

ROLE AND OPERATIONS OF THE KMD IN SERVICE DELIVERY FOR SUSTAINABLE DEVELOPMENT



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DISASTERS CAUSED BY HYDROMETEOROLOGICAL HAZARDS

Early Warning as Decision Support in Planning, Preparedness and Effective Management in Support of Hyogo Framework of Action (2005 – 2015) in Disaster Risk Reduction and Socio-Economic Development

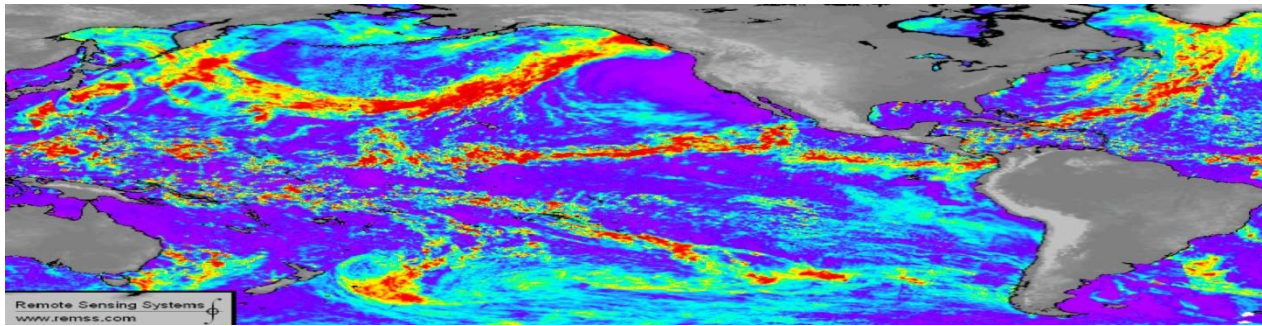
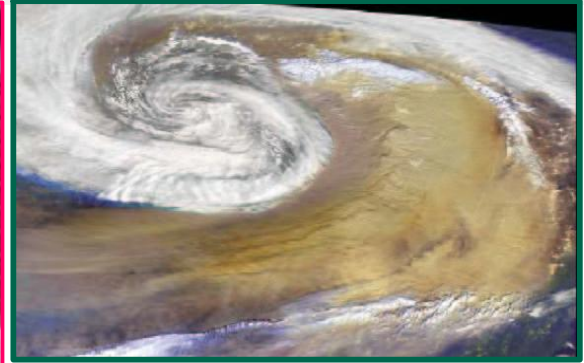
The disasters caused by hydrometeorological hazards include:

- Droughts;
- Heavy rainfall leading to Floods;
- Strong winds, tropical cyclones;
- Thunderstorms, hailstorms and lightning;
- Heat waves, cold chills and frost;
- Forest and wild fires;
- Desert locust swarms;
- Land/Mud slides;
- Health epidemics;
- Aviation hazards;
- Smoke, fog, dust or haze, among others.

These hazards erode livelihoods of people in Kenya and Africa and cause significant set-backs to social and economic development.

It is said,

“An Ounce of Prevention is Worth a Pound of Cure” or simply “Prevention is Better Than Cure”



Forecasting Severe Weather for Disaster Risk Reduction In Kenya

Forecasting Severe Weather

1) Enables Decision-Making in Planning, Preparedness and Good Disaster Management;

2) Enhances Safety and Protection of Life;

3) Helps reduce damage to Property, Physical Infrastructure and the Environment



Services Offered by the Kenya Meteorological Department

- 1. Aeronautical Meteorological Service** to the Aviation industry (landing taking-off and enroute forecasting)
- 1. Agro-meteorological Services** to Agriculture and food security sector (Onset, amount and cessation of the seasonal rains);
- 2. Hydro-meteorological Services** for Hydro-power, solar and wind energy generation and distribution;
- 4. Bio-meteorology And Air Quality Forecasting** for Health and public safety (malaria, meningitis, cholera, typhoid, bronchitis, asthma, etc);
- 5. Water Resources Management And Development** (fresh water for drinking, sanitation and industry);
- 6. Environment And Natural Resources** (Fire weather, Forestry and Wildlife; Recreation, Sports and Tourism, Eco-system conservation);
- 7. Disaster Management** (high impact weather and extreme climate events –floods and droughts, wind gusts, lightning, etc);
- 8. Marine Meteorology And Oceanographic Services** (Maritime transport and navigation, fishing, surfing, off-shore oil exploration and drilling services);
- 9. Weather Services For The General Public** (rain, temperature, heat wave, cold chill, cloudy duration, visibility, etc);
- 10. Weather Services For Road And Railway Transport** (rain, temperature, visibility, land/mud slide);
- 11. Weather forecast to the Media** (TV, radio, newspapers, web, voice service, mobile services...)
- 12. Specific Assistance** (Sport, special events...);
- 13.** The National Meteorological Service is able to advertise on its own expertise and showcase its know how and competence;
- 14.** Seasonal Climate Outlook presentation to the **National Drought Steering Committee**, chaired by the Prime Minister;
- 13.** Seasonal Climate /Weather Outlook presentation to Cabinet; attended by all line ministries and impacted sectors;
- 14.** Seasonal Climate/Weather Outlook to stakeholders;
- 15.** **Annual Performance Contract, Work Plan and Procurement Plan** are vetted by the Permanent Secretary of the parent Ministry and the Parliamentary Committee on Lands and Natural Resources, where Service Delivery and development are given special attention;
- 16.** Specific services adapted to National Met Service's end-users;
- 17.** **Building Climatology** for the Building and Construction industry (return period for bridge construction, rainfall amount and rates, sun radiation, temperature, etc);
- 18.** **Climate Change** monitoring, detection, attribution, prediction and assessment to help in Climate Change adaptation and mitigation;
- 19.** **Catastrophic Weather information for the Insurance industry** based on weather risk management within financial risk transfer markets



Quality Management System

1. NMHSs are seen as *service providers* to the Public and Industry;
2. Quality Management System (QMS) principle is expected from *providers of goods and services*;
3. QMS {ISO} is enforced in *aviation* by national and international regulations;
4. QMS is high in areas of high financial and social impact:
 - Early Warning Systems (EWS);
 - Disaster Risk Reduction (DRR);
 - Aviation and Maritime transport;
 - Climate change



Background of National Meteorological & Hydrological Services

1. THE WMO CONVENTION

- In line with the World Meteorological Organisation (WMO) Convention, adopted on 11 October 1947, and reviewed in 2007, *the National Meteorological and Hydrological Services (NMHSs), like the Kenya Meteorological Department (KMD):*
 - *Are the single authoritative voice and source on weather and hydrological warnings;*
 - *And may also be responsible for air quality, astrophysical phenomena, seismic and tsunami warnings.*
- The views of NMHSs are considered to be scientifically sound and impartial when advising their governments.

2. ESTABLISHMENT OF METEOROLOGICAL SERVICES IN KENYA

- The present Kenya Meteorological Department (KMD) started as a small colonial service for East Africa way back in 1929, called the British East African Meteorological Service (BEAMS), to provide meteorological and climatological services to various sectors of the economy.
- KMD became a Department of the Government of Kenya in 1977 from the previous East African Meteorological Department (EAMD) after the collapse of the East African Community (EAC).



The Main Purpose of Kenya Meteorological Department

As stated in the **WMO Convention**, the purpose of an NMHS, like KMD, is in observing and understanding weather and climate and in providing meteorological, hydrological and related services in support of relevant national needs, which include the following areas:

- a) *Protection of life and property;*
- b) *Safeguarding the environment;*
- c) *Contributing to sustainable development;*
- d) *Promoting long-term observation and collection of meteorological, hydrological and climatological data, including related environmental data;*
- e) *Promotion of endogenous capacity-building;*
- f) *Meeting international commitments;*
- g) *Contributing to international cooperation.*



Mission and Vision of Kenya Meteorological Department

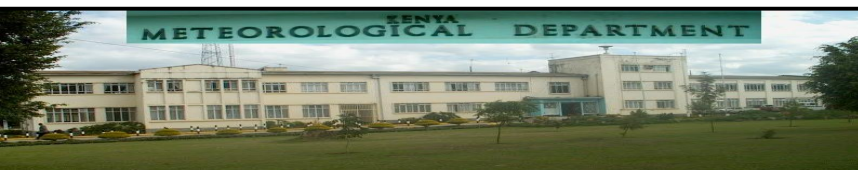
Vision:

To Become a Leading, World Class Operational Forecasting Centre and Scientific Institution that Provides Optimum Contribution to Improved Quality of Life

Mission:

To Facilitate Accessible Meteorological Information and Services and Infusion of Scientific Knowledge to Spur Socio-economic Growth and Development

1. Weather and climate information in Kenya is primarily a national **Public Good** and need to be made widely available.
2. The KMD own and operate most of the infrastructure that is needed for providing the weather, climate, water and related environmental services for the protection of life and property, economic planning and development, and for the sustainable exploitation and management of natural resources.



The Functions and Operations of KMD In Support Of Service Delivery

The KMD infrastructure include round-the-clock data collection stations from geographically dispersed observing locations feeding into real-time data analysis, modelling and forecasting activities that must be communicated to the user communities. Thus, the functions of KMD include:

- Establish and operate **observing station networks** that gather observations of the earth-atmosphere-ocean system on real-time to support the provision of weather, climate, water and related environmental services and research activities including the assessment and projection of climate change;
- Establish and operate **telecommunication networks** for rapid exchange of observation, data and services;
- Acquire and operate **data-processing systems** to provide real-time weather, climate, water and related environmental services including warnings and alerts to the public and sectors such as agriculture, water resources, energy, health, shipping, aviation, national defence and environment. KMD, thus, acts as part of an international network contributing to sustainable development;
- Develop and **distribute forecasts**, warnings and alerts for safety of life and property and to support efforts to reduce the impacts of weather, climate, water and related environmental natural hazards.



The Functions and Operations of KMD In Support of Service Delivery

- Provide essential data, information and products necessary for designing, planning, developing and managing **infrastructure, settlements** and other life supporting systems such as **agriculture, water resources, energy and transport** for improving the well-being of societies;
- Participate in the development, implementation and operation of **national multi-hazard early warning systems** including those in seismology and in ocean related phenomena such as tsunami;
- Maintain a continuous, reliable and comprehensive *historical record* of its national weather, climate, water and related environmental data;
- Provide relevant advice on weather, climate, water and related environmental issues for decision-making;
- Advancing science and technology related to weather, climate and water as well as developing and improving operations and services through research and development;
- Fulfilling relevant **international commitments**, including those under the Convention of the World Meteorological Organization (WMO), and the furthering of national interests by participation in the appropriate international programmes and activities;



MEETING THE GOVERNMENT'S INTERNATIONAL OBLIGATIONS

- **Accomplish Resolution 40 of WMO:**
 - “provide on a free and unrestricted basis essential data and products which are necessary for the provision of services in support of the protection of life and property and the well-being of the nation”;

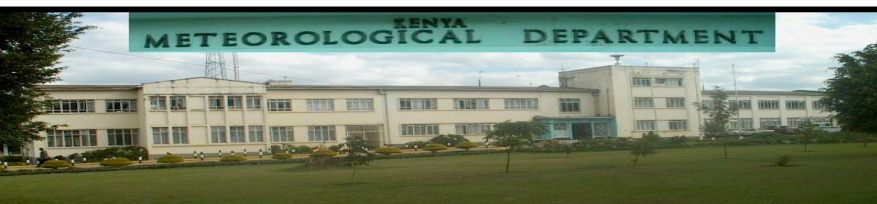
- **Support to the Safety and Efficiency of:**
 - *International shipping and maritime affairs; and*
 - *Military and civil aviation;*

- **Support to Climate Change Adaptation**
 - Computation of carbon footprint

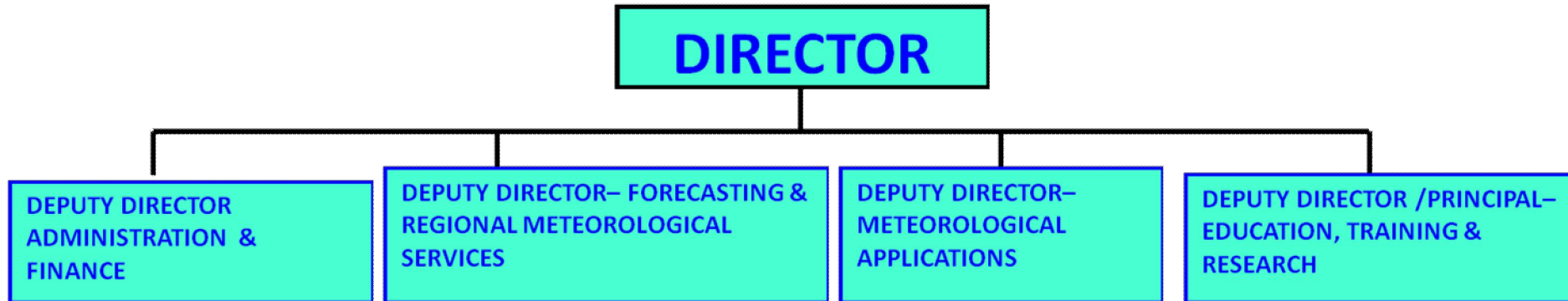
 - The monitoring, assessment, and projection of Climate Change; as well as

 - Contributing to the assessment of the impacts, measures and options to deal with Climate Change;

- **Support For New Innovation Requiring New Technology**
 - Creation of the multi-disciplinary experts in aviation, seismology, space weather, volcanology, transport and dispersion modelling including volcanic ash and aerosol observations
 - Aviation fatality rate in Africa is 8 times the global average.
 - Also 35-40% of aviation accidents are attributed to bad weather. Other reasons are human error and mechanical malfunction.



KMD ORGANIZATIONAL STRUCTURE



METEOROLOGICAL INFRASTRUCTURE IN SUPPORT OF SERVICE DELIVERY

METEOROLOGICAL INFRASTRUCTURE

- Data Observational systems and network;
- Data telecommunication systems and network;
- Data procession, analysis and forecasting systems;
- Product and information dissemination systems;
- Human resource capital

CURRENT OBSERVATIONAL NETWORK

Synoptic Stations:

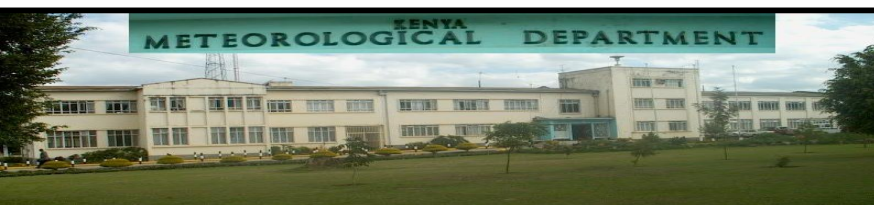
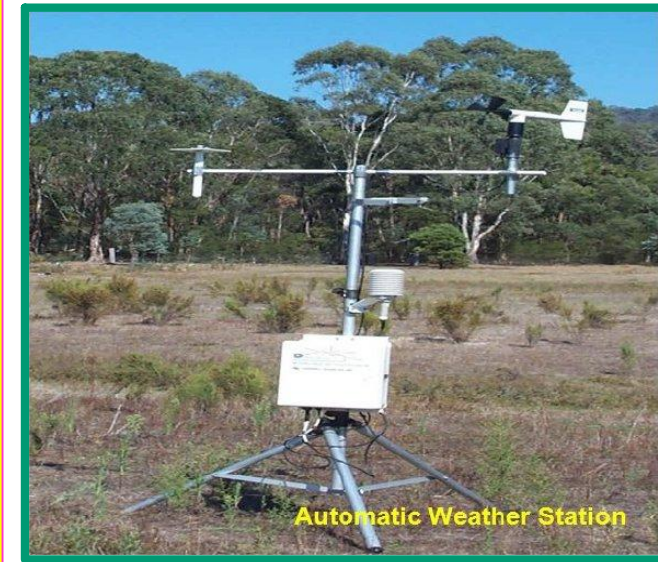
- 38 manned 24-hr Surface Synoptic Stations,
- 17 agro-meteorological stations
- 4 marine Tidal gauges with automatic Met sensors.
- 1 Upper-Air station in Nairobi

Automatic Weather Observing Systems:

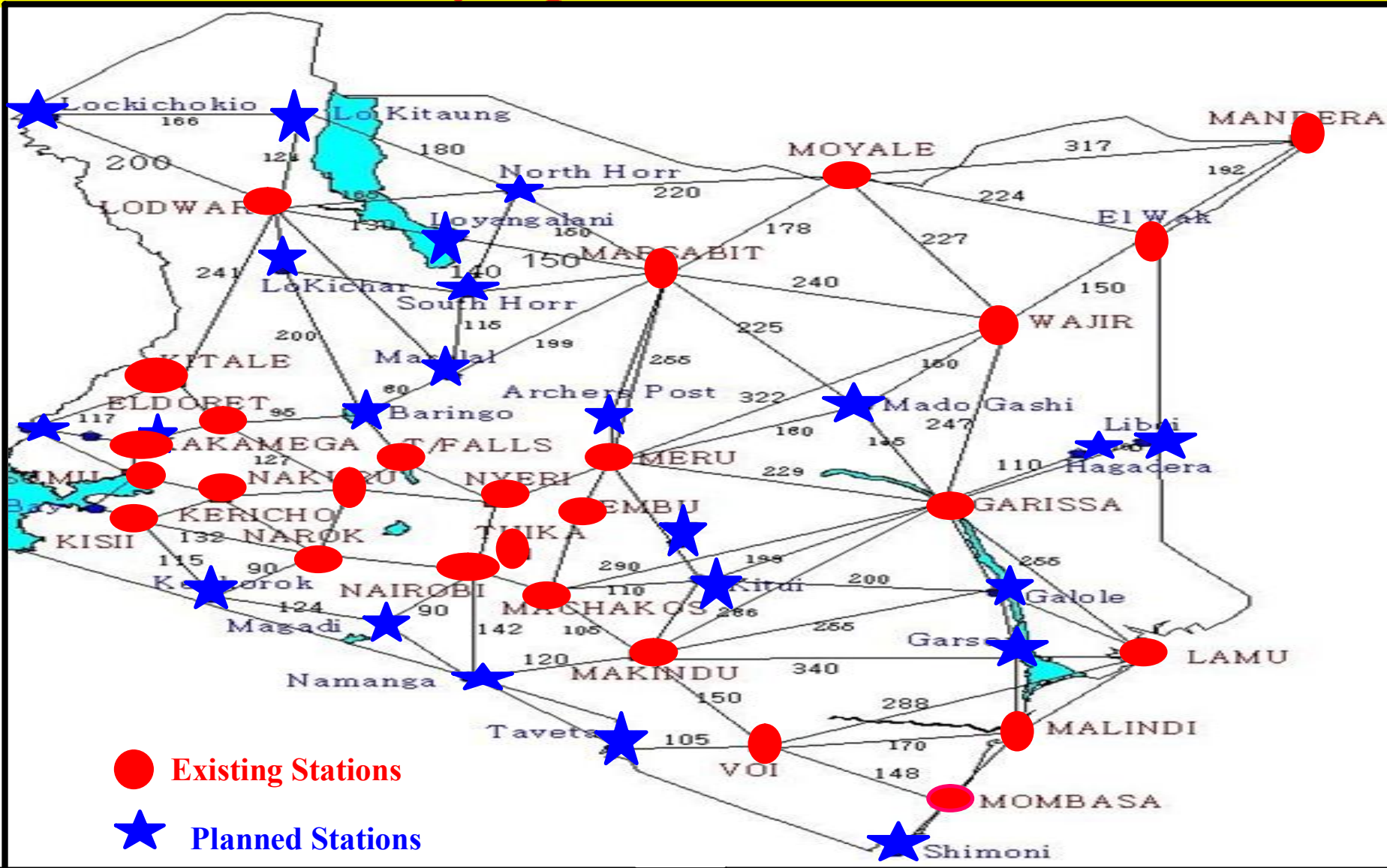
- 24 Automatic Weather Stations (AWSs)
- 3 Airport Weather Observation Systems (AWOSs) at JKIA, Wilson & MIA
- 17 Hydromet AWSs for water catchment areas

Rainfall Stations:

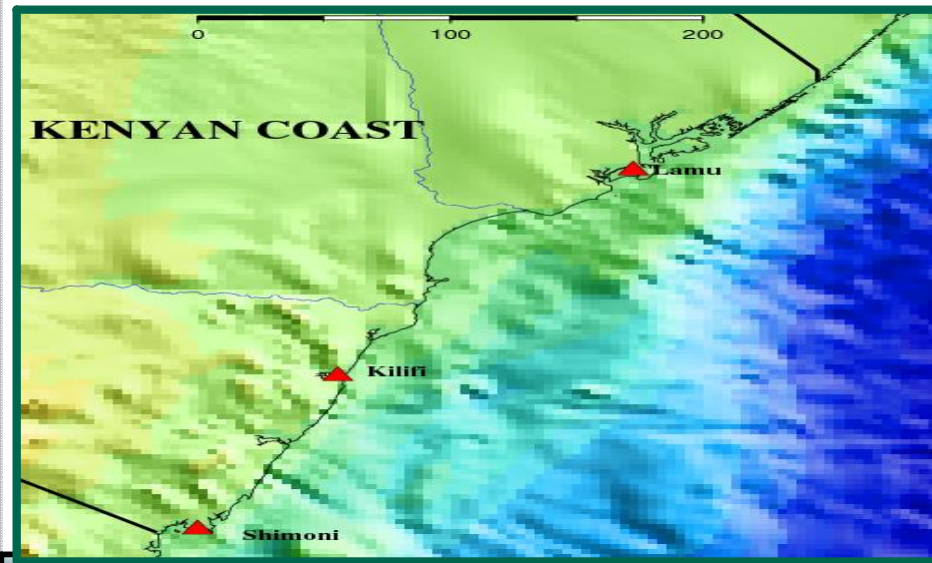
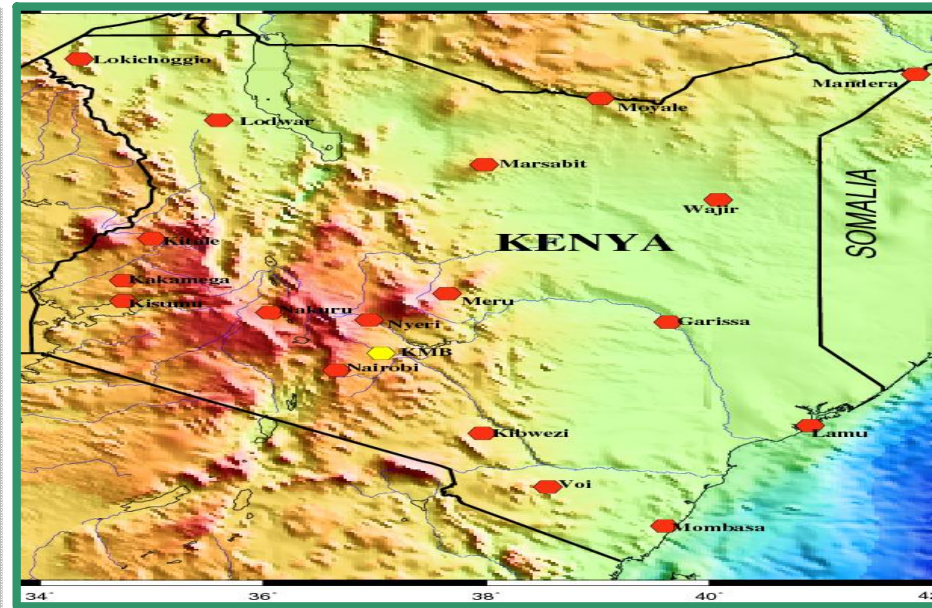
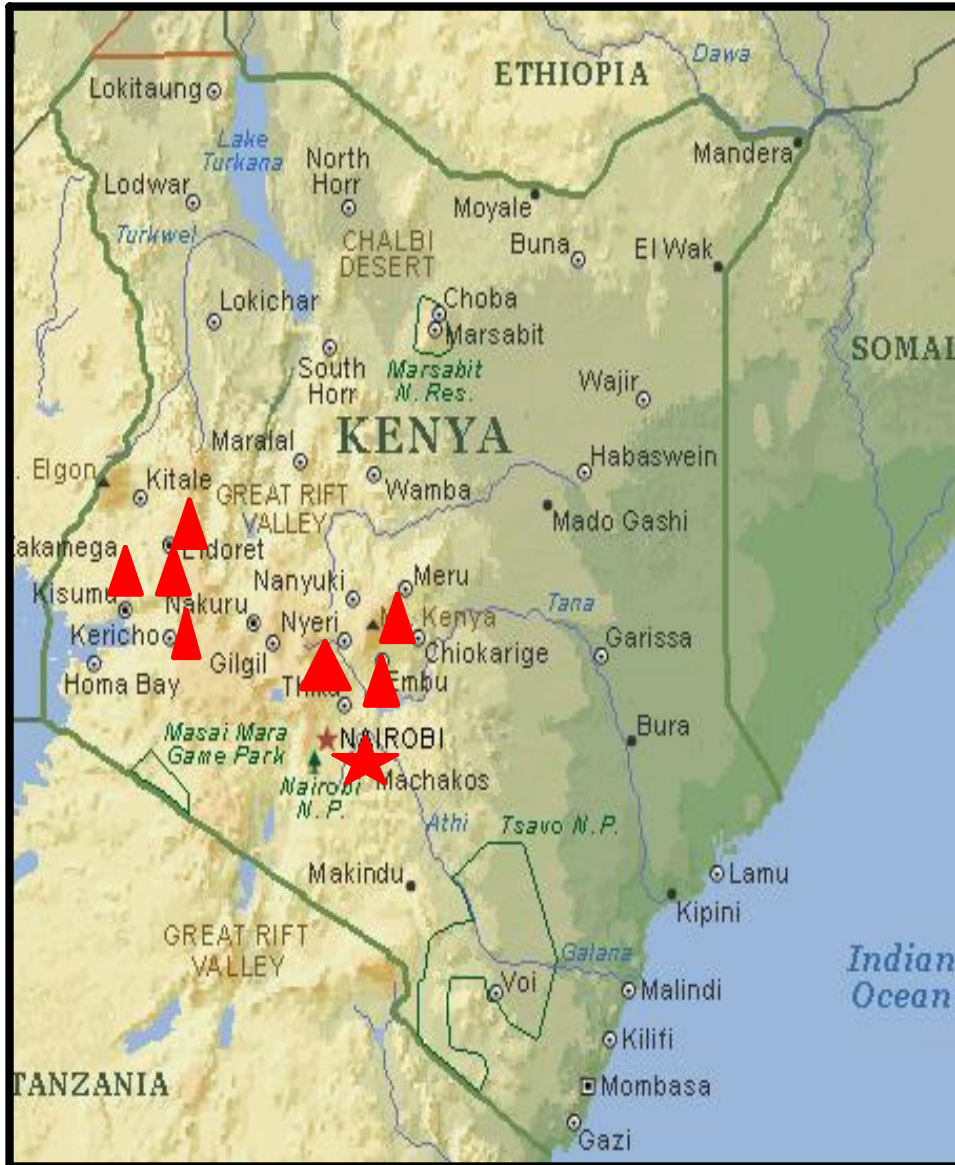
- Over 1000 rainfall stations most of which are operated by Voluntary Observers



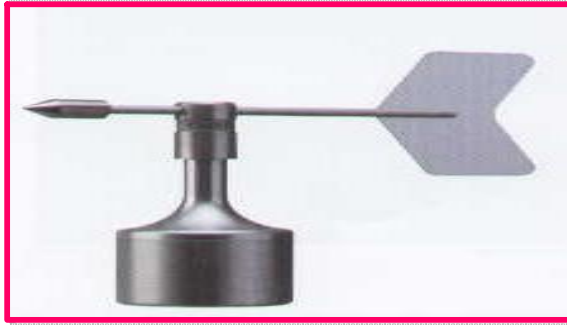
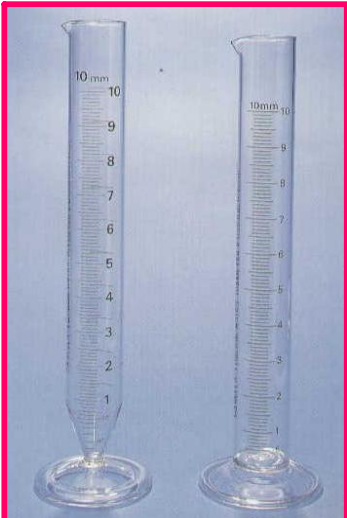
Network of Synoptic Observation Stations



Location of Hydromet, Seismic and Tidal Gauge Instruments



Some of the Meteorological Instruments for Surface Observations



Upper-Air, Remote Sensing and AWOS Equipment

Upper Air Stations

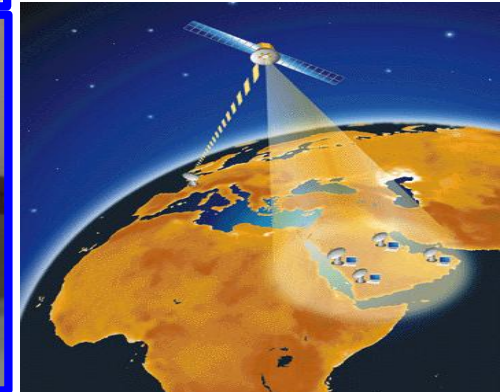
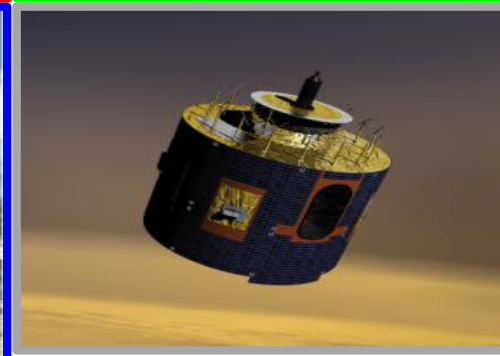
- 1 Upper Air Station at Dagoretti Corner, Nairobi
- Tender for acquiring two other stations for Garissa and Lodwar already awarded.

Lightning and Thunderstorms detection

- 4 Lightning and thunderstorm detection systems at Nairobi, Mombasa, Kisumu and Eldoret

Remote Sensing

- 3 Satellite ground receiving stations:
 - » 2 for MSG; and
 - » 1 for NOAA satellite data



Pollution Monitoring and Climate Change

A. Global Atmosphere Watch Station (GAW) on Mt. Kenya

- WMO Global Atmosphere Watch (GAW) station monitors the background air pollution and global atmospheric chemical composition as relates to the quality of air and climate change;
- **Pollution Monitoring Station at Chiromo (University of Nairobi)**

B. OZONE MEASUREMENTS

- One Ozone measuring system in Nairobi (Dagoretti)
- Ozone monitoring stations as relates to the levels of ozone in the lower atmosphere.

C. Support to Climate Change Adaptation

- The monitoring, assessment, and projection of Climate Change; as well as
- Contributing to the assessment of the impacts, measures and options to deal with Climate Change;

D. MONITORING CLIMATE AND CLIMATE CHANGE

- Contribution of scientific input to monitoring, prediction, attribution, mitigation and adaptation to Climate Change issues relevant to Kenya's negotiations under the **United Nations Framework Convention on Climate Change (UNFCCC)** ;
- Monitoring environmental pollution, Greenhouse Gases, and other atmospheric constituents including ozone and aerosols over the Kenyan atmosphere as a contribution to scientific knowledge in the **Inter-governmental Panel on Climate Change (IPCC)**;
- Provide expert advice on environmental audit and impact assessment;



MULTI-HAZARD EARLY WARNING SYSTEMS (MH-EWS) AND EMERGENCY RESPONSE OPERATIONS

ENHANCED CAPABILITIES OF KMD IN MULTI-HAZARD EARLY WARNING AND DISASTER PREVENTION AND PREPAREDNESS

1. Tsunami Early Warning

Four tidal gauge stations at: *Lamu, Malindi, Kilifi and Shimoni* for *Multi-hazard Disaster Risk Reduction* through detection and early warning:

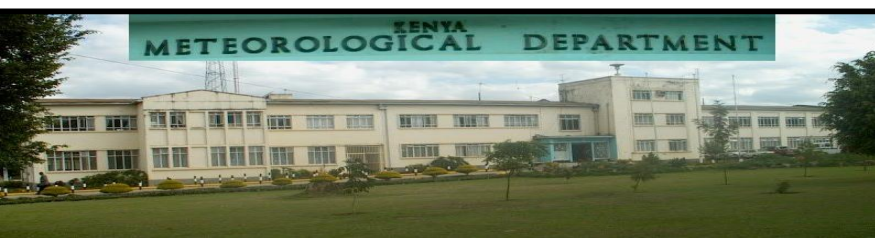
- Ocean waves;
- Sea level rise;
- Salinity;
- Sea surface temperature;
- Water quality; and
- Tsunami related hazards at the Coast.

2. Ocean Wave Forecasting

- Forecasts of ocean wave period and probabilistic forecasts of wave height are essential tools in the generation of warnings of remotely generated swell essential in the disaster risk reduction;

3. Tools and Technology

- New tools and technology needed in order to improve marine meteorological forecasting, tsunamigenic forecasting, reinforce maritime security and optimize fishery management including maritime services for international ship navigation



National Telecommunication Systems and Network at KMD

1. Four Local Designated Data Collection Centers connected to HQs Through Satellite-based VSAT Communication system, namely:

- JKIA Met Station, Nairobi;
- MIA Met Station, Mombasa;
- Garissa Met Station; and
- Kisumu Met Station.

2. Met stations at Malindi and Eldoret airports have been connected to the HQs via VSAT (to be changed to fiber optic soon).

3. General Packet Radio Service (GPRS) facility has been installed in Twenty Four outstations to facilitate data transmission to the HQs and cut down on cost of data transfer.

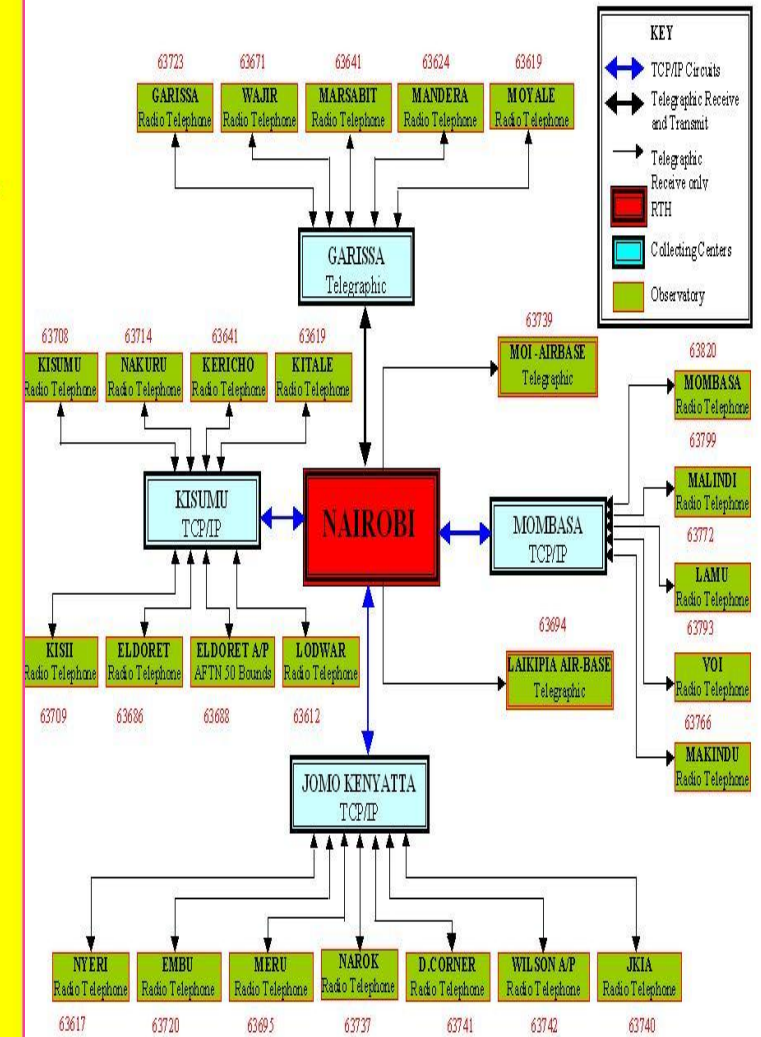
4. The High Frequency Single Side Band (HF-SSB) Radio Telephones are used as back-ups to collect data from the synoptic weather observation stations.

5. Regional Telecommunications Hub (GTS Node):

KMD has a regional responsibility and hosts the WMO Regional Telecommunications Hub (RTH) of the Global Telecommunication System (GTS) for:

- Receiving and disseminating of weather data from neighboring countries to the rest of the world; and
- Receiving and disseminating global weather data and products from the rest of the world to the same neighboring countries.
- Receiving and disseminating of Data, or Data Exchange, is accomplished through the Automatic Message Switching System (AMSS).

NATIONAL TELECOMMUNICATION NETWORK



REGIONAL TELECOMMUNICATION NETWORK IN AFRICA (REGIONAL ASSOCIATION I, RAI)

A. AUTOMATIC MESSAGE SWITCHING SYSTEM (AMSS) FOR DATA TELECOMMUNICATION AND EXCHANGE

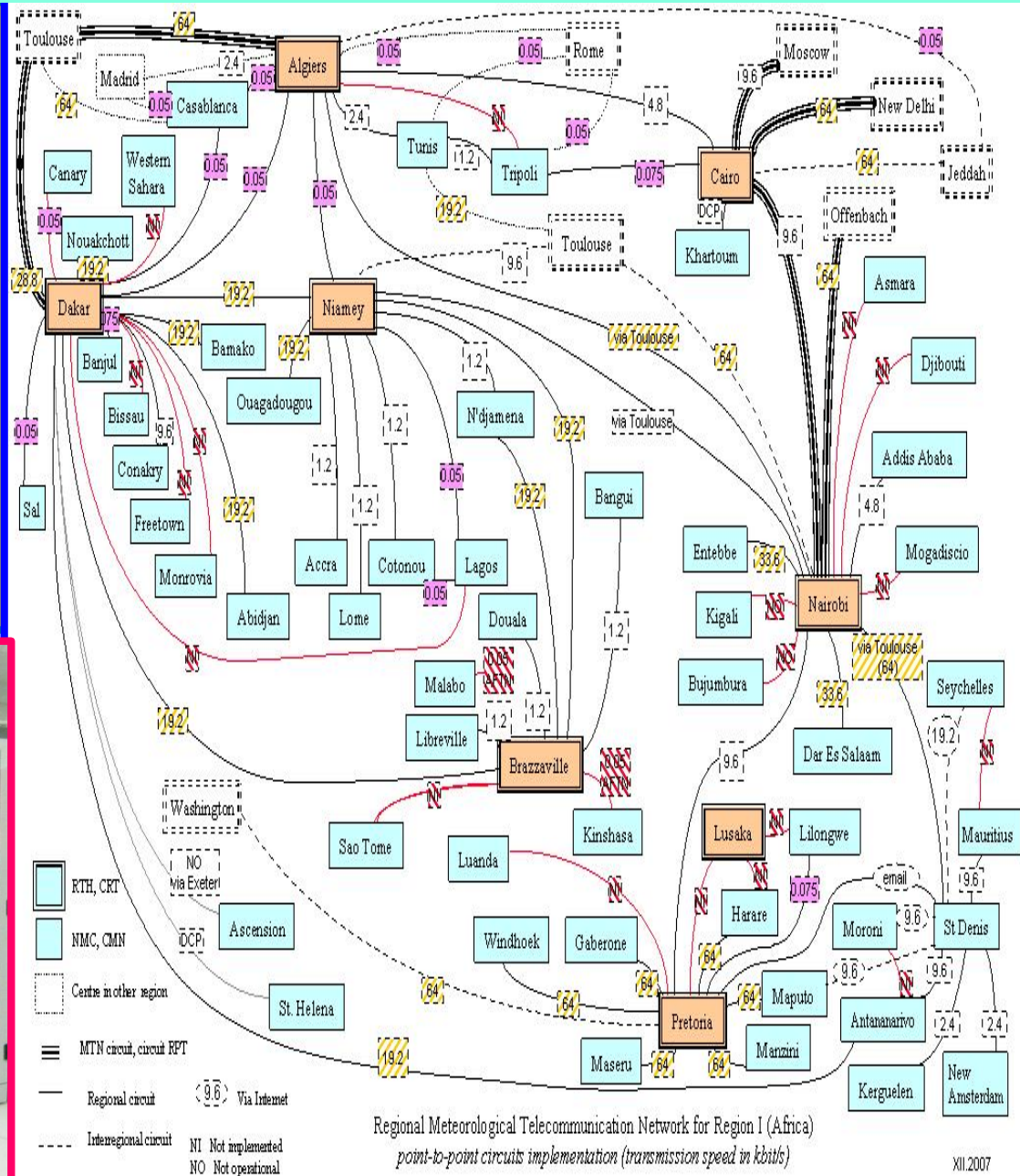
- Operational AMSS used in Kenya;
- Links Kenya to Offenbach/Main, Germany through the WMO Global Telecommunication System (GTS)

B. WMO INFORMATION SYSTEM (WIS)

Science and Technology for the development and implementation of the new WMO information system:

1. WIS development and implementation
2. Data representation and codes
3. Climate Data Management and Exchange

- Routine collection and dissemination service for time-critical and operation-critical data and products;
- Data Discovery, Access and Retrieval service;
- Timely delivery service for data and products.



Forecaster Workstation

PRODUCTS FOR EARLY WARNING, DISASTER PREPAREDNESS AND MITIGATION

KMD issues:

Short-range weather Forecasts (24-hours-3days);

Medium-range weather forecasts (4-days, 7-days, 10 days or decadal);

Long-range forecasts (30-days or monthly) and (90-days or seasonal weather outlook)

NWP Model Running Capability

Global Model outputs

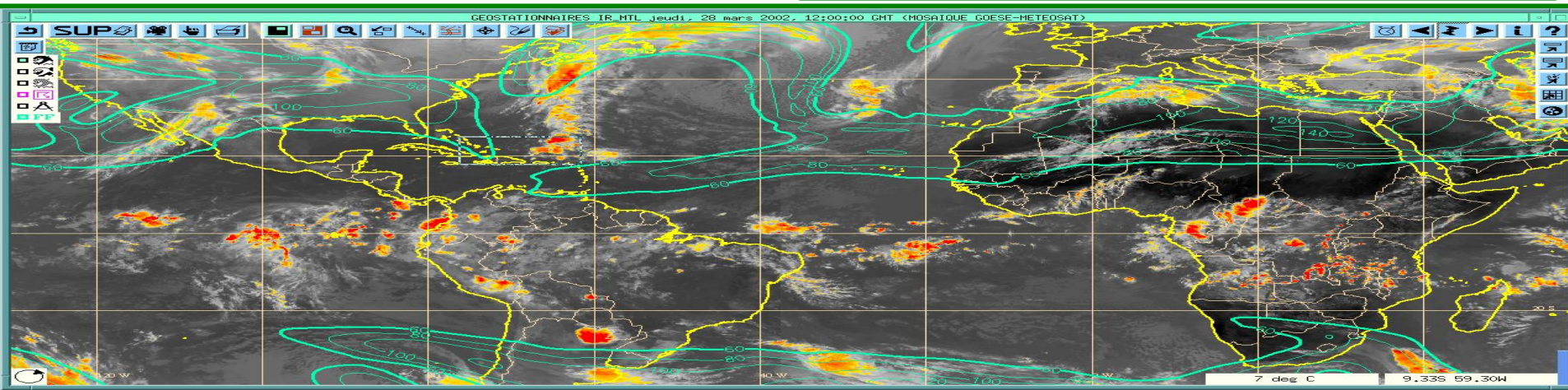
Limited-Area Model (HRM-Kenya, WRF-Kenya)

Forecasting Capability

- Tailor-made forecast as a decision support tool for planning and
- preparedness in weather and climate sensitive sectors;
- Pilot Briefing (Terminal forecasts, Enroute and Landing forecasts)

Climatology

Data Management





IMIS

CliSys

TransMet

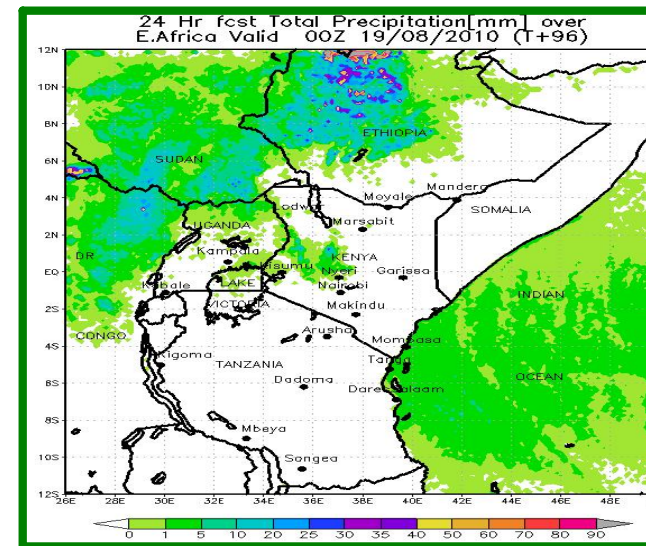
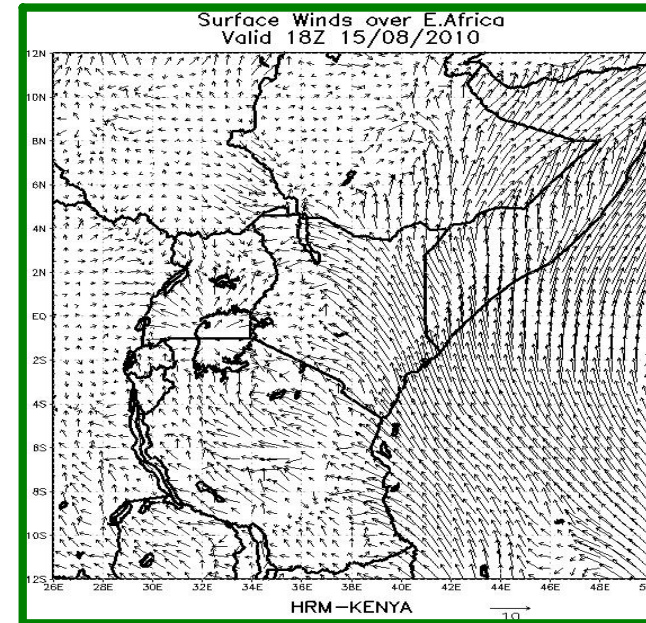
Typical Architecture of a Central System for Data Processing, Analysis, Forecasting , Exchange and Archival for Vision 2030



Data Processing, Analysis and Forecasting Systems In Support of Service Delivery

NUMERICAL WEATHER PREDICTION PRODUCTS

1. African Monitoring of Environment for Sustainable Development (AMESD) Forecaster Workstation for data and product manipulation as well as visualization tool;
2. RETIM –Africa equipment for satellite data reception and dissemination;
3. PC Workstation for the National Climate Diagnostics Laboratory (NCDL)- For regional Climate Change Scenario generation using the Providing Regional Climates for Impacts Studies (PRECIS) Model – very recent. Testing in progress;
4. To improve the skill of the 24-hour, 4-day and 7-day forecasts, KMD is running two Numerical Weather Prediction (NWP) Models:
 - High Resolution Model (HRM); and
 - Weather Research Forecasting (WRF).
 - The two Limited-area models (LAMs) give forecasts of up to 120 hours (5 days).
5. Computational Capacity: PC- Cluster (2-nodes) for Numerical Weather Prediction (NWP) to run a High Resolution Model (HRM) - from DWD, Germany, and a Weather Research and Forecasting (WRF) Model of the US Weather Service.
 - The PC-cluster provides a High Performance Computing (HPC) Platform for NWP.
 - These models run 120 hours (or 5 days) forecast in less than 45 minutes.
 - Resolutions are 14km and 15km for the HRM and WRF respectively.



FLOOD DIAGNOSTICS AND FORECASTING CENTRE (FDFC) AT KMD

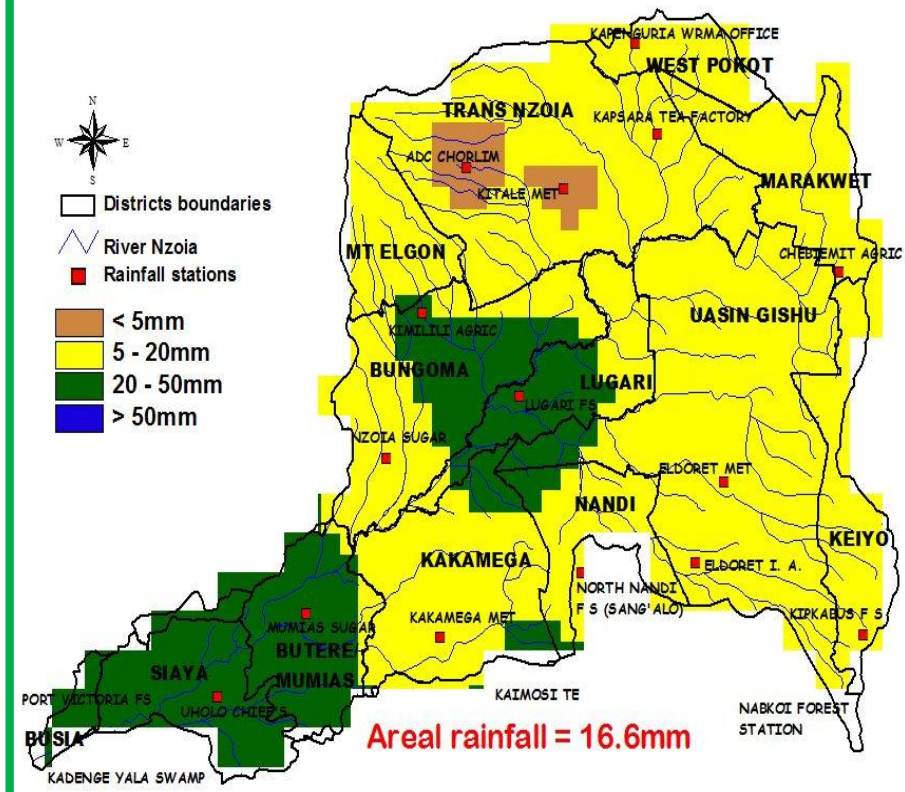
OFFICE OF THE PRESIDENT,
MINISTRY OF STATE FOR SPECIAL PROGRAMMES

WESTERN KENYA COMMUNITY DRIVEN DEVELOPMENT AND FLOOD MITIGATION PROJECT

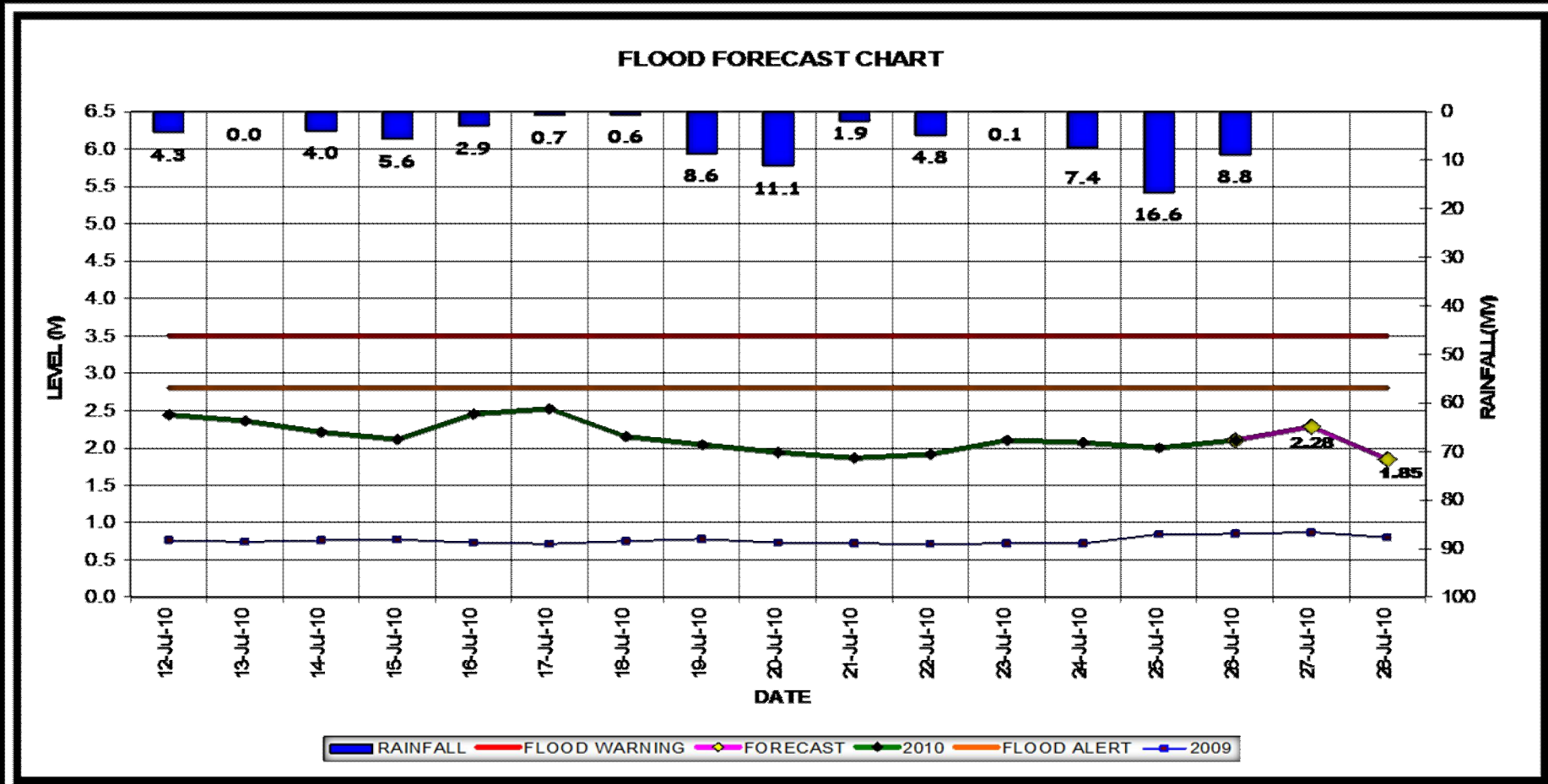
Science and Technology Development Implementation For Enhanced Capabilities To Provide Better Hydrological Forecasts and Assessments

- Water Resources Assessment;
- Hydrological Forecasting and Prediction;
- Water, Climate and Risk Management;
- Quality Management Framework in Hydrology (QMF-hydrology);
- Hydrological Data Rescue;
- Capacity Building in Hydrology and Water Resources
- Support to the African Ministerial Council on Water (AMCOW) and UN-Water/Africa

Rainfall distribution over Nzoia basin
20 April 2009



DATA PROCESSING FACILITIES AND PRODUCTS GENERATED



Current and Forecast Water Levels at Rwambwa Bridge RGS



Production and Modes of Dissemination of Information from KMD

1. Media:

- Press Releases;
- Media personnel/KMD interaction;
- In collaboration with ICPAC, a number of media personnel have been trained to comprehend the basics contained in a forecast .

2. Government Organs/Ministries which receive KMD Information and services

- Ministry of Environment and mineral resources (MEMR);
- Office of the President (OP);
- Ministry of state for Special Programmes, National Disaster operation Centre (NDOC);
- Parliamentary Committee on Environment and Natural Resources (PCEN);
- Ministry of Agriculture (MOA);
- Ministry of Energy (MOE);
- Ministry of Health (MoH), etc;

3. As mentioned earlier KMD also generates specialised services to specific sectors of the economy including:

- Agriculture, livestock development and food security;
- Energy, mostly hydropower, solar and wind;
- Transport (road, railway, aviation);
- Public Health and safety;
- Marine/offshore fishing and oil exploration and drilling
- General public
- Building/construction
- Water Resources management and development;
- Forestry and Wildlife;
- Recreation, Sports and Tourism;
- Disaster Management;
- Environment conservation (fire weather, air quality forecasting etc)



Modes of Dissemination of Information from KMD

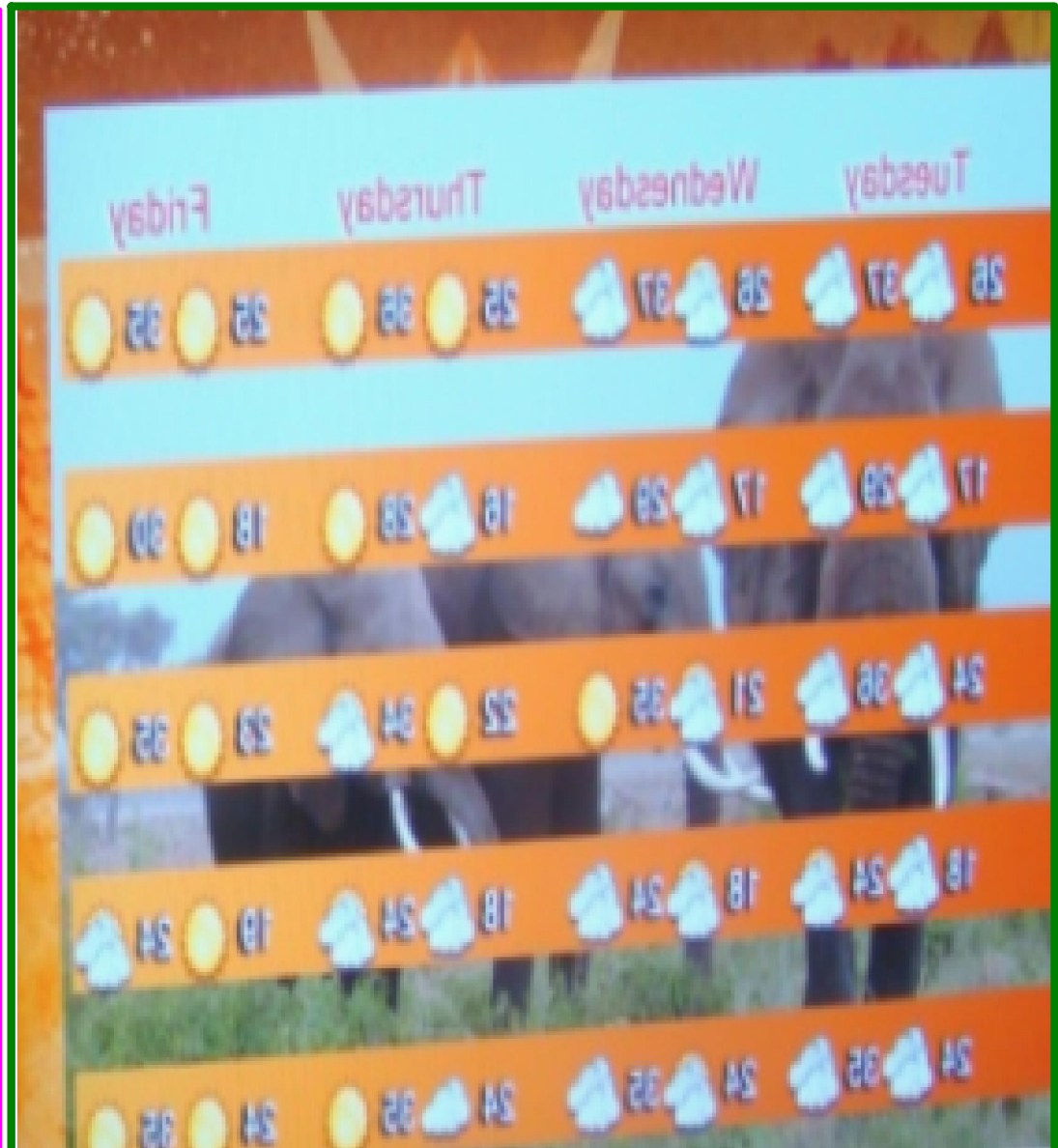
Data Analysis and Processing

Meteo Factory

An automatic mass-production system of meteorological information with the frequency, layout, and dissemination medium required by the end-user:

Press Releases Using;

- Television (TV Met);
- Voice;
- SMS;
- Electronic Public Display Boards, etc.



Users of Disseminated Information from KMD

•Climatological production TV system; Specific services adapted to sectors

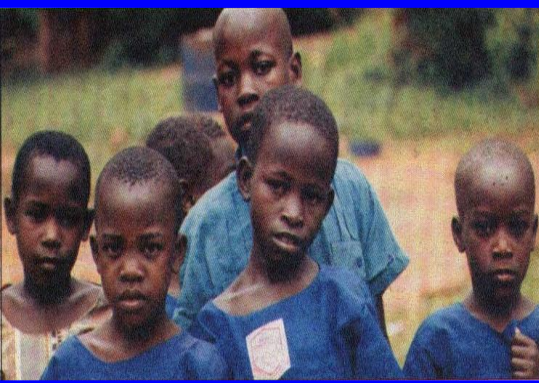
1.National Met Service's end-users:

Agro meteorology; Marine/offshore; General public; Building/construction; Energy, mostly hydropower, solar and wind; Transport; Health; Disaster management; Environment (fire weather, etc)

2.Marketing & Sales to End Users/Customers

It offers an opportunity to provide commercial services to the community:

- Weather forecast for professional users industry, public works, agriculture, insurance, environment, marketing...)
- Weather forecast to Medias (TV, radio, newspapers, web, voice service, mobile services...)
- Specific Assistance (Sport, special events...)
- It allows the National Meteorological Service to advertise on its own expertise and know how



Modes of Dissemination of Information from KMD

- Other modes of information dissemination include RANET community FM Stations (Suswa, Kangema, and Budalang'i operational),
- Public Weather Display Boards and
- Our website : www.meteo.go.ke



RANET-KENYA RURAL COMMUNICATION PROJECT



RANET AND FOOD SECURITY



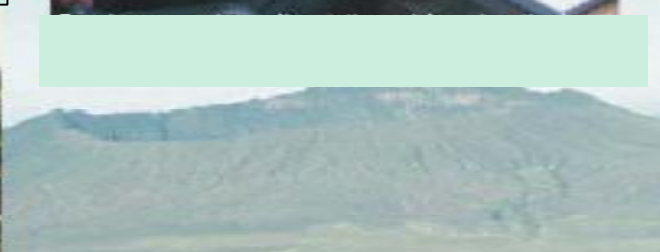
MISSION: To improve agriculture and livestock production, mitigate impacts of disasters, promote health and conserve the environment for vulnerable rural communities using weather and climate forecasts for sustainable development.



RANET AND HEALTH



RANET AND DISASTER MANAGEMENT



Sponsored by NOAA, WorldSpace Freeplay Foundation, ACMAD and Safaricom

RANET AND COMMUNICATION



KENYA METEOROLOGICAL DEPARTMENT



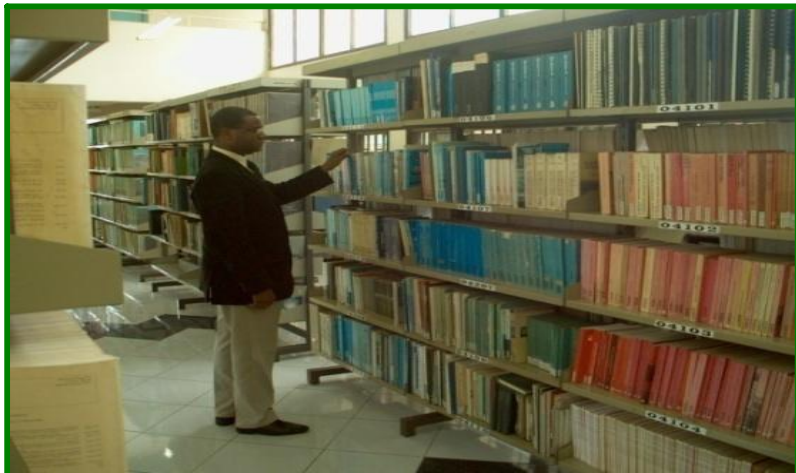
Education and Training at IMTR/WMO RTC-Nairobi in Support of Service Delivery

WMO Regional Training Centers (RTC) Nairobi

- a) There are 23 WMO RTCs in the world and 8 Africa: RTC Algeria, RTC China, RTC Egypt, RTC Kenya, RTC, Niger, RTC Nigeria, RTC Madagascar, RTC Russian Federation and South Africa.
- b) Note that the EC-LXII reconfirmed the Regional Training Centers in Egypt and Kenya.

The WMO RTC Nairobi

- a) Conducts meteorological Education and Training and skills development in Kenya, Africa and beyond;
- b) Conducts Research and Development to improve the quality of meteorological services and the understanding of meteorological phenomena, including climate change and environmental issues;
- a) Maintains a National Meteorological Library for education, training, research and development in the science of meteorology and related sciences;



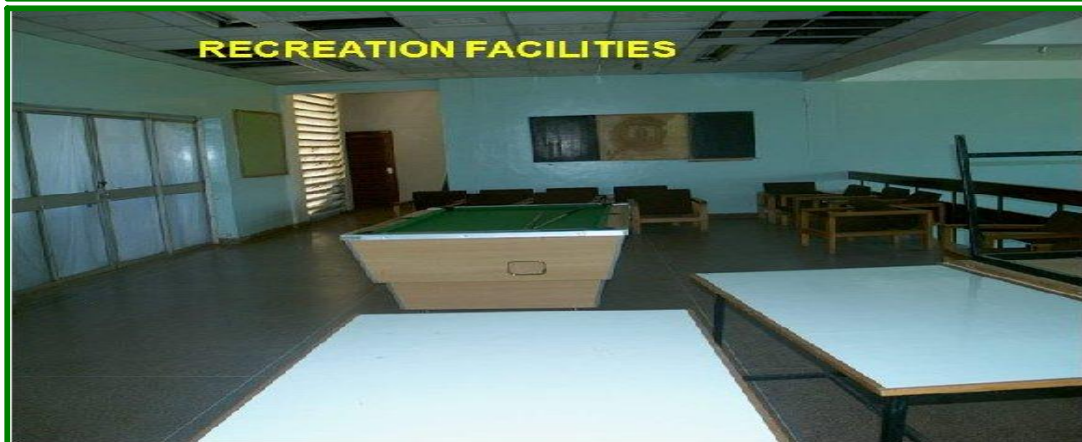
Education and Training at IMTR/WMO RTC-Nairobi in Support of Service Delivery

1964 – The Institute for Meteorological Training & Research (IMTR) was established under UNDP.

1965- the IMTR was designated as the World Meteorological Organization (WMO) Regional Meteorological Training Centre (RMTC) for the Anglophone Africa and part of the Middle East (e.g. Kuwait and Yemen)

The WMO RTC- Nairobi has two components:-

- IMTR which offers Diploma and Certificate courses located at Kenya Meteorological Dept premises.
- Dept of Meteorology, The School of Physical Sciences (SPS) located in Chiromo Campus, University of Nairobi which offers Degree and Post Graduate Diploma courses



Engineering Division at KMD in Support of Service Delivery

Tasks Carried Out

- Design, installations, commissioning and maintenance of meteorological systems and equipment in the Department.
- Design and fabrication of mechanical, electronic and electrical parts and equipment to assist in the maintenance and installations of equipment and meteorological instruments, including RANET.
- Telecommunication and network design and maintenance.



Instrument Calibration Centre at KMD in Support of Service Delivery

**WMO Regional Instrument Calibration Centre (RICC)
Objective is to:**

To maintain the standards of meteorological instruments to WMO and ICAO standards through:

1. Calibration;
2. Measurement;
3. Inter-comparison experiments



KMD'S Budget

KMD's Budget (in Kshs Millions) for the Last Five Years

Financial Year (1 July of 1 st Year to 30 June of 2 nd Year)	Recurrent Vote {Running costs for O & M (million Kshs)}	Development Vote {Capital Expenditure for Development Projects (Millions Kshs)}	Total Expenditure (millions Kshs)
2006/2007	724	398	1122
2007/2008	777	235	1012
2008/2009	802	170	972
2009/2010	885	406	1291
2010/2011	915	301	1216



KMD Annual Expenditure

- The **Recurrent Vote** is for money used as running costs for: Personnel Emoluments (salaries and wages); Operational and Maintenance (O & M) costs in providing data observation (surface, upper-air and marine, pollution); data processing, analysis, forecasting and storage; service delivery including data exchange; and data management infrastructure; Instrument maintenance and calibration;
- **Development Vote** for money used for capital expenditure on projects to improve the meteorological infrastructure that include: observation systems and networks; telecommunication systems and networks; data processing, analysis, forecasting and storage systems; Service delivery system; human resource capital (expertise, skills and competencies).



Regional & International Centres Located At KMD

<p>WMO Sub-Regional Office for East and Southern Africa (WMO-SROESA)</p>	
<p>IGAD Climate Prediction and Applications Centre (ICPAC).</p>	
<p>WMO Regional Telecommunication Hub (RTH)</p>	<p>Data Exchange</p>
<p>WMO Regional Training Centre-Nairobi</p>	<p>Education And Training Research And Development</p>
<p>WMO Regional Specialized Meteorological Centre</p>	<p>Monitoring Of Monsoonal Flow, Tropical Cyclones, Tsunamis, Run NWP Models, Forecast Severe Weather</p>
<p>WMO Regional Instrument Centre</p>	<p>Instrument measurement, calibration and inter-comparison to meet WMO and ICAO standards</p>
<p>Centre Of Excellence (CoE) in African Satellite Meteorology Education and Training (ASMET) under EUMETSAT</p>	



Human Resources: KMD Faces the Challenges of Very Few Staff and More Responsibility

CADRE	NO.	QUALIFICATIONS
MET ASSISTANTS AND MET. OFFICERS	272	Equivalent of Diploma and Higher National Diploma
MET. TELECOMMUNICATION OFFICERS	23	Equivalent of Diploma and Higher National Diploma
MET. COMMUNICATION OFFICERS	103	Equivalent of Diploma and Higher National Diploma
ENGINEERS	7	DEGREES IN ENGINEERING (UNDERGRADUATE AND SOME WITH MSc)
METEOROLOGISTS	105	BSc. IN METEOROLOGY (3 PhDs and 48 MSc.)



Human Resource at KMD Contd...

Very Few Staff and More Responsibility

Staff Levels from 1995 to 2010

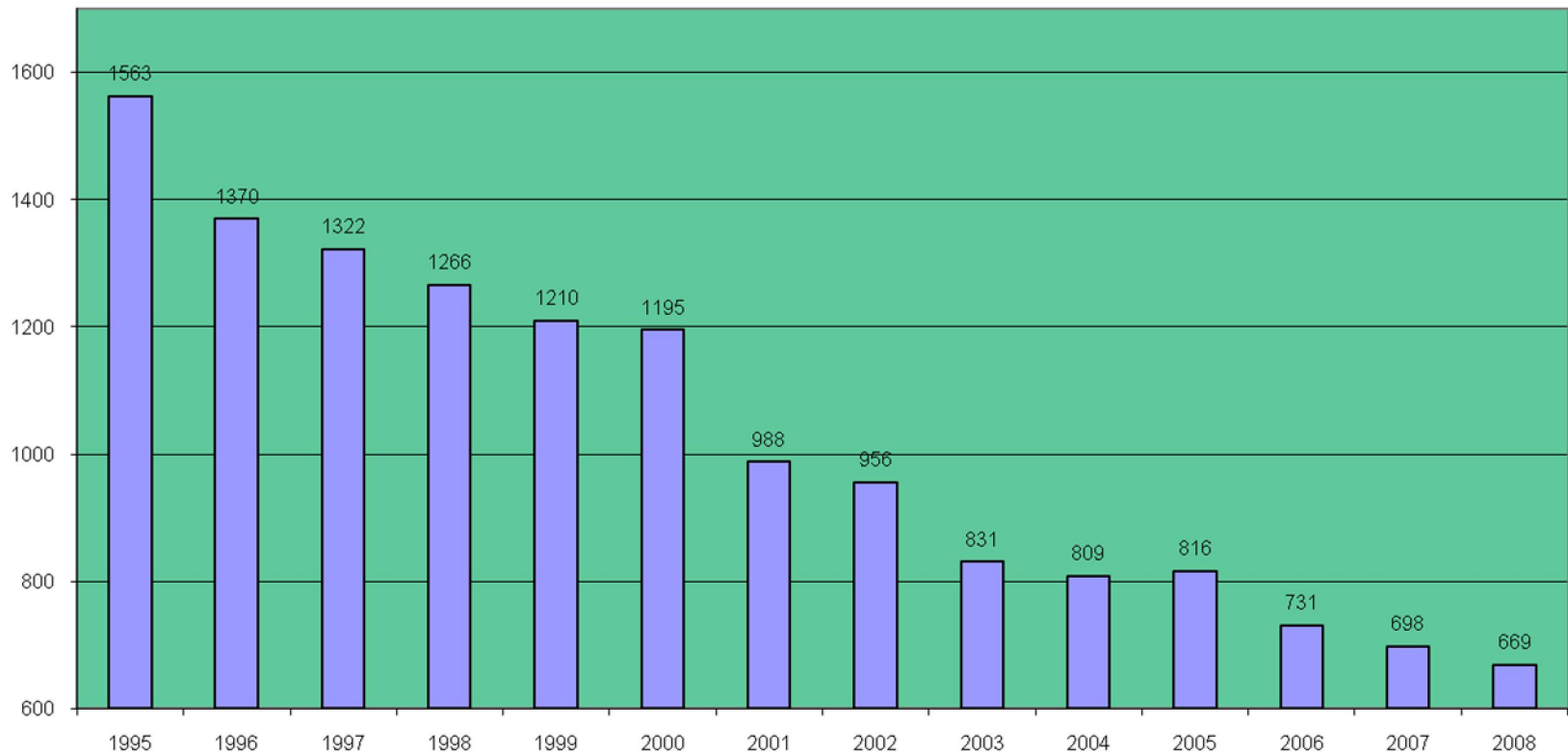
- There has been a consistent decline in number in staff levels since the year 1995; (when the freeze on employment was effected) to 2010;
- From an original staff establishment of **1543** to the current **663 in post**, out of which **515** is professional and **148** support staff.



Human Resource at KMD Contd...

Very Few Staff and More Responsibility

Staff Levels from 1995 to 2008



Local Partnerships and Cooperation In Service Delivery

- KMD has stakeholders Which Include:
 - The Kenya Civil Aviation Authority (KCAA);
 - Department of Resource Surveys and Remote Sensing (DRSRS);
 - Department of Mines and Geology;
 - Kenya Agricultural Research Institute (KARI);
 - Ministry of Agriculture;
 - Ministry of Water Resources;
 - KENGEN - (Electricity Generating Company);
 - Ministry of Forestry and Wildlife;
 - Regional Centre for Mapping of Resources for Development (RCMRD);
 - Kenya Bureau of Standards (KEBS);
 - Kenya Sugar Authority (KSA);
 - Kenya Maritime Authority (KMA);
 - Kenya Marine and Fisheries Research Institute (KMFRI);
 - Kenya Wildlife Services (KWS);
 - Lake Victoria Environmental Management Programme (LVEMP);
 - Jomo Kenyatta University of Agriculture and Technology (JKUAT);
 - National Environment Management Authority (NEMA);
 - University of Nairobi (Department of Meteorology and Department of Geology) among many others.



CHALLENGES

Legislative Matters

- There is need to have national legal instruments to define the mission and mandate of KMD which will ensure that the Department's responsibilities are well-defined nationally and its contribution to society is appropriately recognized to ensure adequate resources;
- KMD lacks an Act of Parliament establishing its existence. The mission statement should be affirmed in a "Meteorological Act" and Law or other official governmental instrument;

Operational Matters

- KMD receives low budgetary allocation and has therefore a problem of upgrading its equipment, plants and instruments required for improved information, products and services. Hence the two flagship projects captured under Vision 2030 cannot be realized with the current government funding. There is need for a financier. The projects are:
 - Modernization of meteorological services; and
 - Weather modification.

Financial Matters

- Accounting systems at Ministry Hqs is slow in disbursing voted funds to run the department and pay merchants. GoK has installed the IFMIS System to improve procurement and accounting
- Slow Vouchers processing causes a delay in paying contractors/suppliers of goods, works and services. This is in contravention of the Service Charter for the Ministry;

Human Resource Matters

- Poor succession management due to embargo on recruitment; Gok has allowed recruitment
- Old Schemes of Service; GoK is undertaking Workload Analysis

Service Delivery Matters

- Inadequate technological and marketing capacity to meet the needs of an increasing sophisticated public and private sector clientele ;
- Disasters caused by hydrometeorological hazards such as droughts, strong winds, floods, thunderstorm or lightning, forest and wild fires, desert locust swarms, landslides, epidemics, aviation hazards, smoke dust or haze, among others, are eroding livelihoods of people in Africa and causing significant set-backs to social and economic development.;
- KMD requires to liaise with relevant stakeholders to develop guidelines for meteorological, hydrological and climate-related hazard analysis, mapping and forecasting tools for the country in order to adequately provide hazard information and analysis for risk assessment and planning;
- Increase in RANET FM stations popular with the communities and members of parliament;
- Need for public education and awareness;
- That 96% of disasters caused by natural hazards in RA I during the period 1980–2007 were linked to meteorological-, hydrological-, and climate-related events.



ONGOING INITIATIVES IN SUPPORT OF SERVICE DELIVERY

- The KMD would effectively contribute to security and sustainable development, particularly in poverty reduction efforts, climate change adaptation and disaster risk reduction if transformed into an autonomous entity;

Transformation to a Semi-Autonomous Government Agency

- **Inter-Ministerial Committee in place**
- **Draft Policy Paper, Legal Framework(Meteorological Law), Business Plan, Human Resource Manual, Service Delivery Manual being prepared**
- **National and Regional Benchmarking undertaken;**
- **Consultant to be recruited**
- **Stakeholders workshop planned**
- **Cabinet Memorandum to be drafted**

- Devolution to Provincial and District offices to devolve services to the grassroots, especially to Commercial and Peasant farmers and livestock keepers;
- Further devolution to Counties, District and Constituencies being formulated to be in tandem with the new governance structure in the new promulgated constitution;
- Updating of the Schemes of Service to motivate and retain highly qualified expertise, special skills and competencies;
- Opening up of more community based radio stations for effective dissemination of weather and climate products in vulnerable rural communities in local languages;
- Engage partnership with Traditional Forecasting Systems or Indigenous Knowledge (IK) in rainfall forecasting; to specific communities e.g. the Nganyi Community in Kenya;
- Improve weather and climate products on TV, Radio, Print Media;
- Engage more with the Media for effective dissemination of forecasts since the Media is very active in Kenya and has a wide readership;
- Train more staff in Broadcast Meteorology, Business Support, Marketing and Customer Care;
- Increase Public Education and Awareness, Carry Out Customer Needs Surveys, etc
- Expanding the station network for effective monitoring of Climate Change and associated impacts;
- Engage more in weather index insurance (WII) to cushion farmers against climate change risks;
- Engage Government in your budgeting process, in particular Ministry of Finance and ministry of Planning;
- Recruitment of staff;
- Development of a Data policy.





*Thank You
For
Your Kind Attention*

