity of Agency in research and application services	Enhancing the capacity of the Agency to monitor, climate projection and conduct research in climate variability and change	**6.1.1** Improved visibility in climate change research and application	June 2019	**6.1:** Increased use of TMA's climate change information and products to build resilience	DRA
	Promoting the use of research application information and products	**6.1.2** Increased uptake of climate research information and products	June 2019		
	Enhancing collaborative research with national and international institutions	**6.1.3** Improved knowledge through collaborative research	June 2021		DRA
Objective 6.2: To **promote** research for better understanding of weather and Climate systems, climate variability and change.	Enhancing research in of meteorology and related fields	**6.2.1** Increased research in meteorology and related fields	June 2021	**6.2:** Enhanced use of weather and climate data and information for climate resilient development and adaptation.	DRA
	Improve publication and dissemination of research findings.	**6.2.2** Research findings and publications disseminated and available for use.	June 2021		DRA
Objective 6.3: To strengthen the Capacity of TMA in Climate Data Management	Modernize climate data management system	6.3.1 Improved data base management systems 6.3.2 Increased quality of generated of climate products	June 2021	6.3: Enhanced quality and accuracy of climate data and products and availability of climate change products	DRA
	Improve the quality of climate data and modernize the quality control and archival systems	6.3.3 Improved data backup systems and availability of easily accessible quality data in digital format	June 2021		DRA

5.1.4 Logical Framework

A logical framework has been developed to facilitate planning, execution and evaluation of various interventions related to the implementation of the Strategic Plan. It consists of a hierarchy of logically linked objectives; defines indicators to track accomplishment of those objectives, specifies sources of verification data to measure indicators and takes into account external assumptions and risks that are likely to affect the success of the implementation process. A detailed logical framework analysis for the TMA Strategic Plan 2017/18 -2021/22 is given in table 6.

Table 6: LOGICAL FRAMEWORK ANALYSIS FOR TMA SP 2017/18-2021/22

Expected Results	Objectively Verifiable Indicators	Sources of Verification	Assumptions
Impact 1: Increased use of weather and climate information for social economic development of the country			
Outcome 1.1: Improved effective weather and climate services	i. Increased Level of satisfaction of the public and other stakeholders ii. Adherence to rules, laws and regulations	• TMA reports • Customer Survey Reports • Self-Assessment Reports	Cooperation of employees and other stakeholders Availability of Met Instruments and new technology
Outcome 1.2: Improved quality assurance, staff competence and adherence to ISO standards	i. ISO Certification ii. Number of competent staff	• Audit Certificates • TMA Performance Reports	Cooperation of management and employees
Outcome1. 3: Improved decision making and plans implementation performance	i. Compliance with regulations and agreements ii. Compliance Timeliness	• Periodic performance reports	Commitment of management staff
Outcome 1.4: Increased availability of financial resources	iii. Number of implemented projects vs planned. iv. Amount of financial resources increased	• TMA Periodic performance reports	Cooperation of stakeholders awareness to cost recovery
Outcome 1.5: Improved cooperation, partnership and gains from collaborative programmes	Number of new collaborations/projects at global, regional and national level contributing to TMA programmes.	• Annual Reports • Regional and international protocols and WMO conventions and agreements compliance reports	Willingness of partners to provide support

Outcome 1.6: Enhance control culture and organisation efficiency	i. Number of clean Audit Reports ii. Compliance to Agency Audit Charter	• External and Internal Audit Reports	Cooperation of employees and stakeholders' involvements
Outcome 1.7: Improved efficiency in services delivery	i. Timeliness in delivery of support services ii. Adherence to service agreements iii. Compliance to Finance and Procurement Acts	• TMA Performance Reports	Cooperation of employees
Outputs			
Output 1.1.1 *Meteorological Policy And Act in place*	*Approved Policy and Act documents*	*Parent Ministry notification and National Parliament Hansard*	*Approval of the Parent Ministry*
Output 1.1.2 Policy Implementation Strategy and Act Regulation in place	*Approved Policy Implementation strategy and Act Regulation documents*	*TMA reports*	*Commitment of management and staff*
Output 1.1.3 *Weather and climate issues Mainstreamed into relevant Sectoral policies*	*Number of relevant sectors that have included weather and climate in their Policies*	*Relevant Sector Policies*	*Cooperation and willingness of relevant sectors.*
Output1.1.4 *National Meteorological Policy and Service Act implemented*	*Number of implemented activities*	*Annual Reports*	*Cooperation of the parent Ministry*
Output 1.2.1 *ISO 9001-2015 Certification attained*	i. ISO 9001-2015 Certificate ii. Number of Commendations/ Level of satisfaction of customers iii. Number of	*TMA Performance reports*	*Availability of funds for improving facilities and staff competence* *Cooperation and ability of employees*

	calibrated Instruments iv. Accuracy of *observations and products*		
Output 1.2.2 *Competent personnel as per WMO Standards in place*	*Number of competent staff*	*TMA reports*	*Commitment of staff*
Output 1.2.3 *Increased scope of Aeronautical Meteorological Services Quality Management System*	*Number of stations and sections implementing QMS*	*TMA Annual reports*	*Availability of funds and staff commitment*
***Output* 1.2.4** *Increased Efficiency of operations and services delivery*	i. *Number of programmes and projects implemented as planned,* ii. *User satisfaction* iii. *Clean audit financial statements*	*TMA reports including Customer survey reports*	*Availability of funds and commitment of staff*
Output 1.3.1 Improved management of resources	i. *Number of programmes and projects implemented* ii. *Clean audit financial statements*	*TMA reports and CAG Audit reports*	*Commitment of management and staff*
Output 1.3.2 *A monitoring and Evaluation System strengthened*	i. *Effective and efficiency implementation of programmes and projects* ii. *Operational Hardware and software system components for E&M*	*Periodic monitoring and evaluation reports*	*Commitment of management, staff and availability of resources*
Output 1.4.1 A resource mobilization plan in place and increased resources availability ***Output 1.4.2***	*The resource mobilization plan document*	*TMA Reports* *Income and*	*Commitment of management and staff* *Approval by the National Assembly*

Joint operation in programs related to meteorological infrastructures	*Level of implementation of projects*	*expenditure reports*	*Cooperation and willingness Parent Ministry*
Output 1.4.3 *Cost recovery Framework sustained and operational*	i. *Cost recovery Framework document and revenue accrued* ii. *Number of stakeholders participating cost recovery*	*Project implementation reports*	*Cooperation of relevant stakeholders*
Output 1.4.4 *Capacity of resource mobilization improved and increased revenue*	*i. Number of planned projects and activities implemented on schedule* *ii. Amount of revenue collected*	*Financial reports*	*Commitment of staff and cooperation of users of services*
Output 1.5.1 *Broader Network of partnerships and enhanced technical cooperation.*	*Number of partners with collaborative programmes*	*Annual reports*	*Ability of TMA to make contacts and negotiate*
Output 1.5.2 *Enhanced regional and international data and products exchange*	*i. Amount of data exchanged* *ii. Timeliness of data exchange*	*National and WMO data monitoring reports*	*Cooperation of participating institutions*
Output 1.5.3 *International obligations fulfilled*	i. Number of constituent workshops and meetings attended and conducted *ii.* Number of contributions made	TMA financial reports, WMO and bilateral development assistance projects reports	*Availability of funds* *Commitment of stakeholders and development partners*
Output 1.6.1 Improved efficiency and accountability of resources utilization	*Number of fully implemented projects*	*Performance reports*	*Commitment of staff and management*
Output 1.7.1 *Efficiency procurement management systems*	*Adherence to Laws, rules and regulations*	*TMA Annual reports* *Financial and Procurement reports*	*Commitment of relevant employees and availability of*

			resources
Output 1.7.2 *Efficiency Financial management systems*	*Adherence to Laws, rules and regulations*	*TMA Annual reports Financial and Procurement reports*	*Commitment of relevant employees and availability of resources*
Outcome 2.4 Improved service delivery through utilisation of ICT	Timeliness of data exchange and service delivery	TMA Annual reports	Availability of resources and commitment of staff
Impact 2: Increased protection of life and property from extreme weather and climate events			
Outcome 2.1: Improved working environment and increased availability of data	Number of established, rehabilitated and maintained stations	Performance Reports	Availability of funds
Outcome 2.2: Improved access to timely weather and climate information and quality of forecasts	i. Amount of data and information availed to customers ii. Number of forecasts and outlooks disseminated timely to users	Performance reports	Availability of resources Commitment of staff
Outcome 2.3: Improved efficiency using standard equipment, Instruments and Quality working tools	Percentage of increase in accuracy of forecast	TMA reports Number of calibrated instruments	Adequate tools and commitment of engineers
Outputs			
Output 2.1.1 CFO own building in place for improved services	*Number of Buildings constructed/Increased office space*	*Project Handing over certificates*	*Availability of funds and competence of contractors*
Output 2.1.2. *Increased number of modern meteorological Observing stations*	i. Number of newly established stations ii. Amount of information received at CFO	*TMA reports*	*Availability of funds*
Output 2.1.3 *Fixed Buoys operating in Indian Ocean in place*	*i. Number of observations received from Buoys in Tanzania ocean waters*	*TMA Performance Reports*	*Availability of resources and willingness of cooperating partners*
Output 2.1.4 *Strengthen Radar Network*	i. Number of		

Output 2.1.5 *Establish Meteorological Satellite receiving Centre*	established radar stations i. Amount of information received at CFO		
Output 2.2.1 *Modern real time data monitoring in place* ***Output 2.2.2*** *Modern Plotting, analysis and packaging system Operationalized* ***Output 2.2.3*** *Modern data and exchange systems in place*	*i. Operational hardware and software components* *ii. Timely exchange of information and products* *i. Operational hardware and software components* *ii. Timely and efficient production of forecasts and other products* *i. Amount of data exchange* *ii. Timeliness in data exchange*	*TMA Performance reports* *TMA Performance reports* *TMA Performance reports*	*Availability of resources.* *Availability of resources*
Output 2.3.1 Calibration equipment and calibrated meteorological instruments in place ***Output 2.3.2*** Improved capacity of fabrication and maintenance of meteorological Instruments	*Number of calibrated instruments and equipment* *Number of fabricated and maintained instruments*	*Workshop reports* *Workshop fabrication and maintenance reports*	*Availability of resources and committed engineers* *Availability of funds and commitment of staff*
Output 2.4.1 *Modern information and communication systems in place*	*Number of tools and software acquired;* *Declining breakdown of equipment and instruments*	*Workshop maintenance reports*	*Availability of funds and commitment of engineers*.
Impact 3: Increased satisfaction of public, customers and stakeholders with the services provided			
Outcome 3.1: Improved capacity to deliver	Level of customer	Customer survey	Commitment of

services	satisfaction	reports	trained staff
Outcome 3.2: Increased number of meteorological professionals	Number of trained professional staff	Training Reports	Availability of resources
Outcome 3.3: Increased organisational efficiency	Level of customer satisfaction	Customer Survey reports	Commitment of staff and availability of funds
Outputs			
Output 3.1.1 *Competent human resources increased and sustained* ***Output 3.1.2*** *Succession Plan in place*	*Number of trained competent staff* *Continuity of service*	• *Training reports* • *Competence Assessment Reports* • *Human resource reports* • *Training reports*	*Availability of funds* *Availability of experienced staff*
Output 3.2.1 *Improved training system at Kigoma Training Centre* ***Output 3.2.2*** *Improved Infrastructure at Kigoma Training Centre* ***Output 3.2.3*** *Short and long term diversified programme in place*	*i. Improved syllabus* *ii. Number of improved courses* *iii. Conducive teaching environment* *Number of constructed and rehabilitated buildings* *Number of new courses introduced*	*Training Centre reports* *Training Centre reports* *Staff reports*	*Availability of funds* *Adequate Publicity drive* *Availability of funds* *Availability of funds*
Output 3.3.1 Availability of adequate and motivated staff	*Number of staff and level of motivation*	*TMA reports*	*Availability of funds and staff welfare plans*
Impact 4: Weather and climate information oriented to specific needs for safety of persons and property			
Outcome 4.1: Improved capacity to deliver impact-based forecasts and risk-based warnings	Availability of Impact based forecasts and risk based warnings	CFO and Evaluation Reports	Commitment of staff and cooperation from key stakeholders

Outcome 4.2: Improved capacity to deliver quality aeronautical and marine meteorological services	Number of stations providing briefing services for aviation and marine services	Performance Reports	Availability of resources
Outputs			
Output 4.1.1 *Impact based weather and climate forecasts and risk based warnings strengthened* ***Output 4.1.2*** *Operational MHEWS In place*	i. *Level of accuracy of forecasts* ii. *Impact and risk based warnings issued to the public* *Operationalized MHEWS*	*Verification reports Monitoring and evaluation reports* *Severe weather reports*	*Commitment of professional staff* *Cooperation of news media*
Output 4.2.1 *Competent staff and quality Aeronautical Meteorological Services sustained* ***Output 4.2.2*** *Quality Marine meteorological Services provided* ***Output 4.2.3*** Oversight safety assessment completed	*ISO Certification awards* i. *Number of stations providing marine meteorological services* ii. *Number of vessels receiving services* *Clean oversight inspection report* *Number of non-conformities*	*Annual reports* *TMA Reports* *Oversight safety inspection reports TMA Operations reports*	*Staff commitment and Availability of resources* *Availability of funds* *Availability of funds and Commitment of staff*
Output 4.3.1: *Efficient Meteorological Station operations*	i. Reduced number of breakdown ii. Amount of data received at CFO	TMA reports	Availability of funds
Output 4.4.1: *Specialized Hydro-meteorological and Agro-meteorological services in place*	i. Number of products delivered	TMA reports	Availability of funds

	ii. Level satisfaction iii. Number of customers accessing the products		
Impact 5: Increased understanding of benefits and use of weather and climate information services by public and other stakeholders			
Outcome 5.1: Improved capacity to deliver tailor made Services and products	i. Types and Number of tailor made products ii. Level of customer Satisfaction iii. Number of Service Level Agreements made	TMA Reports & Customer surveys	Availability of Resources Commitment of staff
Outcome 5.2: Increased demand and uptake of weather and climate services	i. Number of customers ii. Level of public awareness	Customer surveys	Public readiness to receive and understand meteorological information
Outcome 5.3: Improved service delivery mechanism	i. Service Delivery Strategy document ii. Number of customers	TMA Reports/ Customer survey reports	Staff commitment
Outputs			
Output 5.1.1 *Improved data management systems*	*Number of customers served* *Number of products produced*	*Customer reports*	*Commitment of staff*
Output 5.1.2 *Packaged Tailor-made products in place*	*Types and number of tailor made products*	*Customer reports*	*Staff innovation*
Output 5.1.3 *Competent staff in place and improved dissemination of tailor-made meteorological services and products*	*Number of competent staff*	TMA Reports/ Customer survey reports	*Availability of resources*
Output 5.2.1 *Increased awareness on the use*	*i. Number of*	*Customer reports*	*Cooperation of*

of TMA's services.	*customers* *ii. Number of Service Level Agreements developed*		*customers* *Availability of resources*
Output 5.2.2 *Increased media channels and frequency of dissemination*	*Number of media channels*	*Public Weather service reports*	*Willingness of news media*
Output 5.3.1 *Service Delivery Framework in place*	*i. Service delivery strategy document* *ii. Service Standard Operating Procedure* *iii. Level of service delivery*	*Performance reports*	*Innovation of staff*
Impact 6: Increased climate resilience through effective use of climate variability and climate change information			
Outcome 6.1: *Increased use of TMA's Climate change information and products to build resilience*	*Number of Climate change impacts assessments issued*	*Stakeholder survey*	*Availability of resources*
Outcome 6.2: *Enhanced use of weather and climate data and information for climate resilient development and adaptation.*	*Level of use and understanding of weather and climate information*	*Stakeholder survey*	*Cooperation of stakeholders and the public*
***Outcome* 6.3:** Enhanced quality and accuracy of climate data and products and availability of climate change products for effective adaptation	*i. Number of stations and parameters digitized* *ii. Number of climate products generated and published* *ii. Number of customers served with climate data*	*Quarterly and Annual reports* *TMA performance reports* *Stakeholders Survey report*	*Availability of resources*

Outputs			
Output 6.1.1 *Improved visibility in climate change research and application* ***Output 6.1.2*** *Increase uptake of climate research information and products*	*Customer feedback* *Number and types of products and information disseminated*	*Annual reports* *Customer Survey Reports* *TMA Research Journal*	*Availability of resources* *Availability of resources*
Output 6.1.3 Improved knowledge through collaborative research	*Number of collaborative research projects publications and reports*	*TMA reports*	*Cooperation of research institutions and availability of resources*
Output 6.2.1 *Increased research in meteorology and related field* ***Output 6.2.2*** *Research findings and publications disseminated and available for use*	*Number of research findings published* i. Number of dissemination channels ii. Number and types of findings available for use	*TMA research reports* *National Annual Climate Status Report* *TMA Research Journal*	*Commitment of professional staff and availability of funds.* *Availability of dissemination channels and funds*
***Output* 6.3.1** Improved data base management systems	i. Number of software acquired ii. Number of computer facilities	*Quarterly and Annual reports* *TMA performance reports*	Availability of resources
***Output* 6.3.2** Increased quality of generated of climate products	i. Number of climate products generated	*Stakeholders Survey report*	
***Output* 6.3.3** Improved data backup systems and availability of easily accessible quality data in digital format	i. Backup system document ii. Number of stations and parameters digitized		

5.1.5 Risk Assessment

A risk assessment has been made to identify the factors that are likely to impede the achievement of the goals and objectives of the Strategic Plan. There are various categories of risks namely: Development Risks; Operational Risks; Financial Risks and Reputation Risks. For each of the identified risks, an estimate was made of the probability (level of occurrence) of these risks occurring and the effect the risk would have if it were to occur.

The risks have been prioritized in terms of severity of impact and level of likelihood to occur. This will assist the Agency to maximize resource use by focusing the majority of time and effort on the most important risks. Based on that criterion the risks with the highest priority are listed in Table 7. The matrix is also used for monitoring purposes since the characteristics of the risks change with time, whereby certain will reduce effect or disappear or be added overtime. A list providing an analysis of risks for all objectives is given in tabular form as shown in Table 8.

Table 7: RISK MONITORING MATRIX FOR TMA STRATEGIC PLAN 2017/18-2021/22

Risk Area	Probability	Effect	Indicator	Frequency to monitor	Risk Response
1. Weak cooperation from relevant stakeholders	Low	Significant	Number and level of contribution of cooperating stakeholders	Quarterly	Regular Contacts and an awareness plan
2. Unavailability of sufficient resources	Medium	Significant	Amount of resources obtained vs expected	Quarterly	An elaborate resource mobilization plan
3. Weak coordination with key partners and stakeholders	Low	Moderate	Level of satisfaction about coordination issues	Annually	A detailed communication plan
4. Low integrity of some employees	Low	Moderate	Clean audit reports	Monthly	Regular integrity seminars
5. Incompetent teaching staff/ good curriculum	Low	Significant	Student performances /results	Annually	A comprehensive Training School strategic plan
6. Weak Cooperation of media channels	Low	Significant	Low level of informed public, customers	Quarterly	Preparation of MoUs and SLAs
7. Low awareness of customers and public	Medium	Significant	Little utilization of services / weak response for advisories and warnings	Quarterly	A detailed awareness / sensitization plan

8. Limited understanding of climate variability and climate change	Medium	Significant	Level of understanding/awareness	Annually	An awareness plan and cooperation with Environment Agencies
9. Weak infrastructure components needed to support service delivery	Low	Moderate	Existence of adequate infrastructure	Annually	Develop partnership with government institutions and private sector organizations
10. Inadequate human resources capacity	Low	Moderate	Existence of adequate manning levels at all stations and sections	Annually	Review updated requirements and implement a succession plan
11. Weak Institutional Framework	Low	Significant	Availability of Policy and new Act	Monthly	Elaborate plans for follow up of approval and implementation plan
12. Lack of capacity to cope with rapid technology change	Medium	Significant	Availability of modern equipment	Annually	Effective plan for modernization of equipment and services
13. Lack of staff involvement and awareness of the Strategy	Low	Significant	Level of involvement and awareness of staff	Quarterly	Wider involvement and awareness plan to staff

Table 8: A matrix indicating identified organizational and operational risks for all objectives.

ORGANIZATIONAL RISKS						
Programme/Project/Policy Initiatives	**Risks**	**Impact**	**Probability**	**Mitigating Measure/Response**	**Year 1 2017**	**Year 2 2018**
1.1 To establish policy and strengthening of legal framework for effective weather and climate services	Weak cooperation from relevant stakeholders	high	Low	Avoidance		
				Reduction	V	V
				Sharing		
				Acceptance		
1.2 To strengthen Quality Assurance, Competence Assessment and Risk Management System to ensure quality and efficient weather and climate services.	Inability to migrate to ISO 9001-2015 Weak adherence to standards	high	low	Avoidance		
				Reduction	V	V
				Sharing		
				Acceptance		
1.3 To implement and enhance Agency monitoring and evaluation system.	Weak monitoring and evaluation capacity	moderate	medium	Avoidance		
				Reduction	V	V
				Sharing		
				Acceptance		
1.4 To strengthen resource mobilization strategies	Lack of a cost recovery framework	high	medium	Avoidance		
				Reduction	V	V
				Sharing		
				Acceptance		
1.5 To enhance regional and international cooperation in weather and climate services	Weak coordination with regional and international organizations	high	low	Avoidance		
				Reduction		
				Sharing	V	V
				Acceptance		
1.6 To enhance corporate governance and internal control	Low integrity of some staff	low	low	Avoidance		
				Reduction	V	V
				Sharing		
				Acceptance		

RISKS TO PROGRAMME/PROJECT AND POLICY INITIATIVES						
Programme/Project/Policy initiatives	**Risks**	**Impact**	**Probability**	**Mitigating Measure/Response**	**Year 2017**	**Year 2018**
1.7 To strengthen financial and procurement systems	Inefficiency of operation and service delivery (overly manual operation)	moderate	low	Avoidance		
				Reduction	V	V
				Sharing		
				Acceptance		
2.1 To strengthen, modernize and expand meteorological infrastructure for improved delivery of services	Below standard meteorological infrastructures by some stakeholders and Inadequate working environment	moderate	medium	Avoidance		
				Reduction	V	V
				Sharing		
				Acceptance		
2.2 To modernize the real time data monitoring, data exchange, processing and forecasting systems.	Inefficient operational capacity	low	moderate	Avoidance		
				Reduction	V	V
				Sharing		
				Acceptance		
2.3 To strengthen the capacity for calibration and maintenance of instruments and equipment	Weak compliance to standards	moderate	moderate	Avoidance		
				Reduction	V	V
				Sharing		
				Acceptance		
2.4 To strengthen the information and Communication systems for efficient service delivery	Inefficient operational capacity	high	medium	Avoidance		
				Reduction	V	V
				Sharing		
				Acceptance		
3.1 To develop the human resources capacity of TMA for efficient provision of services,	Weak capacity to deliver services	low	low	Avoidance		
				Reduction	V	V
				Sharing		
				Acceptance		
3.2 To enhance the capacity of Kigoma Meteorological Training Centre for professional training in meteorology and related courses	Inadequate infrastructure and human resources capacity	moderate	medium	Avoidance	V	V
				Reduction		
				Sharing		
				Acceptance		

3.3 To develop and implement Strategic Human Resource Plan and Welfare programmes for efficient service delivery	Inadequate human resources capacity	moderate	medium	Avoidance	V	V
				Reduction		
				Sharing		
4.1*:* To strengthen the production and delivery of quality weather and climate forecasts, warnings and information	Weak capacity to generate impact based forecasts and risk based warnings	moderate	low	Avoidance		
				Reduction	V	V
				Sharing		
				Acceptance		
4.2 To strengthen the provision of aeronautical and marine meteorological services.	Inadequate capacity to provide services as per ICAO and WMO requirements (staff competences)	Significant	Low	Avoidance		
				Reduction	V	V
				Sharing		
				Acceptance		
4.3 To enhance and sustain station networks operational environment	Inefficient operational capacity	moderate	low	Avoidance		
				Reduction	V	V
				Sharing		
				Acceptance		
4.4 To strengthen the provision of Hydro-meteorological and Agro-meteorological services	Weak capacity to deliver services	moderate	low	Avoidance		
				Reduction	V	V
				Sharing		
				Acceptance		
5.1 To strengthen the capacity for generation of tailor-made weather and climate services.	Weak capacity to generate sector specific tailor made products	moderate	low	Avoidance		
				Reduction	V	V
				Sharing		
				Acceptance		
5.2 To promote awareness and sensitization of the public and other stakeholders on use of weather and climate services for safety and socio economic benefit.	Low awareness of customers and public	high	moderate	Avoidance		
				Reduction	V	V
				Sharing		
				Acceptance		
5.3 To develop and implement framework for services delivery.	Weak coordination and efficiency for	moderate	low	Avoidance		
				Reduction	V	V
				Sharing		

	service delivery			Acceptance		
6.1 To strengthen capacity of TMA in research and application services.	Low data availability	moderate	moderate	Avoidance		
				Reduction	V	V
				Sharing		
				Acceptance		
6.2 To promote research for better understanding of weather and Climate systems, climate variability and change.	Limited understanding of climate variability and climate change	moderate	low	Avoidance		
				Reduction	V	V
				Sharing		
				Acceptance		
6.*3 To strengthen the capacity of TMA in Climate Data Management systems*	Weak capacity to deliver services	high	low	Avoidance	V	V
				Reduction		
				Sharing		
				Acceptance		

5.2 Communicating the Plan

A communication strategy, which will help TMA to effectively communicate the various aspects of the strategic plan, has been prepared. Part one consists of communication objectives, which are aligned to TMA core objectives, communication activities and an action Plan are presented as Table 9a.
The second part of the communication strategy consists of main audiences including the public, Government institutions, service users, development partners, staff and other stakeholders. Their requirements and means of communicating to them are provided in Table 9b.

Table 9a: Communication Objectives and Action Plan

Communication Objectives	Key Communication activities	Time frame	Budget In Tz Shs. Million
1.1: To seek the assistance and intervention of the Parent Ministry and relevant stakeholders for approval and implementation of newly established Meteorological Policy and Act	Write officially to the Parent Ministry and make follow up	June 2017	NIL
To urge Parent Ministry ensure weather and climate services requirement are reflected in relevant sector Policies	Write formally and meet officials of relevant sectors. Make follow up	June 2017	NIL
1.2:To seek the assistance and cooperation of employees on Quality Assurance, competence assessment and risk management	Write formally and hold meetings	June 2018	6.5
1.3: To urge management and employees implement and utilize a M&E system	Organize a seminar	December 2017	(Included in 1.2 above)
1.4: Request the Parent Ministry, Ministry of Finance and others to assist in allocation of more resource	Write official letters and make follow up	June, 2017	NIL
1.5: To seek cooperation and collaboration of relevant international bodies and countries on matters related to weather and climate	Correspond with relevant bodies and countries and put on TMA website	June 2017	NIL
1.6: To urge management and employees practice good governance	Organize a seminar	June 2017	3.8

1.7: Request the cooperation and assistance of employees and other stakeholders on modernizing financial, procurement and management systems	Hold meetings and write official letters	June, 2017	(Included in 1.2 above)
2.1: To inform and seek assistance of the Parent Ministry and relevant authorities on plans to improve TMA infrastructure and meteorological observation stations.	Make official correspondence and follow up. Put an advertisement in Government newspapers	June 2017	3.5
2.2: Inform relevant stakeholders TMA planned modernization of data monitoring, exchange, processing and forecasting systems	Make official correspondence and follow up. Put on TMA website Put an advertisement in Government newspapers	June, 2017	3.5
2.3: Inform employees about increasing the capacity for calibration and maintenance	Hold a meeting and write a letter	June, 2017	NIL
3.1: Inform and seek assistance of relevant authorities on human resources development	Make an official communication	December 2017	NIL
3.2: Inform relevant authorities on plans to strengthen the capacity of NMTC	Make formal contact and put on TMA website Advertise in Government newspapers	June, 2017	(Included 2.1 above)
3.3: To inform and seek assistance of relevant authorities on plans to have sufficient staff at all work stations	Write formally, put on TMA website.	June, 2017	NIL
4.1: Inform relevant stakeholders on TMA plans to improve capacity to deliver impact based forecasts and risk based warnings	Write formally to stakeholders and put on TMA website	December 2017	NIL
4.2: Inform aeronautical and marine authorities on planned	Write formally and put on TMA website	June 2017	NIL

improvement to deliver aeronautical and marine meteorological services			
5.1: Inform relevant customers and stakeholders on improvement of capacity to deliver tailor made services and products	Write formally and put on TMA website	December 2017	NIL
5.2: Inform the public and other stakeholders with a view of increasing awareness and use of TMA's services and products	Seek audience on radio and TV stations	December 2017	4.8
5.3: Inform relevant stakeholders on improved service delivery	Write formally and put on TMA website	June 2018	NIL
6.1: Inform the public and relevant stakeholders on increased use of TMA's climate change information to build resilience	Write formally and advertise in media channels	December 2017	4.8
6.2: Inform relevant stakeholders of TMA contribution on research on weather, climate variability and climate change	Write formally and put on TMA website	June 2018	NIL
TOTAL			**Tz 23.4**

Table 9b: Key stakeholders, requirements and means of communication

Stakeholders/Customers	Message examples/ Requirement	Means of communication	Frequency	Means of verification
General Public Agriculture & food Security Water Sector Disaster management organizations Mass media	**TMA Vision is** ***'To stand out as a centre of excellence in the provision of world class weather and climate and other related services thereby contributing to sustainable socio-economic development'***. **TMA Mission is** ***To provide quality, reliable, and effective weather and climate services thereby contributing to the safety and socio-economic well being of people and to the national development agenda.*** To provide accurate daily and seasonal weather forecasts, beginning and end of rains, forecasts of extreme weather conditions such as floods and droughts.	Media channels Press release Newsletter, bulletins, mobile phones Website	Daily, Dekadal, monthly, quarterly and seasonal	Carryout a survey. Make follow-ups. Responses
Ministerial Advisory Board. Employees and Workers council	Strategic Plan TMA Vision, Mission, Core values, Objectives, Goals	MAB Meetings and seminars TMA website	Quarterly and annually	Interviews and follow up

Construction sector Energy sector Mining, Gas and Oil exploration Sector Industrial sector Tourism sector	To provide weather and climate information for design and plan of projects and weather information for daily operations TMA Vision, Mission, Core values, Objectives, Goals	Website Conferences and workshops	Daily, monthly, seasonal	Follow up and responses
Ministry of Works, Transport and Communication Government Institutions	TMA Strategic Plan document and its implementation reports	Formal letter Website Meetings	Monthly, Quarterly, Annually	Follow up and responses
Environmental sector Health Sector	To provide meteorological information for impact assessment, Global warming and climate change and weather conditions for outbreak and control of diseases. TMA Vision, Mission, Core values, Objectives, Goals	Website Newsletter	Monthly Quarterly Annually	Follow up and response
WMO SADC and EAC Countries (NMHSs) International Organizations and professional societies	TMA Vision, Mission, Core values and Goals Strategic Plan document	Formal letter Website Meetings	Annually	Follow up and responses
Schools and Academic Institutions Universities and Research Institutions	To provide meteorological facilities, data and information for learning, teaching, research and development. TMA Vision, Mission, Core values and Goals	Website Meetings	Annually	Follow up and responses
Suppliers	To provide efficient and ethical PMS and	Website	Annually	Follow up

Private sector	adherence to Procurement Policies and Regulations and delivering timely and correct weather information for planning and running of businesses TMA Vision, Mission, Core values and Goals	Meetings and seminars Newsletter		Responses and inquiries.

5.3 Financing the Strategic Plan

The financing of the Strategic plan is expected to be mainly from three main sources of revenue highlighted in the following items.

5.3.1 Financing by the Government

The Government has been the major source of revenue for development as well as operational running costs of TMA. The Government has continued to do so in facilitating TMA to be able to provide public goods services such as establishing basic infrastructure for weather and climate monitoring as well as facilities for processing and generation of forecasts and warnings for the public. This source of revenue is expected to support about seventy percent (70%) of the budget requirement for implementing the Strategic Plan.

5.3.2 Financing by revenue accrued from cost recovery for provision of services

TMA undertakes cost recovery for provision of some services provided for commercial enterprises. Cost recovery is mainly undertaken with the understanding that the funds shall be used by the Agency to ensure the services are sustained and improved as necessary. This applies for the case of cost recovery revenue for provision of aeronautical meteorological services, marine services and other specialised services that require value added services. This source of income is expected to contribute about twenty five percent (25%) of the budget for financing the Strategic Plan.

5.3.3 Other Financing Sources

TMA obtains support in form of scholarships as part of human capacity development from development partners. This is expected to continue during the SP period. Furthermore, it is expected that TMA will continue to benefit from collaborative projects initiated to support Climate Change adaptation initiatives and those under coordination of AMCOMET and WMO among others. Such projects are expected to assist in enhancing human resource capacity, enhance monitoring and modelling capability of the Agency. Other sources are expected to contribute about five percent (5%) of the budget requirement.

5.4. Action Plan for implementation of the Strategic Plan

The Action Plan for the implementation of the TMA Strategic Plan for the period 2017/18-2021/22 has been developed with the costing based on available information on requirements and pricing of various items. A total resource requirement is estimated at Tanzania Shillings 85,495,000,000.

A summary of resource requirements for the implementation of the TMA Strategic Plan 2017/18-2021/22 is given in table 9**.** A detailed Action Plan is attached to this report as Annex 4**.**

Table 9: Summary of resource requirements for the implementation of interventions to achieve various goals of the TMA Strategic Plan.

Goal No.	Strategic Goal	Resource requirements in Million Tz Shs.
1.	**Efficient functioning of the Organization realized to deliver quality and reliable services.**	3,540
2.	**Modernization of infrastructure achieved to support delivery of efficient and reliable services**	55,095
3.	**Human resources capacity enhanced to provide efficient services**	14,775
4.	**Quality weather and climate forecasts and information produced and delivered to meet stakeholders' needs**	3,120
5.	**The public and other stakeholders informed to realize the safety and social economic benefits of weather and climate services**	1,695
6.	**Research and climate change science issues addressed for climate resilient development and adaptation to climate change.**	7,270
7.	**Grand Total**	**Tz Shs million 85,495**

6. MONITORING AND EVALUATION

6.1 Monitoring

In order for TMA to be able to systematically and continuously collect information to assess progress and demonstrate results of implementation of the Strategic Plan, and perform measurement on the progress a monitoring and evaluation framework has been developed. It is expected that its use will enhance transparency and accountability in a Results Based Management (RBM) approach.

A Performance Measurement Framework for TMA comprises of an assessment of the achievement of expected results using various basic elements including: indicators; baseline; targets, verification data sources and their collection methods, frequency of measurement and responsible persons. A detailed performance framework matrix is included in the Plan as Annex 5.

The function of coordinating the monitoring of implementation of the Strategic Plan falls under the Planning, Monitoring and Evaluation Unit, responsible for ensuring that the framework is operational throughout the Strategic Planning Period. It is recommended that each Director of Division will be responsible for monitoring the overall strategies relevant to their division in collaboration with the M&E unit.

6.2 Evaluation

The evaluation components are included within the Performance Measurement Framework referred to under item 6.1 above. The Agency expects to acquire a suitable Monitoring and Evaluation Software tool to facilitate the efficient implementation of this important function. Ideally the evaluation shall be done at the end of the five year period, though more regular reviews annually and mid-term evaluation are also useful to assess how efficient the goals are being met and provide room for revision where deemed necessary.

6.3 Reporting

TMA will make Results-Based Reporting using the Performance and Monitoring Framework developed. Progress made towards expected results will be captured using selected indicators and against the baseline.

The frequency of the monitoring reports shall be quarterly while the evaluation reports shall be at mid-term and at the end of the five-year period.

The responsibility of coordinating the reporting falls under the office of the Planning, Monitoring and Evaluation Unit who will liaise with Divisional Directors in undertaking this responsibility. The reports shall include: part of Progress reports to the MAB (quarterly) and Annual reports.

7. ANNEXES

ANNEX 1: STRATEGIC PLANNING PROCESS METHODOLOGY

1. Strategic Planning Methodology

The methodology and schedule of activities for the development of the Strategic Plan for TMA for the period 2017/18- 2021/22 are detailed in the following sections.

1.1 Data collection and review of documents

The methodology for undertaking the assignment includes a desk study whereby relevant documents from TMA, WMO, Government and other sources were reviewed. Key documents include: Tanzania Meteorological Agency Strategic Plans 2010- 2013 and 2013 – 2016; Annual Business Plans and Progress Reports for the relevant period; Stakeholder assessment Reports; other relevant international, regional and national Strategies such as the United Nations Sustainable Development Goals (UNSDG), WMO Strategy 2016-2019, AMCOMET Integrated Strategy for Africa, Meteorological Association of Southern Africa (MASA) Strategic Plan, EAC Climate Change Strategy, SADC Regional Infrastructure Development Master Plan -RISDP 2012-2027, MKUKUTA, National Vision 2025 and National Five Year Development Plan (FYDP II). 2016/17 – 2020/21.

It also includes consultations with key stakeholders from within and outside the TMA in order to establish policy directives, the current status, identify challenges and capacity gaps and propose/develop strategies to address them taking into account of stakeholders' views. An evaluation of the implementation of the previous Strategic Plans was conducted and the recommendations arising have been used in the development of this Plan. A structured questionnaire has been developed to assess the functioning of basic infrastructure and systems components and other services of TMA. A series of Interviews and meetings with management and staff of TMA as well as stakeholders were undertaken as necessary in order to ensure the strategy process is well informed and owned by relevant players on important aspects of the SP.

1.2 The Strategic Planning Phases

The assignment was undertaken in three major phases as follows:

a) **The preparatory phase** which was mainly associated with the: establishment of the strategic planning process. This phase included meetings with the Management Team to identify the SP Team obtain relevant documents for review and agreeing on the proposed work plan and ensure availability of resources to support the development processes. During this phase it was also agreed that the Strategic Plan be developed along the Theory of Change Model.

b) **The Assessment and Analysis Phase**, which entailed looking inside and outside the organization to assess the level of availability of infrastructure, equipment and tools as well as human resources capacity to establish the gaps and development, needs required for delivery of services. It also involved the assessment of the impacts of the prevailing and foreseen environment and other factors that are likely to influence the performance of the organization. The following tools have been used for Assessment and Analysis Phase: Strengths, Weaknesses, Opportunities and Challenges (SWOC) Analysis; Political, Economic,

Social, Technological, Legal and Environmental (Ecological) PESTLE Analysis and Stakeholders Assessment.

c) **The Design Phase** which involves developing of the Strategic Plan using the Guidelines and template provided by WMO whereby after the assessment phase the Organizational Vision, Mission and Core Values are developed and agreed upon followed by developing a Strategic framework for the Agency and its Monitoring and Evaluation framework.

1.3 Specific Tasks of the planning process

1.3.1 The assignment was undertaken through implementation of the following specific tasks:

i. Identifying and documenting the existing and required priority products and services that meet sectoral and user needs (i.e. agriculture and food security, water resources, public health, energy generation, DRR, among others).

ii. Identifying key stakeholders required in order to develop and deliver better weather and climate services (within and outside government – i.e. Ministry of Agriculture, Water, etc.), including the private sector, academia, NGOs and local communities).

iii. Based on the identified products and services, prepare, plan and undertake capacity needs assessment and identify the NMHSs human, infrastructural, institutional and governance, fiscal and legal capacity needs to provide a good understanding of the gaps that exist in the development of weather and climate services.

iv. Analyzing the findings of the capacity needs assessment and providing a report (a) outlining key gaps that exist and (b) how it should engage with key stakeholder identified to help the NMHS improve its delivery of key products and services that meet sectoral and user needs.

v. Identifying an institutionalized mechanism at the national level to coordinate in a systematic manner the elements that pertain to the entire value chain for the production, delivery and application of weather and climate services (frameworks at the national level) and facilitate discussion thereof to ensure a streamlined approach involving all stakeholders;

vi. Assessment and making recommendations on funding issues and sustainability, including Development of non-government revenue streams (from commercial products, transformation to facilitate cost recovery, for example).

vii. Based on the NSP, develop current and future investment plans, for support from the national government and development partners setting out where these might be complementary.

viii. Liaising with desk offices at Ministries of Planning and Economic Development and Finance, respectively on how to incorporate TMA services into country priorities for government funding.

ix. Formulating concrete recommendations and actions, which clearly indicate how the recommendations and actions will contribute to major strategies and agendas in the country so as to show the relevance of investments.

ANNEX2: MEMBERS OF THE STRATEGIC PLAN PREPARATION TEAM

The Strategic Planning process Team comprised of 10 core Members as listed below:

No.	Name	Designation	Role	Contacts
1.	Dr. Agnes Kijazi	Director General	Chairperson	agnes.kijazi@meteo.go.tz
2.	Dr. Pascal Waniha	Director Technical Services	Assistant Team-Leader	pascal.waniha@meteo.go.tz
3.	Dr. Hamza Kabelwa	Director Forecasting Services	Member	hamza.kabelwa@meteo.go.tz
4.	Dr. Ladislaus Chang'a	Director Research and Applied Meteorology	Member	ladislaus.changa@meteo.go.tz
5.	Mr. Laurent Shauri	Director Support Services	Member	laurent.shauri@meteo.go.tz
6.	Mr. Mohamed Ngwali	Director of Zanzibar Office	Member	Mohamed.ngwali@meteo.go.tz
7.	Mr.Kassim A. Kassim	Manager Internal Audit TMA	Member	kassim.kassim@meteo.go.tz
8.	Mr.Samwel Mbuya	Manager Forecasting Services	Member	samwel.mbuya@meteo.go.tz
9.	Mr.Selemani A. Selemani	Economist	Member	selemanis@yahoo.com
10.	Mr. Kidimwa S. Kidimwa	Manager Planning and Monitoring	Secretary	kidimwa.kidimwa@meteo.go.tz
11.	Mr.Philbert F. Tibaijuka	WMO Consultant	Consultant	tibaijukap@yahoo.com

ANNEX 3: LIST OF PERSONS /ORGANISATIONS CONSULTED

TMA staff consulted as part of Internal Institutional Survey			
No.	**Name**	**Title**	**Institution**
1	Mr. Emmanuel J. Mtenga	Manager Legal Services	TMA
2	Mrs.Tumaini Hiluka	Manager Procurement and Supplies	TMA
3	Mr. Wilbert Timiza Muruke	Manager International Affairs	TMA
4	Mr. Michael R.Ntagazwa	Manager Finance and Accounts	TMA
5	Mr.Tunza Sanane	International Affairs Officer	TMA
6	Mr.Deogratius Kambalile	Internal Audit	TMA
7	Mr. Wilberforce Kikwasi	Acting Manager Forecasting Services	TMA
8	Mr. John W. Mayunga	Manager Marine and Aeronautical Services	TMA
9	Eng. Jane Olotu	Manager Technical Services	TMA
10	Mr. Emmanuel T. Kidebwana	Manager Information Communication Technology(ICT)	TMA
11	Mrs.Hellen Msemo	Manager Network Operation	TMA
12	Mrs. Mariam Is-haaq	Manager Human Resources	TMA
13	Mrs. Rosemary Mchihiyo	Manager Training/Acting Manager Public Relations	TMA
14	Mrs.Janeth Loning'o	Manager Climate Change and Climatology	TMA
15	Dr.Hashim J. Ngongolo	Manager Environment and Research	TMA
16	Mr.Jullen Mwanyilu	Acting Manager Agromet and Hydrometeorology	TMA
17	Mr. Gabriel Migire	Director Policy and Planning	Ministry of Works, Transport and Communications
18	Mr.Geofrid Chikojo	Manager Quality Assurance and Network Planning	TMA
19	Hafia J Bakari	Meteorologist	TMA ZANZIBAR
20	Khamis Salim Khamis	Engineer	TMA ZANZIBAR
21	Said K Said	Meteorologist	TMA ZANZIBAR
22	Ms Shariffa Masoud	Regional Officer	TMA Coast Region

Organisations involved in TMA stakeholder consultative meetings and user surveys		
No	Organisation	Contact
1.	Ministry of Works Transport and Communications	Holland House, Samora Avenue P. O. Box 9423, Dar es Salaam Telephone: +255 22 2123936
2.	Tanzania Civil Aviation Authority	P.O. Box 2819, Dar es Salaam, Tanzania Tel: (255) 22 2198196, Fax: (255) 2844304 Email: tcaa@tcaa.go.tz
3.	Tanzania Airports Authority	Julius Nyerere Int. Airport, Terminal 1, P.O. Box 18000, Dar es Salaam +255 22 2842402/3 Email: info@airports.go.tz
4.	Tanzania Government Flight Agency	P.O. Box 1493, Dar Es Salaam +255 (22) 2138638 / +255 (22) 2124895
5.	Tanzania Air Operators Association	Head Office: P.O. Box 364, Dar es Salaam, Tanzania info@taoa.co.tz Phone:+255 754 334 072
6.	Precision Air	Samora & Pamba Road NIC Building ground floor. Tel:+255 22 2121718,
7.	SwissportTanzania Plc.	P.O. Box 18043, Terminal II, Julius Nyerere International Airport, Dar es Salaam, Tanzania.
8.	Kenya Airways	Viva Towers 1st Floor Ali Hassan Mwinyi Road Dar es Salaam Tanzania +255 22 216 3917 & 8
9.	KLM Royal Dutch Airline	KLM Tel: + 255 22 216 3914
10.	Ethiopian Airlines	T.D.F.L Building, Upanga street, Dar Es-Salaam, dares@ethiopianairlines.com
11.	Ministry of Agriculture, Livestock and Fisheries	Kilimo Dar es Salaam Tanzania P.O Box 9192, Dar es Salaam, Tanzania
12.	Ministry of Water and Irrigation	Maji Ubungo, P.O. Box 9153, Dar es Salaam E-mail: ps@maji.go.tz
13.	Ministry of Energy and Minerals	P. O. Box 2000 Dar es Salaam, Tanzania Tel:+255 22 2117156
14.	Ministry of Health, Community Development, Gender, Seniors and Children	Kivukoni Front, P.O. Box 3448, Dar es Salaam, Tanzania. Tel +255 22 2111459 E-mail ps@mcdgc.go.t

15.	Ministry of Natural Resources and Tourism	Mpingo House,40 Nyerere Road, 15472, Dar es Salaam, Tanzania Email: ps@mnrt.go.tz
16.	TANESCO	+255 022 2451130/38, Email:info@tanesco.co.tz
17.	Rural Energy Agency – (REA)	Mawasiliano Towers, 2nd Floor Sam Nujoma Road P. O. Box 7990,Dar es Salaam, Tanzania Tel: +255 22 2412001 Email: info@rea.go.tz
18.	Tanzania Renewable Energy Association (TAREA)	P.O. Box 32643 Dar es Salaam Tanzania Tel: +255-784-99 37 55 Email: info@tarea-tz.org
19.	Tanzania Petroleum Development Corporation (TPDC)	P.O. Box 2774/5233, Dar es Salaam Tel: +255 22 2200 103/4 | Fax: +255 22 2200 113 Email: info@tpdc-tz.com
20.	SONGAS	P. O. Box 6342,Dar es salaam Tanzania T: +255 22 245 2160 e: songas.info@songas.com
21.	Disaster Management Dept.PMO	P. O. Box 3021, Dar Es Salaam
22.	Department of Environment VPO	P. O. Box 5380, 11406 Dar es Salaam, Tanzania Tel. No. : + (255) 22 2113857 Email: ps@vpo.go.tz
23.	Tanzania Red Cross Society	Head Office, Plot No. 53, Block C Mikocheni, Old Bagamoyo Road, P.O.Box 1133 Dar Es Salaam.
24.	Tanzania Broadcasting Corporation (TBC)	P.O.BOX 9191, Dar es Salaam - Tanzania info@tbc.go.tz +255 (0) 22 2860760/7 +255 (0) 22 2700062
25.	ITV	PO BOX 4374 Dares Salaam Email: info@itv.co.tz
26.	CHANNEL 10	.. P.O. Box 19045, Jamhuri/Zaramo Street Dar es Salaam, Tanzania.
27.	STAR TV	P.O. BOX 1732, Post Road. Mwanza, Tanzania. Tel:+255-28-2503262 E-mail:marketing@startvtz.com
28.	STANDARD NEWS PAPERS	P.O.Box 9033 DAR ES SALAAM 255 Tanzania Email: info@tsn.go.tzPhone: +255 22 286 4864

ANNEX 4: ACTION PLAN FOR 2017/18-2021/22

Result Area 1 (Outcome1. 1): A well-managed institution providing improved weather and climate services **Key Indicators:** Level of satisfaction with weather and climate services of the public and other stakeholders				
Outputs	**Activities**	**Time Frame (begin by, completed by)**	**Person responsible**	**Costs/Inputs In Million Tz Shs.**
Output 1.1.1: Meteorological Policy and Act in place	**Activity 1.1.1.1:** Develop draft proposal of Meteorological Policy and Meteorological Services Act **Activity 1.1.1.2:** Engage internal stakeholders in the formulation of draft proposal of Meteorological Policy and New Meteorological Services Act **Activity 1.1.1.3:** Provide awareness on implementation of Policy and Act	July 2017-March 2018 July 2017-March, 2018	DG	60 20 20
Output 1.1.2: Policy Implementation Strategy and Act Regulations in place	**Activity 1.1.2.1:** Develop draft proposal of Meteorological Policy Implementation Strategy and Meteorological Services Act Regulations **Activity 1.1.2.2:** Engage internal stakeholders in the formulation of draft proposal of Meteorological Policy Implementation Strategy and Meteorological Services Act Regulations **Activity 1.1.2.3:** Provide awareness on Policy Implementation Strategy and Meteorological Services Act Regulations.	July, 2017 - March 2018	DG	60 20 20
Output 1.1.3: Weather and climate issues mainstreamed into relevant sectors.	**Activity 1.1.3.1:** To conduct awareness programs for stakeholders in mainstreaming weather and climate services in their socio-economic activities.	July 2017-June 2019	DG	50

	Activity 1.1.3.2: Establish Service Level Agreement and MoUs with relevant stakeholders.			
Output 1.1.4 National Meteorological Policy and Meteorological service Act implemented	**Activity 1.1.4.1:** To oversee implementation of the Meteorological Policy and Meteorological service Act	June 2021	DG	20
			Sub Total	**270**
Result Area 1 (Outcome 1.2): Improved quality assurance and competence of staff **Key Indicators:** ISO Certification and number of competent staff				
Output 1.2.1: ISO 9001-2015 Certification attained	**Activity 1.2.1.1** Develop and implement a Plan to Migrate to ISO 9001-2015 standards **Activity 1.2.1.2** Organize a QMS external Audit for certification	September 2018.	DG-MQRM	100 50
Output 1.2.2 Competent personnel as per WMO Standards in place	**Activity 1.2.2.1** Conduct Competence Assessment for all relevant categories of human resource	July 2017-June 2021	DG-MQRMA	40
Output 1.2.3 Increased scope of Aeronautical Meteorological services Quality Management System	**Activity 1.2.3.1:** To expand Aeronautical Meteorological services Quality Management System to other remained Airports. **Activity 1.2.3.2:** To establish Marine Meteorological services Quality Management System.	July, 2017-June 2021 June, 2021	DG DG	170 100
Output 1.2.4 Increased Efficiency of operations and service delivery	**Activity 1.2.4.1** Establish and implement a Risk Management System	July 2017-June 2021	DG	60
			Sub Total	**520**
Result Area1.: (Outcome1.3): Improved decision making and plans implementation performance **Key Indicators:** Timeliness and compliance with regulations and agreements				
Output 1.3.1: Improved management of resources	**Activity 1.3.1.1** To develop and implement the planning and budgeting System for resource management	July 2017-June 2021	DG- MPM	100

Output 1.3.2: Monitoring and Evaluation System strengthened	**Activity 1.3.2.1** Operationalize and sustain monitoring and Evaluation System	July 2017-December 2018	DG- MPM	100
			Sub Total	**200**
Result Area 1: (Outcome 1. 4) Increased availability of financial resources **Key indicators:** Number of implemented projects and amount of financial resources				
Output 1.4.1: A resource mobilization plan in place and increased resources availability	**Activity 1.4.1.1** To develop and implement a resource mobilization plan	October 2017-June 2021	DG-MPM	50
Output 1.4.2: Joint operation in programs related to meteorological infrastructures	**Activity 1.4.2.1** To engage stakeholders in mainstream weather and climate services in their priority plans.	October 2017-June 2021	DG-MPM	100
Output 1.4.3: Cost Recovery Framework sustained and operationalized	**Activity 1.4.3.1** Develop and implement a cost recovery framework for services.	July 2017-June 2019	DG-MPM	100
Output 1.4.4: Capacity of resource mobilization improved and increased revenue	**Activity 1. 4.4.1** Develop and implement a resource mobilisation strategy for TMA	July 2017-June 2018	DG-DSS	50
			Sub Total	**300**
Result Area1: (Outcome 1.5) Improved cooperation, partnership and gains from collaborative programmes. **Key Performance Indicators:** number of collaborations and projects at all levels.				
Output 1.5.1: Broader Network of partnerships and enhanced technical cooperation.	**Activity 1.5.1.1:** Improve partnerships with, countries, organizations and universities to collaborate in relevant programmes: i) Ratify protocols and engage in relevant MoUs for enhancement of partnerships with relevant institutions. ii) Participate in meetings/activities of various organizations where Tanzania is a Member.	July 2017-June 2021	DG-MIA	50 600
Output 1.5.2: Enhanced regional and international data and products exchange	**Activity 1.5.2.1** Undertake data and products exchange regionally and international	June 2021	DFS	100

Output1. 1.5.3: international obligations fulfilled	**Activity 1.5.3.1** Pay contributions to Organisations such as WMO, MASA and others.	June 2021	DG-MIA	600
			Sub Total	**1,350**
Result Area 1: (Outcome1. 6): Enhance control culture and organisation efficiency **Key performance Indicators:** Compliance to Agency Audit Charter				
Output 1.6.1: Improved efficiency and accountability in resources utilization	**Activity 1.6.1.1:** Develop and implement a risk based internal Audit Plan **Activity 1.6.1.2:** Implement oversight and control system	July 2017-June 2021 July 2017-June 2021	DG- MIA DG-MIA	300 100
			Sub Total	**400**
Result Area1: (Outcome 1.7): Improved efficiency in service delivery **Key Performance indicators**: Timelines in service delivery and compliance to Finance and procurements Acts				
Output 1.7.1: Efficient Procurement management Systems in place	**1.7.1.1** Enhance and Operationalize Procurement Management System,	December 2018	DG-MPS	300
Output 1.7.2: Efficient financial Management Systems in place	**1.7.1.2** Enhance and Operationalize Financial Management information System		DG-MFA	200
			Sub-total	**500**
			Total 1	**3,540**

Result Area 2: (Outcome2.1) Improved working environment and increased availability of data **Key Performance Indicators:** Number of established, rehabilitated and maintained stations.				
Output 2.1.1: CFO **own building** in place for improved services	**Activity 2.1.1.1:** Construct Central Forecasting Office **own** building	July 2017-December 2020	DG-DTS	20,000
Output 2.1.2 Increased number of modern meteorological observing stations	**Activity 2.1.2.1:** Revive 2 Upper Air Stations **Activity 2.1.2.2:** Establish 50 AWS and 3 manned stations **Activity 2.1.2.3:** Establish 10 Lightning Detection Stations **Activity 2.1.2.4:** Install 100 Automatic rainfall stations and receiving data server **Activity 2.1.2.5:** Replacement of mercury based instruments	July 2017-June 2021	DTS	10,000 400 1,265 800 1,000
Output 2.1.3 Fixed Buoys operating in the Indian ocean	**Activity 2.1.3.1.** Acquisition of 1 Mooring/Fixed Buoys in South West Indian Ocean in the Tanzania waters.	July 2017-December 2019	DTS/DFS	3,000
Output 2.1.4 Strengthened Radar Network	**Activity 2.1.4.1.** Establish 2 Weather and Ocean Radar stations	July 2017-December 2019	DTS/DFS	7,000
Output 2.1.5 Established Meteorological Satellite receiving centre	**Activity 2.1.5.1.** Collaborate with the WMO/AMCOMET to establish Country phase I Meteorological Satellite Receiving Centre.	July 2017-December 2019	DTS/DFS	5,000
			Sub Total	**48,465**
Result Area 2: (Outcome 2.2) Improved access to timely weather and climate information and quality of forecasts **Key Performance indicators:** Improved access to timely weather and climate information and quality forecasts				
Output 2.2.1: Modern real time data monitoring system in place	**Activity 2.2.1.1** Develop and Operationalize modern real time data monitoring system	July 2017-December 2020	DTS/DFS	1800

Output 2.2.2 Modern Plotting, analysis and packaging system Operationalized	**Activity 2.2.2.1** Acquire modern automated technologies for plotting, analysis and packaging.	July, 2017 June, 2018	DTS&DFS	140
Output 2.2.3 Modern data exchange systems in place	**Activity 2.2.3.1** Acquire and maintain modern data exchange systems	July 2017-December 2020	DTS/DFS	500
			Sub Total	**2,440**
Result Area 2: (Outcome 2.3): Improved efficiency using standard equipment, instruments and quality working tools **Key Performance Indicators:** Percentage of increase in accuracy of forecasts				
Output 2.3.1 Calibration equipment and calibrated meteorological instruments in place	**Activity 2.3.1.1** Acquire and Operationalise calibration instruments for wind and temperature parameters at TMA workshop. **Activity 2.3.1.2** Undertake calibration and maintenance of meteorological equipment and instruments	June 2019	DTS	1,290
Output 2.3.2 Improved capacity of Fabrication and maintenance of meteorological instruments	**Activity 2.3.2.1** Acquire modern equipment for fabrication and maintenance of meteorological instrument	July 2017-June 2021	DTS	400
Output 2.4.1 Modern information and communication technology systems in place	**Activity 2.4.1.1:** Establish and manage modern information and telecommunication systems **Activity 2.4.1.2:** Phase I establishment of fibre network connectivity and maintain internet back-up for operational purposes **Activity 2.4.1.3:** Acquire and maintain sophisticated operational software for efficient service delivery.	June 2019	DTS&DFS, DRA	300 2000 200
			Sub Total	**4,190**
			Total 2	**55,095**

Result Area 3: (Outcome 3.1): Improved capacity to deliver services **Key Performance Indicators:** Level of customer satisfaction				
Output 3.1.1: Competent human resources increased and sustained	**Activity 3.1.1.1** Update and implement Agency training programme. **Activity 3.1.1.4** Facilitate human resource and safety compliance Audit	July 2017-June 2020	DSS MTG	1,515
Output 3.1.2 Succession plan in place	**Activity 3.1.2.1** Develop and implement a succession plan for the TMA	October 2017-June, 2018	DSS	60
			Sub Total	**1,575**
Result Area 3 (Outcome 3.2) Increased number of meteorological professionals **Key Performance Indicators:** Number of trained professional staff				
Output 3.2.1 Improved training system at Kigoma Meteorological Training Centre	**Activity 3.2.1.1** Build capacity of the Kigoma Meteorological Training Centre.	July 2017-June 2020	DSS-MTG&PRINCIPAL	1,500
Output 3.2.2 Improved Infrastructure and tools at Kigoma Training Centre	**Activity 3.2.2.1** Conduct Kigoma Training Centre improvement feasibility study **Activity 3.2.2.2** Establish and implement infrastructure development Plan of Kigoma Training Centre **Activity 3.2.2.3** Rehabilitate and maintain existing buildings at Kigoma Training Centre	July 2017-June 2020 July 2017-June 2020 July 2017-June 2018	DSS-MTG&PRINCIPAL&MPM	50 1,200 300
Output 3.2.3 Increased number of short and long term diversified programs	**Activity 3.2.3.1** Establish long and short term meteorological related programs	July 2017-June 2020	DSS-MTG&PRINCIPAL	100
			Sub Total	**3,150**

Result Area 3 (Outcome 3.3) Increased organisational efficiency **Key Performance Indicators**				
Output 3.3.1 Availability of adequate and motivated staff	**Activity 3.3.1.1** Conduct a staff needs assessment for all stations and operational offices and relocate staff to fill gaps	July 2017-June 2020	DSS-MHR	50
	Activity 3.3.1.1 To enhance the Agency capacity to recruit and retain multidisciplinary human resources staff.	July 2017-June 2020	DSS-MHR	10,000
			Sub Total	**10,050**
			Total 3	**14,775**
Result Area4. (Outcome 4.1): Improved capacity to deliver impact based forecasts and risk based warnings **Key Performance Indicators:** Availability of impact based forecasts and risk based warnings				
Output 4.1.1 Impact-based weather and climate forecasts and risk-based warnings strengthened	**Activity 4.1.1.1** Develop and implement the production of impact-based weather and climate forecasts and warnings.	July 2017-June 2019	DFS	500
	Activity 4.1.1.2 Strengthen application capacity of Numerical Weather Prediction (NWP) modelling and post processing.	July 2017-June 2019	DFS	300
Output 4.1.2 Operational MHEWS in place	**Activity 4.1.2.1** Develop and implement a Multi-Hazard Early Warning System (MHEWS)	July 2017-June 2019	DFS	50
	Activity 4.1.2.2 Establish and maintain Procedures (SOPs) for impact-based and risk-based warnings.	July 2017-June 2019	DFS	50
			Sub Total	**900**
Result Area 4: (Outcome 4.2) Improved capacity to deliver aeronautical and marine meteorological services **Key Performance Indicators:** Number of stations providing briefing services for aviation and marine services				
Output 4.2.1 Competent staff and quality Aeronautical Meteorological services sustained.	**Activity 4.2.1.1** Enhance supervision and conduct frequent on-job trainings	July 2017-June 2019	DFS	20
	Activity 4.2.1.2 Introduce Meteorological briefing services at 5 Airports of Musoma,	July 2017-	DFS	100

	Kigoma, Tabora, Shinyanga and Pemba.	June 2019		
Output 4.2.2 Quality Marine meteorological services provided	**Activity 4.2.2.1** To improve and sustain marine meteorological services **Activity 4.2.2.2** Introduce marine meteorological services at 5 Major Ports of Pemba, Tanga, Mtwara, Musoma and Bukoba.	July 2017-June 2019 July 2017-June 2019	DFS DFS	200 150
Output 4.2.3 Oversight safety assessment completed	**Activity 4.2.3.1** Conduct Aeronautical Meteorological safety oversight assessment	July 2017-June 2021	DFS	100
Result Area 4: (Outcome 4.3) Increased data availability and users of products **Key Performance Indicators:** Number of operational stations and users				
Output 4.3.1 Efficient Meteorological station operations	**Activity 4.3.1.1** Establish and maintain conducive environment for both Synoptic and Agro-meteorological stations operations	July 2017-June 2021	DRA	1,500
Result Area 4: (Outcome 4.4) Hydrometeorological and Agrometeorological services improved **Key Performance Indicators: Number and quality of products/bulletins**				
Output 4.4.1 Specialized Hydro-meteorological and Agro-meteorological services in place	**Activity 4.4.1.1** Develop specialized Hydro-meteorological and Agro-meteorological services and products **Activity 4.4.1.2** Develop and implement flood monitoring guidance products. **Activity 4.4.1.3** Collaborate with Ministry responsible for Agriculture to establish Agro-meteorological stations in Agricultural Research Institutions. **Activity 4.4.1.4** Develop competence of staff in production of specialized Agro- and Hydro-Meteorological services.	July 2017-June 2021 July 2017-June 2021 July 2017-June 2021 July 2017-June 2021	DRA DRA DRA DRA	100 30 NIL 20
			Sub Total	**2,220**
			Total 4	**3,120**

Result Area 5. (Outcome 5.1): Improved capacity to deliver tailor made services and products **Key Performance Indicators:** Types and number of tailor made services and products, level of customer satisfaction				
Output 5.1.1 Improved data management	**Activity 5.1.1.1** To conduct data Rescue and management for non-real time data	July 2017-June 2018	DRA	150
Output 5.1.2: Packaged Tailor made products in place	**Activity 5.1.2.1** Tailor made products generation and packaging experts training	July 2017-June 2018	DFS&DRA	150
	Activity 5.1.2.2 Acquisition of tools and software for tailor made products generation and packaging	July 2017-June 2021	DFS&DSS	150
	Activity 5.1.2.3 Establish and operationalize a Product Development Service			
Output 5.1.3: Competent staff in place and improved dissemination of tailor made meteorological services and products.	**Activity 5.1.3.1** Modernize CFO weather studio including facilities for teleconference.	July 2017 – June 2018	DFS	200
	Activity 5.1.3.2: Establish a weather studio at Zanzibar TMA offices.	July 2017 – June 2018		200
	Activity 5.1.3.3 Provide capacity to staff on PWS packaging and dissemination	July 2017 – June 2018		
			Sub Total	**850**
Result Area 5 (Outcome 5.2): Increased demand and uptake of weather and climate services **Key Performance Indicators:** Number of customers and level of public awareness				
Output 5.2.1: Increased awareness on the use of TMA's services	**Activity 5.2.1.1:** Carryout awareness and sensitization campaigns for stakeholders.	July 2017-June 2021	DFS&DSS	15
	Activity 5.2.1.2: Conduct annual self-assessment	July 2017-	DSS	160

	programmes and service delivery surveys. **Activity 5.2.1.3:** Carry out two Climate Change awareness seminars for Decision Makers and 100 secondary schools **Activity 5.2.1.4:** Participate effectively in national and international Commemorations and exhibitions **Activity 5.2.1.5:** Develop and implement Service Level agreements	June 2021 July 2017-June 2021 July 2017-June 2021 July 2017-June 2021	 DRA DRA DRA	 20 250 50
Output 5.2.2: Increased media channels and frequency of dissemination	**Activity 5.2.2.1:** Expand dissemination by increasing frequency of dissemination and engagement more media including community radios.	July 2017-June 2019	DFS&DSS	280
			Sub Total	**775**
Result Area 5: (Outcome 5.3): Improved services delivery mechanism **Key Performance Indicators:** Number of Customers and availability of service delivery strategy				
Output 5.3.1: Service Delivery Framework in place	**Activity 5.3.1.1:** Facilitate implementation of the National Framework for Climate Services (NFCS) **Activity 5.3.1.1:** Develop and implement a Service Delivery Strategy	July 2017-June 2018 July 2017-June 2018	DG&DFS&DRA DSS&DFS	30 40
			Sub Total	**70**
			Total 5	**1,695**

Result Area 6. (Outcome 6.1): Increased use of TMA's climate change information to build resilience **Key Performance Indicators:** Number of Climate Change impacts assessments issued				
Output 6.1.1: Improved visibility in climate change research and application	**Activity 6.1.1.1:** Strengthen the capacity of climate change monitoring, modelling and research	July 2017-June 2021	DRA, DTS& DFS	200
	Activity 6.1.1.2: Improve the Database Management system	July 2017-June 2019	DRA	100
	Activity 6.1.1.3: Conduct multi-disciplinary research on climate change	July 2017-June 2021	DFS/DRA	100
	Activity 6.1.1.4: Build capacity in climate and climate change monitoring tools	July 2017-June 2021	DFS/DRA	70
	Activity 6.1.1.5: Develop tools for climate change monitoring	July 2017-June 2021	DFS/DRA	100
Output 6.1.2: Increase uptake of climate research information and products	**Activity 6.1.2.1:** Carry out climate change public awareness through seminars and workshops	July 2017-June 2021	DRA	100
	Activity 6.1.2.2: Facilitate internal use of research findings to improve the Agency's quality services	July 2017-June 2021	DRA	50
Output 6.1.3 Improved knowledge through collaborative research	**Activity 6.1.3.1** Develop and implement collaborative research projects on weather and climate and applications	July 2017 –June 2021	DRA	5,000
Result Area 6. (Outcome 6.2): Enhanced use of weather and climate data and information for climate resilient development and adaptation. **Key Performance Indicators:** *Level of use and understanding of weather and climate information*				
Output 6.2.1: Increased research in meteorology and related field.	**Activity 6.2.1.1:** Conduct research in meteorology, climatology, Agrometeorology, and other related fields	July 2017-June 2021	DRA	200
Output 6.2.2: Research findings	**Activity 6.2.2.1:** Develop efficient research	July 2017-	DRA	500

and publications disseminated and available for use.	dissemination platform (e.g web, electronic library)	June 2021		
Result Area 6. (Outcome 6.3): Enhanced quality and accuracy of climate data and products and availability of climate change products **Key Performance Indicators:** *Number of stations and parameters digitized, climate products generated and published and customers served with climate data*				
6.3.1 Improved data base management systems	Activity 6.3.1.1: Procure data base management facilities including software and computers Activity 6.3.1.2: Organize training for 15 staff on Data Base Management system	July 2017 – June 2021	DRA	100 50
6.3.2 Increased quality of generated of climate products	Activity 6.3.2.1: Perform data quality control for rainfall and temperature for 28 stations Activity 6.3.2.2: Organize training for 15 staff on data quality control and generation of products	July 2017 – June 2021	DRA	100 100
6.3.3 Improved data backup systems and availability of easily accessible quality data in digital format	Activity 6.3.3.1: Prepare and implement a comprehensive backup system Activity 6.3.3.2: Update and Operationalize the data rescue strategy Activity 6.3.3.3: Digitize rainfall, temperature, soil moisture, wind, pressure, rainfall intensity	July 2017 – June 2021	DRA	300 50 150
Total 6				**7,270**
GRAND TOTAL				**85,495**

ANNEX 5: PERFORMANCE MEASUREMENT FRAMEWORK

Expected Results	Indicators	Baseline	Targets	Data Source	Data Collection Methods	Frequency	Responsibility
Impact 1: Increased use of weather and climate information for social economic development of the country	Percentage increase of customers. Level of citizen's satisfaction with weather and climate services	70% percent	An increase of 5% annually	TMA Annual report	Survey	Annually	PS Parent Ministry and DG TMA
Outcome 1.1 Improved effective weather and climate services	Level of satisfaction from the public and stakeholders	70% percent	An increase of 5% annually	Annual reports	Survey	Every 2 years	PS Parent Ministry and DG TMA
Outcome 1.2 Improved quality assurance, staff competence and adherence to ISO standards	ISO Certification and level of competence	ISO Certification	Maintain ISO certification	TMA Annual reports	Review of TMA Reports	Annually	DG & MQARM
Outcome 1. 3: Improved decision making and implementation performance	Timely decision making and implementation of programmes	Fifty percent	An increase of 10% annually	TMA Annual reports	Review of TMA Reports	Semi-annually	DG- MPM
Outcome 1.4: Increased availability of financial resources	Level of projects implementation versus planned	Thirty percent	At least an increase of 10 percent annually	TMA Project reports	Financial reports review	Semi-annually	TMA, PS Parent Ministry
Outcome 1.5: Improved cooperation, partnership and gains from collaborative programmes	Level of collaborations at global, regional and national level contributing to TMA	30 percent	An increase of 5% annually	TMA Annual reports	Annual reports review	annually	DG- MIA

	programmes						
Outcome 1.6: Enhance control culture and organisation efficiency	Clean Audit Reports	10 Audit queries	30 percent decrease per year	CAG	TMA Audit reports	Annually	M-IA
Outcome 1.7: Improved efficiency in services delivery.	Timely delivery of support services	50 percent	At least 80 percent	TMA	MWTC and TMA reports	Semi-annually	DG-MFA MPS MHR
Output 1.1.1 Meteorological Policy and Act in place.	*Approved Policy and Act documents*	None	TMA Policy and Act by December 2017	MWTC	MWTC reports review	Quarterly	PS Parent Ministry and DG TMA
Output 1.1.2 Policy Implementation Strategy of Meteorological Act in place	*Strategy document*	None	June 2018	MWTC	MWTC Reports	Annually	PS Parent Ministry and DG TMA
Output 1.1.3 Weather and climate issues mainstreamed into relevant sectors.	*Number of Weather and climate clauses included in relevant sector Policies*	None	Relevant sector policies amended by June 2019	MWTC	MWTC reports	Annually	PS Parent Ministry and DG TMA
Output 1.1.4 National Meteorological Policy and Meteorological Service Act implemented	*Level of Implementation of new Policy and ACT*	None	Implementation by 2021	TMA	TMA Annual report	Semi-annually	DG TMA
Output 1.2.1 ISO 9001-2015 Certification attained	*Level of satisfaction of customers*	60 percent	At least 80 percent	TMA customer reports	TMA Reports	Annually	DG & MQARM
Output 1.2.2 Competent personnel as per WMO Standards in place	*Level of service delivery*	80percent	Increase 5 percent per year	TMA Annual reports	Review of Training reports	Annually	DG TMA

Output 1.2.3 *Increased scope of Aeronautical Meteorological Services Quality Management System*	*Number of stations and sections implementing QMS*	Currently 33 percent of stations 80% headquarters	Twenty percent increase per year	TMA	TMA reports	Annually	DG & MQARM
Output 1.2.4 *Increased Efficiency of operations and service delivery*	*Efficiency level*	80 Percent	5 percent increase per year	TMA	TMA reports	Semi-annually	DG TMA
Output 1.3.1 *Improved management of resources*	Level of audit queries	Current number of queries	Twenty percent reduction per year	TMA	Review of CAG reports	Annually	DG TMA
Output 1.3.2 *A monitoring and Evaluation System strengthened*	*Operational Hardware and software system components for M&E*	None	M&E system in place by 2018	TMA	TMA Reports	Annually	DG- MPM
Output 1.4.1 *Resource mobilization Plan in place and Increased resources availability*	*Level of implementation of projects*	60 percent available resources	Twenty percent increase of resources per year.	TMA	Financial reports	Annually	PS Parent Ministry DG TMA
Output 1.4.2 *Joint operations in programs related to meteorological infrastructures*	*Level of implementation of projects*	Current amount of revenue	Twenty percent increase per year	TMA	Accounts reports	Annually	PS Parent Ministry DG TMA
Output 1.4.3 *Cost recovery Framework in place and operational*	*Increased revenue from cost recovery*	Current amount of revenue	Ten percent increase per year	TMA	Accounts reports	Semi-annually	DG TMA

Output 1.4.4 *Capacity of resource mobilization improved and increased revenue*	*Number of planned projects and activities implemented on schedule*	Current level of implement ation	Thirty percent increase per year	TMA	TMA reports	Semi-annually	DG TMA
Output 1.5.1 *Broader Network of partnerships and enhanced technical cooperation*	*Number of partners with collaborative programmes*	Current number	Target met by June 2020	TMA	TMA reports	Annually	DG- MIA
Output 1.5.2 *Enhanced regional and international data and products exchange*	*Number of trained professional staff*	Current number of professiona l staff	Ten percent increase per year	TMA	Training reports	Annually	DG TMA
Output 1.5.3 *International obligations fulfilled*	*Amount of data and information transmitted*	Current amount	Required amount met by 2020	TMA	TMA operations report	Semi-annually	DG TMA
Output 1.6.1 *Improved efficiency and accountability of resources utilization*	*Level of implementati on of projects*	Current level	Thirty percent increase per year	TMA	TMA Audit reports	Annually	DG M-IA
Output 1.7.1 *Efficient procurement management systems*	*Adherence to Laws, rules and regulations*	None	Systems in place by 2018	TMA	TMA reports	Quarterly	DG-MFA M-PS M-HR
Output 1.7.1 *Efficient Financial management systems*	*Adherence to Laws, rules and regulations*	None	Systems in place by 2018	TMA	TMA reports	Quarterly	DG-MFA M-PS M-HR
Impact 2: Increased protection of life and property from extreme	Level of people with mitigation and	10 percent	50 percent	Ministry of Environm ent	MOE reports	Bi-annually	Ministry of Environme nt

weather and climate events	adaptation measures						
Outcome 2.1: Improved working environment and increased availability of data	Level of efficiency of offering services	Rented CFO, 27 synoptic stations	Ten percent increase per year	TMA	TMA reports	Annually	DG, Parent Ministry
Outcome 2.2: Improved access to timely weather and climate information and quality of forecasts	Level of available observations and information	97% percent currently	2 percent increase yearly	TMA	TMA reports	Quarterly	Director Forecasting & Director Technical Services
Outcome 2.3: Improved efficiency using standard equipment, instruments and quality working tools	Adequate observations and information	Seventy percent currently	Ten percent increase per year	TMA	TMA operations reports	Semi-annually	Director Technical services
Output 2.1.1 CFO own building in place for improved services	*Number of Buildings constructed/Increased office space*	Current number	According to construction schedule	TMA	TMA projects report	Annually	DG TMA, Parent Ministry
Output 2.1.2 Increased number of modern meteorological observing stations	*Number of newly established stations/ Amount of information received at CFO*	Current number of stations	According to construction schedule	TMA	TMA projects report	Annually	DTS
Output 2.1.3. Fixed Buoys operating in the Indian ocean	*Number of observations received from Buoys in Tanzania ocean waters*	None	One fixed buoy bi-annually by 2020	TMA	TMA reports	Semi-annually	DFS
Output 2.1.4. Strengthened Radar Network	Number of established	Two stations	5 stations by 2021	TMA	TMA projects	Annually	DFS

Output 2.1.5. Established Meteorological Satellite receiving Centre	Radar Amount of information received at CFO	None	Operational Centre by 2021	TMA	report TMA projects report	Annually	DFS
Output 2.2.1 Modern real time data monitoring in place ***Output 2.2.2*** *Modern Plotting, analysis and packaging system Operationalized* ***Output 2.2.3*** *Modern data and exchange systems in place*	*Operational hardware and software components/ Timely exchange of information and products* *Operational hardware and software components /Timely and efficient production of forecasts and other products* *Timeliness and amount of data exchange*	None None None	Systems installed by 2018 Systems installed by 2019 Systems installed by 2019	TMA TMA TMA	TMA reports TMA reports TMA reports	Semi-annually Semi-annually Semi-annually	DFS & DTS DFS DFS
Output 2.3.1 Calibration equipment and calibrated meteorological instruments in place	*Level of accuracy of data and information*	Current accuracy level (80%)	5 percent increase per year	TMA	TMA operations reports	Semi-annually	DTS
Output 2.3.2 Improved capacity of fabrication and	*Number of fabricated and calibrated*	Current number	Ten percent increase per year	TMA	TMA workshop reports	Semi-annually	DTS

maintenance of meteorological instruments	*equipment*						
Outcome 2.4 Improved service delivery through utilisation of ICT	Modern ICT equipments/ systems in place	Current number	Ten percent per year	TMA	TMA reports	Annually	DTS
Output 2.4.1 Modern information and Communication system in place	*Declining breakdown of equipment and instruments*	Current percentage of breakdown	Ten percent decline per year	TMA	TMA Workshop reports	Semi-annually	DTS
Impact 3: Increased satisfaction of public, customers and stakeholders for provision of services	Level of satisfaction of services	(General 70 percent) (Aviation 87%)	5 percent increase annually Increase 5% increase Annually	Surveys	TMA reports	Biannually	MMPR
Outcome 3.1: Improved capacity to deliver services	Level of customer satisfaction	Seventy percent satisfied	5 percent increase per year	TMA Surveys	Conducting a survey	Annually	MMPR
Outcome 3.2: Increased number of professional staff	Number of trained professional staff	Current number	Ten percent increase per year	TMA	Training reports review	Annually	DSS MTRG
Output 3.1.1 *Competent human resources increased and sustained* ***Output 3.1.2*** *Succession Plan in place*	*Number of trained competent staff* *Continuity of service*	Current number at present No succession plan	Ten percent increase per year Plan Developed by 2017	TMA TMA	Training reports review Human resources reports	Annually Annually	D SS MTRG DSS

Output 3.2.1 Improved training system at Kigoma Training Centre	*Conducive teaching environment*	Seventy percent currently	Five percent increase per year	TMA	Human resources reports	Annually	DSS&PRINCIPAL
Output 3.2.2 *Improved Infrastructure at Kigoma Meteorological Training Centre*	*Number of constructed and rehabilitated building*	Current number	Complete rehabilitation by 2020	NMTC	NMTC reports	Annually	DSS&PRINCIPAL
Output 3.2.3 *Short and long term diversified courses in place*	*Number of new courses introduced*	Current number	One new course per year	NMTC	NMTC reports	Annually	Principal NMTC

Impact 4: Weather and climate information oriented to specific needs and safety of persons and property	Level of satisfaction of services	Tailor made products for Aviation and marine an DRR	At least 80 percent Tailor made products for health, water resources and energy one annually	TMA Surveys	TMA reports review	Biannually	DFS
Outcome 4.1: Improved capacity to deliver impact based forecasts and risk based warnings	Availability of Impact based forecasts and risk based warnings	None	Impacts based forecasts and risk warnings issued by 2017	TMA	Operations reports	Annually	DFS
Outcome 4.2: Improved capacity to deliver quality aeronautical and marine meteorological services	Number of stations providing briefing services for aviation and marine services	Current number of stations	2 stations increased per annum	TMA	TMA operations report	Semi-annually	DFS
Outcome 4.3: Increased data availability and users of products	Number of full operational stations and users	Current number of stations	10 percent per annum	TMA	TMA reports	Quarterly	DFS
Outcome 4.4:	**Number and**	Current number	10 percent	TMA	TMA	Annually	DRA

Hydrometeorological and Agrometeorological services improved	**quality of products/bulletins**	of products and user satisfaction	increase of products and user satisfaction annually		reports including user survey reports		
Output 4.1.1 *Impact-based weather and Climate forecasts and Risk-based warnings* ***Output 4.1.2*** *Operational MHEWS in place*	*Level of accuracy of forecasts* *Impact and risk warnings issued to the public* *Operationalized MHEWS*	Daily 75% Seasonal forecasts 85% General forecasts/warnings	5% increase per year 5% increase per year Impacts and warnings issued by 2017	TMA TMA	TMA operations reports Operations reports	Quarterly Semi- Annually	DFS DFS
Output 4.2.1 Competent staff and quality Aeronautical Services sustained ***Output 4.2.2*** *Quality Marine meteorological Services provided* ***Output 4.2.3*** Oversight Safety assessment completed	*ISO Certification awards* *Number of additional stations providing Aeronautical meteorological briefing* *Number of stations providing marine meteorological services/Number of ships receiving services* Clean oversight inspection report.	One ISO certification 8 Stations Four stations currently One inspection/assessment annually	ISO certification for all stations 2020 One increased station per year Clean inspection report/certification by 2021	TMA TMA TMA reports	TMA reports TMA operations report Reports on safety oversight assessment	Annually Semi-annually Annually	DFS DFS DG-MQARM
Output 4.3.1 Specialized Hydro-	*Number of products delivered and*	None	Optimal service provision	TMA Reports	TMA Reports	Annual	DRA

meteorological and Agro-meteorological services in place	*level of customer satisfaction*						
Output 4.4.1 Efficient Meteorological Stations operations	*Amount of data received at CFO and reduced number of breakdowns*	Current	Optimal operations	TMA Reports	TMA Reports	Annual	DRA
Impact 5: Increased understanding of benefits and use of weather and climate information services by public and other stakeholders	Level of use of services	Current	At least 10 percent increase annually	TMA Surveys	Surveys review	Biannually	Manager customer services
Outcome 5.1: Improved capacity to deliver tailor made services and products	Number of types of tailor made products developed /Level of customer satisfaction	Current number	Ten percent increase annually	TMA	TMA reports	Quarterly	DG-MQARM
Outcome 5.2: Increased demand and uptake of weather and climate services	Number of customers and level of public awareness	Current number of customers Current #of awareness events	Ten percent increase per year 2 Additional awareness events annually	TMA	Customer services reports	Annually	DFS, M-PWS
Outcome 5.3: Improved service delivery mechanism	Availability of Service Delivery Strategy/Number of customers	None	Service delivery strategy by 2017	TMA	Customer services reports	Annually	DRA, DFS
Output 5.1.1 *Improved data management system.*	*Number of customers served and products produced*	Current number of customers and products	Ten percent increase per year	TMA	Customer services reports	Semi-annually	DFS
Output 5.1.2 *Packaged*	*Types and*	Current number	One	TMA	Customer	Quarterly	DFS

tailor- made products in place	*number of tailor made products*	(Public, Agriculture, DRR, Aviation and marine)	additional tailor made product for health, water resources, livestock and energy annually)		services reports		
Output 5.1.3 *Competent staff in place and improved dissemination of tailor made meteorological services and products*	*Number of competent staff*	Current number	Optimal number	TMA	Review of TMA Reports	Quarterly	DFS
Output 5.2.1 *Increased awareness on the use of TMA's services*	*Number of customers and Service Level Agreements developed*	Current number	Optimal number	TMA	Review of TMA Reports	Quarterly	DFS&DSS
Output 5.2.2 *Increased media channels and frequency of dissemination*	*Number of media channels*	Current number	Two TV, 5 FM community radios, 2 newspapers increase per year	TMA	Public weather services report	Semi-annually	DFS
Output 5.3.1 *Service Delivery Framework in place*	*Availability of Service delivery strategy and Level of service delivery*	None	Strategy developed and implemented by 2018	TMA	TMA reports	Semi-annually	DRA, DFS

Impact 6: Increased climate resilience through effective use of climate variability and climate change information.	Level of people supported by Government to cope with effects of climate change	Current number	At least an increase of 5% annually	Ministry of Environment	MOE reports review	Biannually	MMPR
Outcome 6.1: Increased use of TMA's Climate change information to build resilience	Number of Climate change impact assessments issued	Monthly percent	At least @10 day issued by 2018	TMA	TMA reports	Annually	DRA
Outcome 6.2: Enhanced use of Weather and climate data and information for climate resilient development and adaptation.	Level of use and understanding of weather and climate information	Current	At least 5% increase annually	Survey	Survey review	Annually	DRA
Outcome 6.3: Enhanced quality and accuracy of climate data and products and availability of climate change products for effective adaptation	Customer feedback	Current	Increased number of climate change products Increased number of customer	TMA	TMA Reports	Annually	DRA
Output 6.1.1 Improved visibility in climate change research and application *Output 6.1.2*	*Customer feedback*	Current status	Increased number of publication	TMA	TMA reports	Annually	DFS& DRA

Increase uptake of climate research information and products	*Number and types of products and information disseminated*	Current status	*6 scientific seminars and training workshops conducted each year*	*TMA*	*Seminar and workshop reports*	*Annually*	*DRA*
Output 6.1.3 *Improved knowledge through collaborative research*	*Number of research projects developed and implemented*	Current	One major collaborative project annually	TMA	Project reports	Annually	DRA
Output 6.2.1 *Increased research in meteorology and related fields*	*Number of research findings published*	Current number	*15 research conducted*	TMA	TMA Reports	Annually	DRA
Output 6.2.2 *Research findings and publications disseminated and available for reference*	*Number of research findings published*	Current number	*3peer reviewed papers on applied meteorology presented, published and disseminated per year*	TMA	TMA research reports	Annually	DRA
***Output* 6.3.1** Improved data base management systems	i. Number of software acquired ii. Number of computer facilities	Current status	*Four computers procured*	TMA	Performance report	Annually	DRA
***Output* 6.3.2** Increased quality of generated of climate products	i. Number of climate products generated	Current status	*Annual climate summary product*	TMA	Performance report	Annually	DRA
***Output* 6.3.3** Improved data backup systems and availability of easily accessible quality data in digital format	i. Backup system document ii. Number of stations and parameters digitized	Current status	*Ten stations and four parameters digitized*	TMA	Performance report	Annually	DRA

ANNEX 6: REFERENCES

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