

KENYA METEOROLOGICAL DEPARTMENT

Towards Improving Early Warning Systems in Kenya:

Examples from operational and research-based efforts to strengthen Preparedness and Early action

Dr Richard Muita, PhD - KMD

Background

Kenya Meteorological Department is the national meteorological service with **AGRICULTURE AND FOOD SECURITY** mandate to provide weather and climate **OBSERVATIONS** (AWS, information to inform decision making AWOS, RADAR, SATELLITE, TRANSPORT (LAND, SEA BUOYS ETC), GNSS, Floating AND AIR) across all sectors Balloon Radiosonde, Mobile WATER RESOURCES Pollution monitoring Lab **TELECOMMUNICATI ONS** (INTERNET, **HEALTH** AMSS, GTS, GSM, **DISASTER RISK** VSAT, PHONE, ETC) NATIONAL **PRODUCT REDUCTION METEOROLOGICAL DISSEMINATION TOURISM CENTRE (NMC) CLIMATE RISK** MANAGEMENT IN AGRI. (WEATHER INDEX **DATA PROCESSING** INSURANCE) **HUMAN RESOURCE** AND FORECASTING **DEVELOPMENT (EXPERTISE, CONFLICT EARLY SYSTEMS WARNING SKILLS & COMPETENCE CC ADAPTATION &**

KADI's outreach and networking event, 17th October 2024

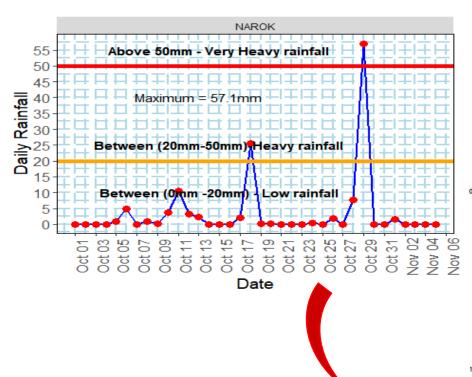
MITIGATION

1) TWIGA-TRANSFORMING WATER, WEATHER, and CLIMATE INFORMATION THROUGH IN SITU OBSERVATIONS for GEO-SERVICES in AFRICA.

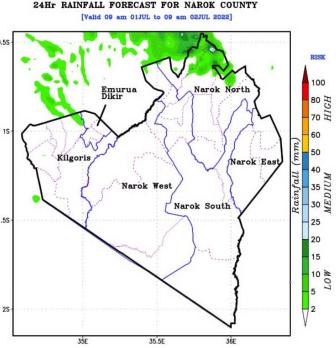
Early Warning Service-Heavy Rainfall and Flooding in Narok County WhatsApp Direct calls Weather data + Frontend Backend Ward Admins Users daily, weekly, Data sources applications (Flash) Group leaders platform monthly, seasonal flood Ranet FM Community Radio forecasts, heavy Citizens rainfall advisories) forecast Synoptic stations AWS stations Pastoralists Ward Flood Volunteer stations Agro-pastoralists Strathmore Disdrometers Monitoring TWIGA Platform Crop-farmers Processed/Raw [KMD] app [HydroLogic] rainfall Data County In situ weather data Hydro-power sector Disaster **AWS stations** Advisories for heavrainfall (>20mm) flood alerts Severe weather forecasts Management County Water Dept [TAHMO] National Game Reserve Meteorological Stream flow data Flood Tourists River level Monitoring gauges/meters WRF and [WRA] Flood model [KMD] Town/Site In situ, satellite maps Watching **ECMWF** Satellite, verification and Downscaled Model validation Forecast weather data stations, models [UK Met] Thresholds for Scenarios for weather and output [SAWS] severe weather heavy rainfall data/maps interpretation GPC models and rainfall amounts Advisories and Flood Alerts [WM0] Real time weather Scenarios for river wn/Site water levels forecasts Advisories for atching/ DM [Aqualinks]

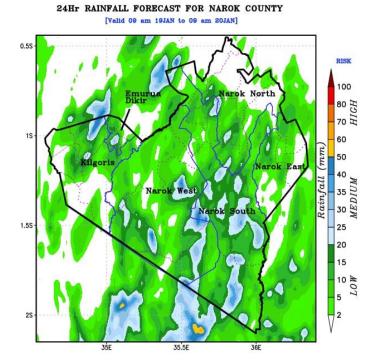
TWIGA-TRANSFORMING WATER, WEATHER, and CLIMATE INFORMATION THROUGH IN SITU OBSERVATIONS for GEO-SERVICES in AFRICA.

Early Warning Service-Heavy Rainfall and Flooding in Narok County – 2018 to 2022



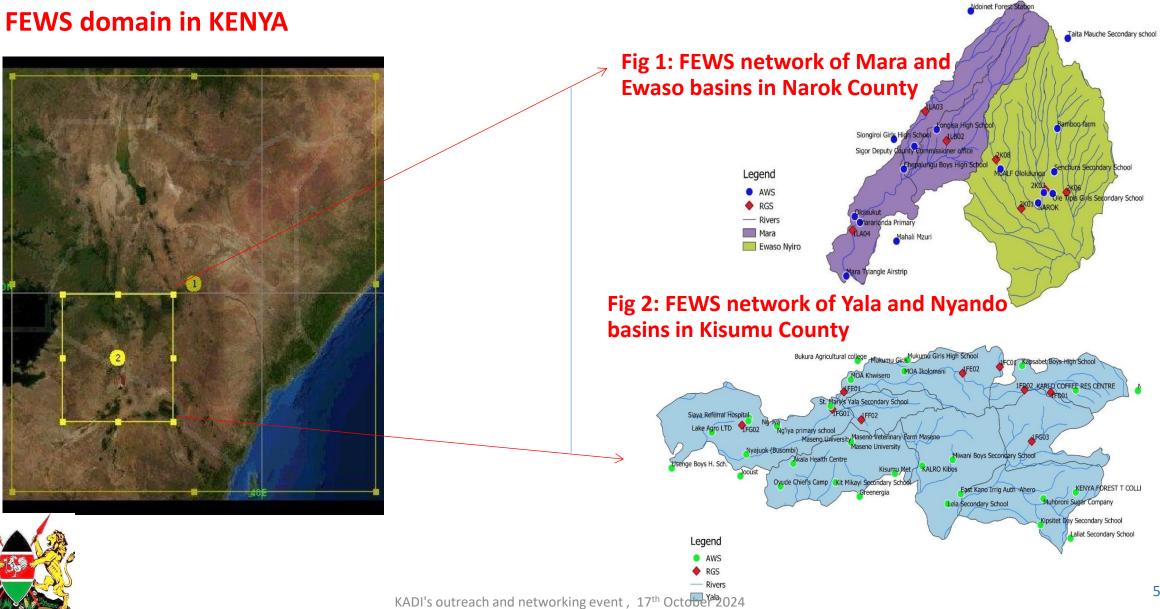
- Running of Weather Research and Forecasting (WRF) model on 24hour basis (main domain over Kenya-5km, nest over Narok 2km)
- Product dissemination through WhatsApp platform –packaged for over 200 end-users





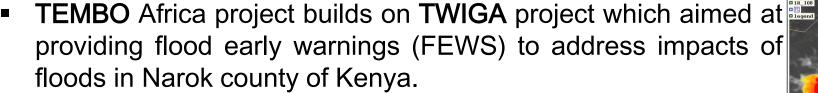


2) TEMBO -Transformative Environmental Monitoring to Boost Observations in Africa



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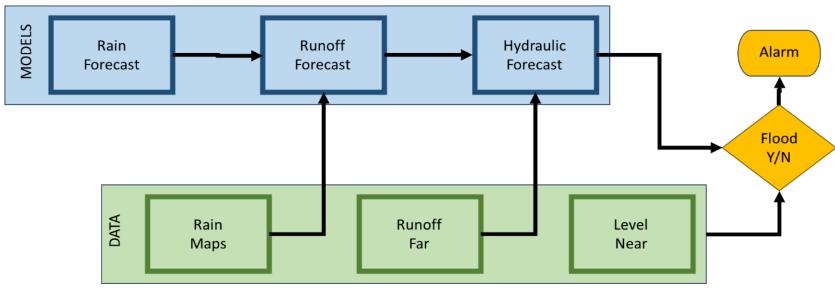




- Since 2023, focus is on key basins in Narok (Mara & Ewaso) and Kisumu (Yala and Nyando).
- The FEWS in the basins comprises
- 1. WRF-model for heavy rainfall and flood risk forecasting
- 2 **GR4J** model; for hydrological flood forecasting

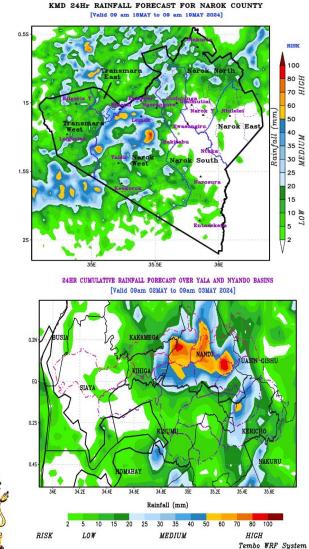


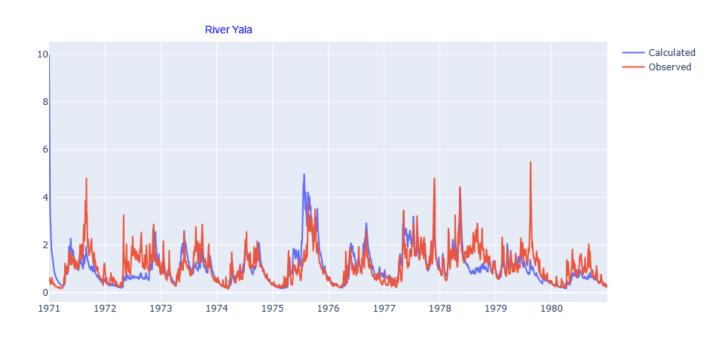




TEMBO- Flood Early Warning Service

WRF model and Flood risk - NAROK (Mara and Ewaso) and KISUMU (Yala and Nyando)



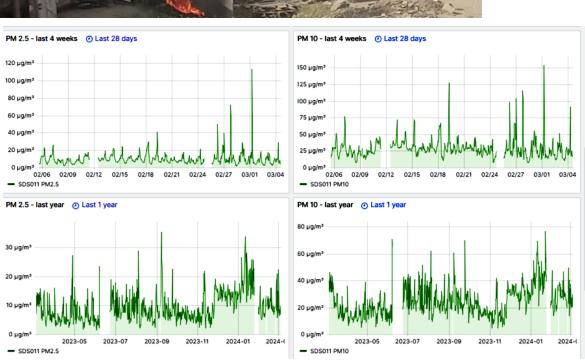


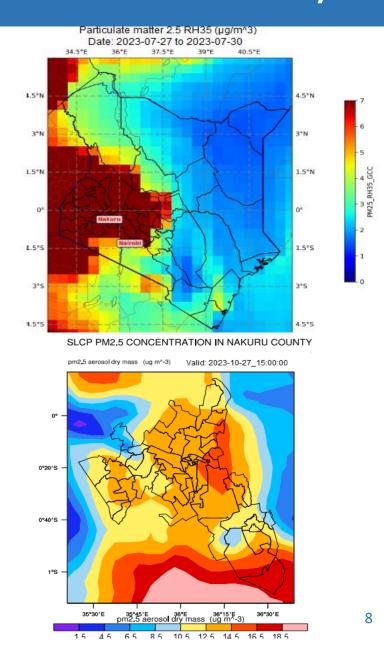
Streamflow for YALA



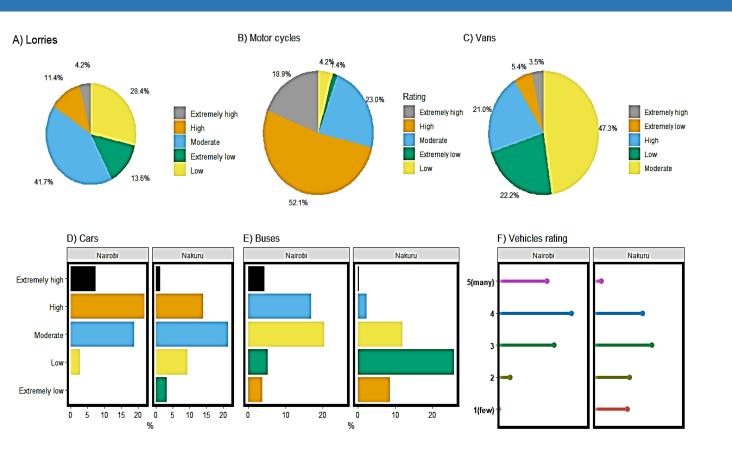
3) KMS –KMD partnership Status, Quantification and Early Warning System for Short Lived Climate Pollutants in Kenya

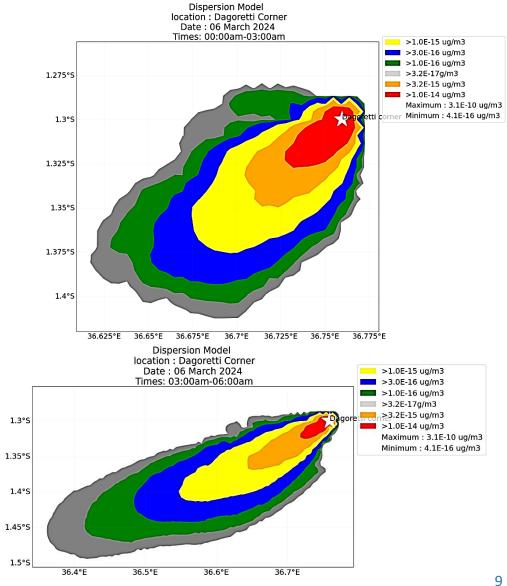






Dispersion model for early warning monitoring of SLCPS in Nairobi and Nakuru





4) Ozone Monitoring



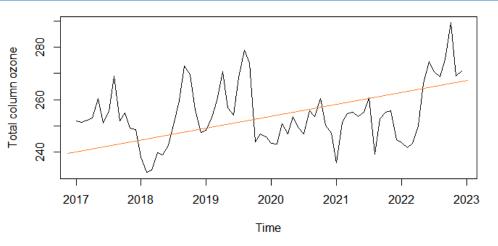


Figure A: Total column ozone over Nairobi from 2017 - 2023

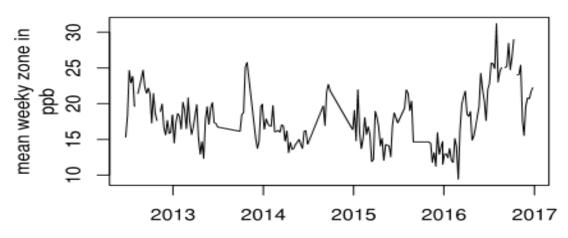


Figure: Mean weekly surface ozone in ppb at the Nairobi station between 2012 and 2017

Selected other projects and collaborators/partners

Projects include:

- ✓ FICAP Flemish International Climate Action Program
- ✓ SAFE4ALL- Safeguarding African Foodsheds and Ecosystems for all Actors across Local, regional and international Levels to manage migration
- ✓ WISER Weather and Climate Information Services
- ✓ KCSAP Kenya Climate Smart Agriculture Project
- ✓ KCEP-CRAL Kenya Cereal Enhancement Programme-Climate Resilient Agricultural Livelihood Window
- ✓ GCRF –Global Challenges Research Fund

Collaborators include:-

- ✓ The University of Nairobi
- ✓ Regional Centre for Mapping of Resources for Development
- ✓ The University of Dar-es-Salaam
- ✓ Segien University, Germany
- ✓ CEH-Wallingford, UK
- ✓ The Free University, Belgium
- ✓ WaterNet
- ✓ Western University College of Science and Technology (WUCST)
- ✓ The Met. Office UK
- ✓ Others

ASANTENI KWA KUNISIKILIZA

TEMBO Africa – KMD