The role of National Meteorological and Hydrological Services (NMHS) in DRR

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Some recent observations on disasters

- There is a Global increasing trend in the number of disasters and their total economic impacts

- 90% of these natural disasters are caused by severe weather and extreme climate events
  - ***A number of severe weather and extreme climate-related events in recent years have led to disasters of devastating consequences to many societies, thus arousing even keener interest of the general public and policy makers***

The role of NMHS

- Weather Monitoring
- Weather Forecasting
- Climate prediction
- Early warnings
- Weather and climate Advisories
- Food security
- Climate Change Detection and attribution
- Research and outreach programmes

Other duties and responsibly NMHS

1. Establishment and maintenance of a national meteorological observation network mandatory for weather and climate observations
2. Monitoring, detection and prediction of weather and climate phenomena and dissemination of relevant products and early warnings;
3. Monitoring environmental pollution and Greenhouse Gases, including ozone
4. Exchange and transmission of meteorological data nationally, regional and internationally;
5. Carrying out meteorological training and research to improve the quality of meteorological services
6. Archival of long-term reliable national climatologically records

Regional and international

- **Fulfillment of the national, regional and international obligations of the Government under the Convention of the World Meteorological Organization (WMO)**

- **Fulfillment of the national, regional and international obligations of the Government under the Convention of the International Civil Aviation Organization (ICAO) and others**

- **Carrying out a Scientific assessment on Climate Agenda under the IPCC which supports country positions on the resolutions, protocols and conventions of the United Nations Framework Convention on Climate Change (UNFCCC)**

- **Fulfillment of such other climate and weather related national, regional and international obligations as may be directed.**

Other duties

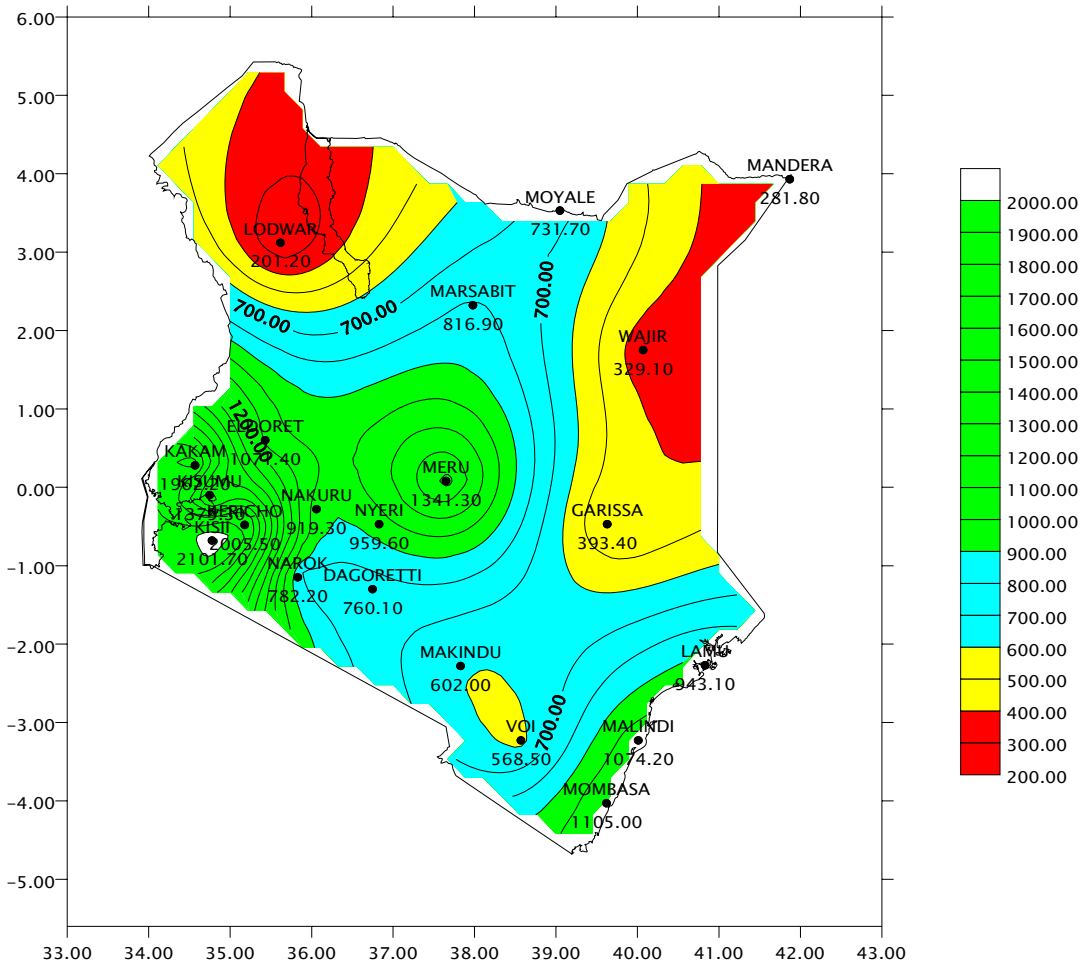
Analysis of weather variables

- Trends and patterns in wind regimes
- Trends and patterns in Pressure systems
- Intensities of rainfall and durations
- Trends in temperature regimes
- Local modification of weather systems
- Regional influences by meso-scale weather systems
- Seasonality

Generate weather products

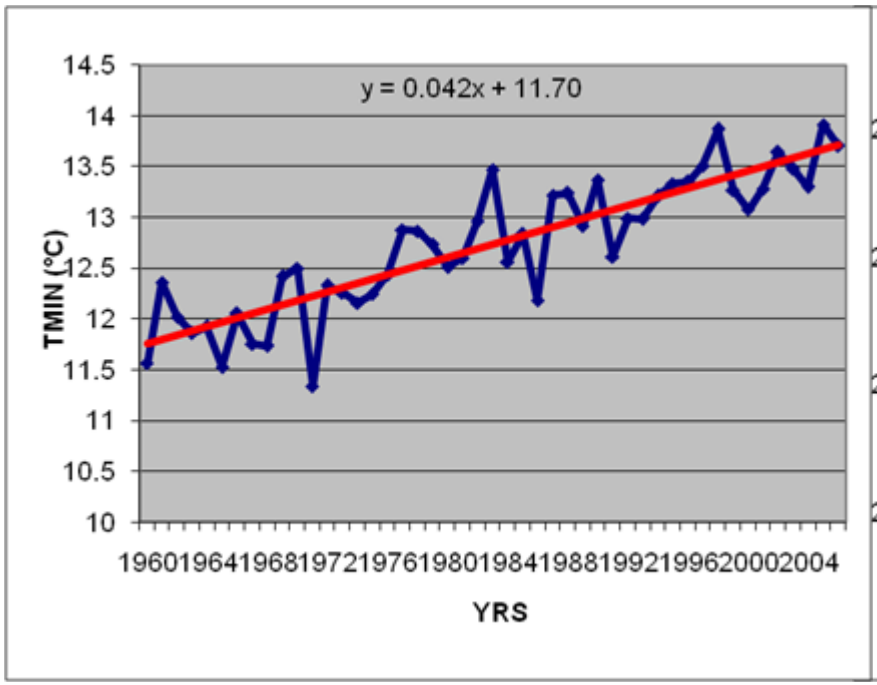
- Nowcasting (6 hrs ahead)
- Weather Forecasts
- 24 hrs,4 days,7 days,14 days,1 month & Seasonal
- Specialized forecasts;
  - Aviation
  - Marine
  - Agriculture
  - Food security
  - Water resources
  - Energy
  - Disaster management
  - Health and other sectors

Some products –Long-term distribution of RF

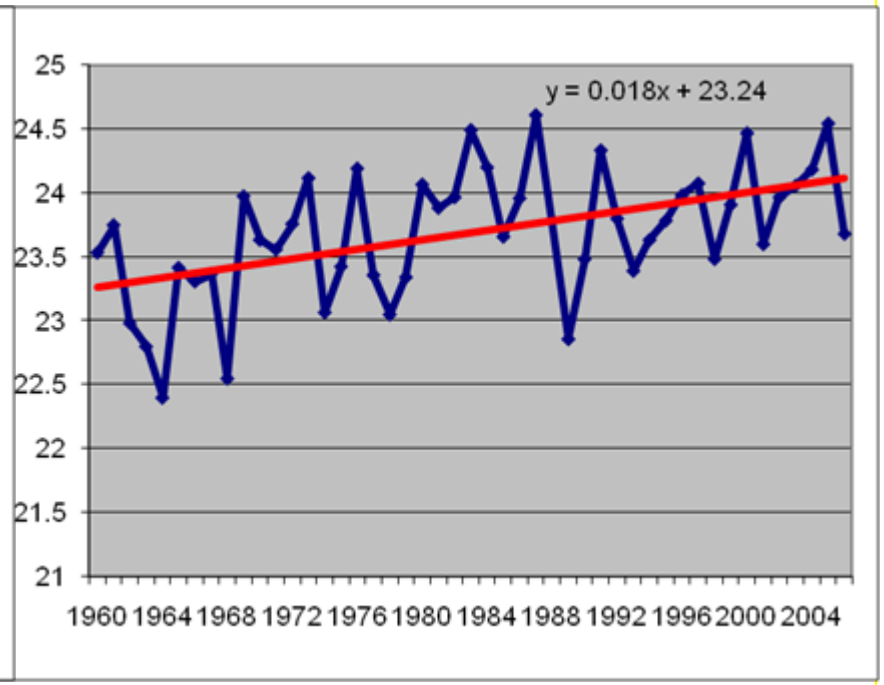


Trends in Temperature at Dagoretti (Nairobi)

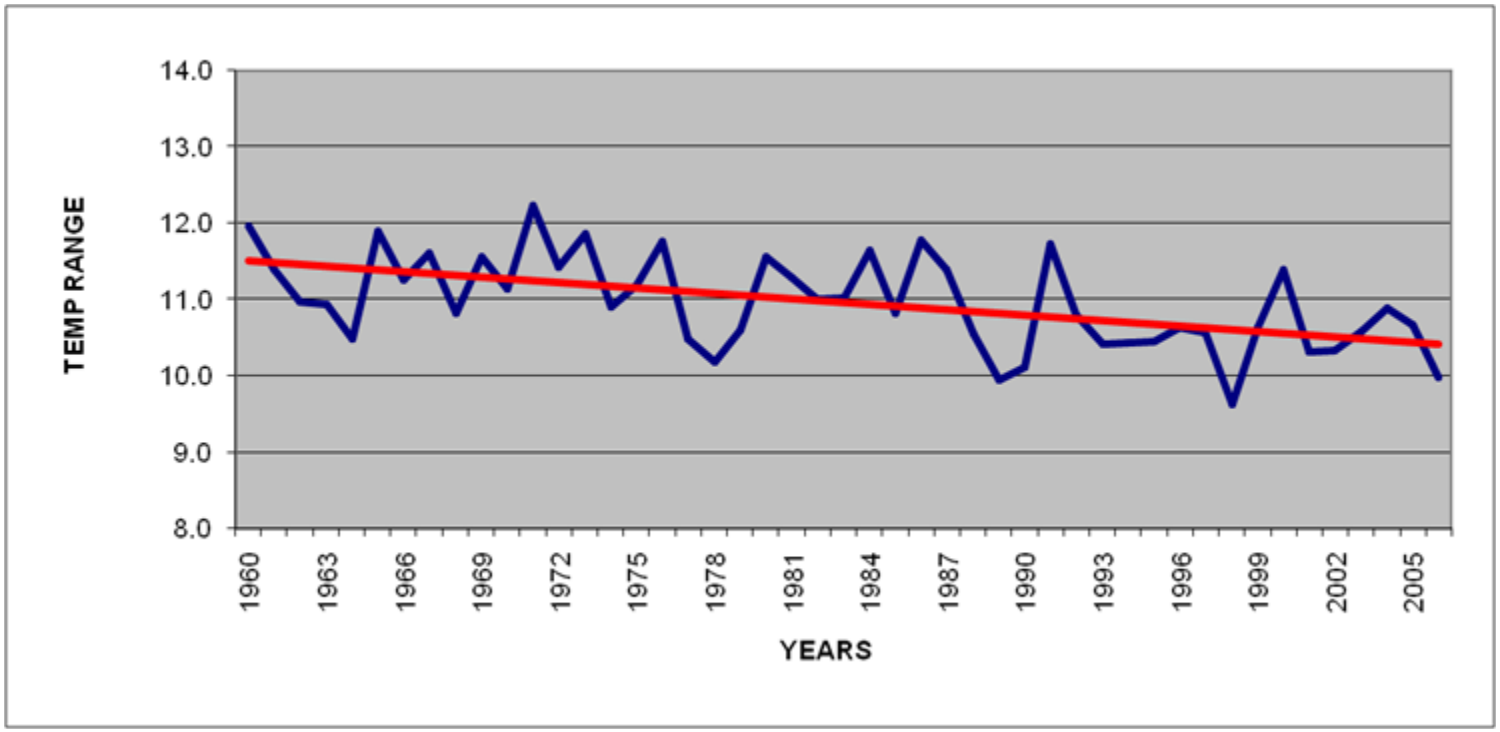
MINIMUM



MAXIMUM

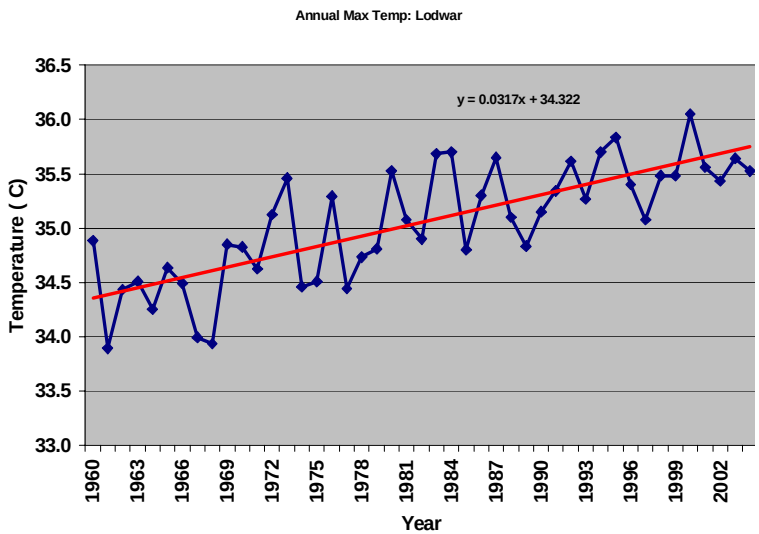


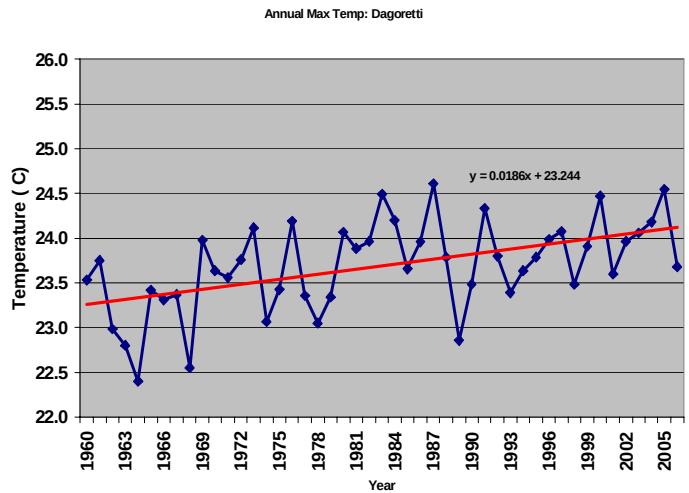
TEMPERATURE RANGE AT DAGORETTI



OBSERVED CLIMATE CHANGE SIGNALS IN KENYA :

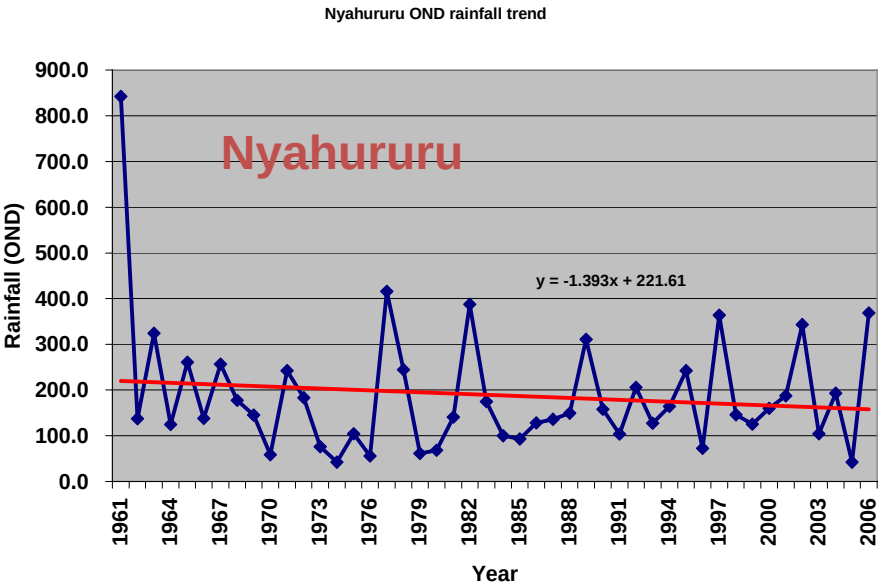
Increases in temperature

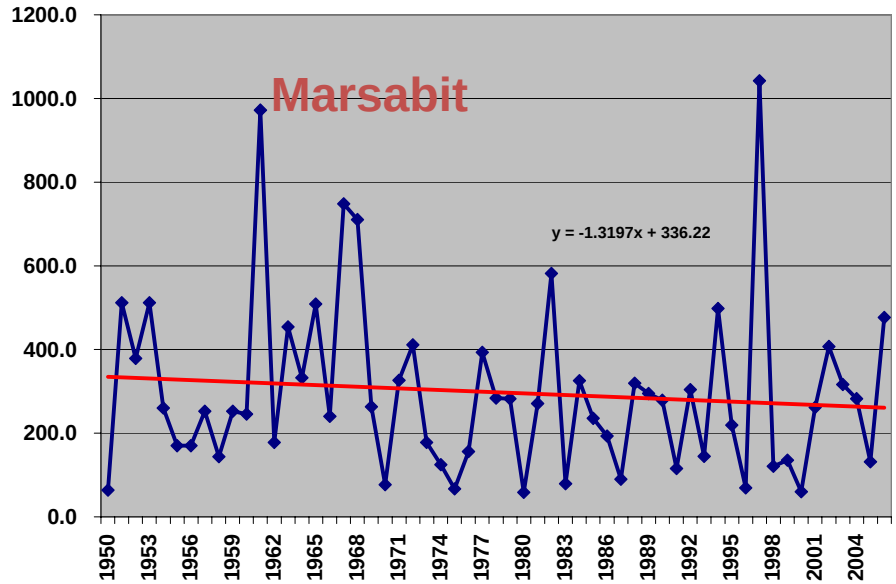


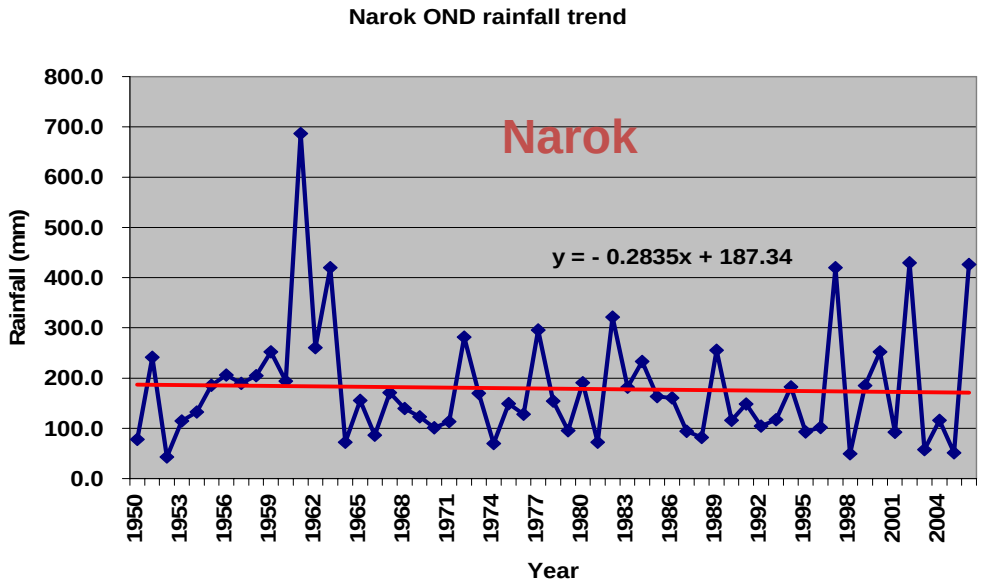


Local maximum temperature trends for Lodwar(Left) and Dagoretti(Right)

Observed Climate Change Signals in Kenya: *Decreasing October – November – December (OND) Seasonal Rainfall Trends*







Finally – Early warning Information for DRR

- Weather warnings and alerts
- Weather advisories
- Climate forecasts and predictions
- Climate advisories
- Stream flow Modeling
- Extreme Weather and severe climate events
  - Droughts Early warning (La-nina conditions)
  - Floods Early warning (El Nino conditions)
  - Real time flood forecasting
  - Extreme temperatures (heat waves)
  - Fog and frost

NB/ Early warning is applied throughout the disaster cycle (Preparedness, response, relief and reconstruction)

Initiatives to improve on EWS for DRR

- A awareness campaign with partners (Nile IWRM-Net, UNISDR, UNOCHA, MOSSP, NDOC and Universities)
- Real time monitoring of hazards
- Timely communication of information
- Research work for thresh-holding of hazards
- Campaign to reach the politicians

Main bottlenecks in NMHS??

- Little funding from national governments
- Inadequate data observational networks and data gaps
- Old equipments in some countries
- Human capacity and succession management problems
- Lack of awareness and poor perception by communities

General Challenges of EWS

- Climate change impacts
  1. Immergence of disease like Rift Valley Fever (RVF) – floods
  2. Highland malaria cases - extreme temperatures
- Lack of knowledge by public to interpret disaster indicators and thresholds
- Changing societal demands and expectation of EWSs over time
- Communication problems
- Hazard characteristics that can change over time
- Domestication of EW tools (Models that are home grown)
- Lack of deterministic EW **m**odels rather than probabilistic ones
- Low level of appreciation and response by community
- Numerical Weather prediction and use of Radar systems is still low

EWS will not work where there is;

- Lack of (poorly implemented) climate-change policies (A national climate change master plan)
- Lack of awareness/preparedness
- A well developed disaster management systems and policies
- Unsustainable exploitation (**over-reliance**) of natural resources
- Lack of relocation opportunities and procedures
- Unfavourable Topography and climate
- Land subdivision and poor land policies
- Adverse socio-economic attributes of risk prone communities (Primary?)
  - Poverty
  - Conflicts
  - High population densities
  - Poor traditions and customs
  - Unwillingness to live with risks (***unwillingness to change with changing environment***)

Conclusions

- *NMHS play major roles in DRR through provision of EW information throughout the disaster cycle*
- *There is need therefore to strength NMHS capacities in order to improve on their role in DRR activities*
- *National DRR platforms should incorporate NMHS in their planning and execution of their national agenda*

Human Encroachment on slopy areas result into: landslides, Mudflows &Rock flow

Flooded Rural Villages: Loss of Livelihood