



KENYA METEOROLOGICAL DEPARTMENT

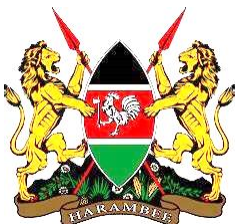
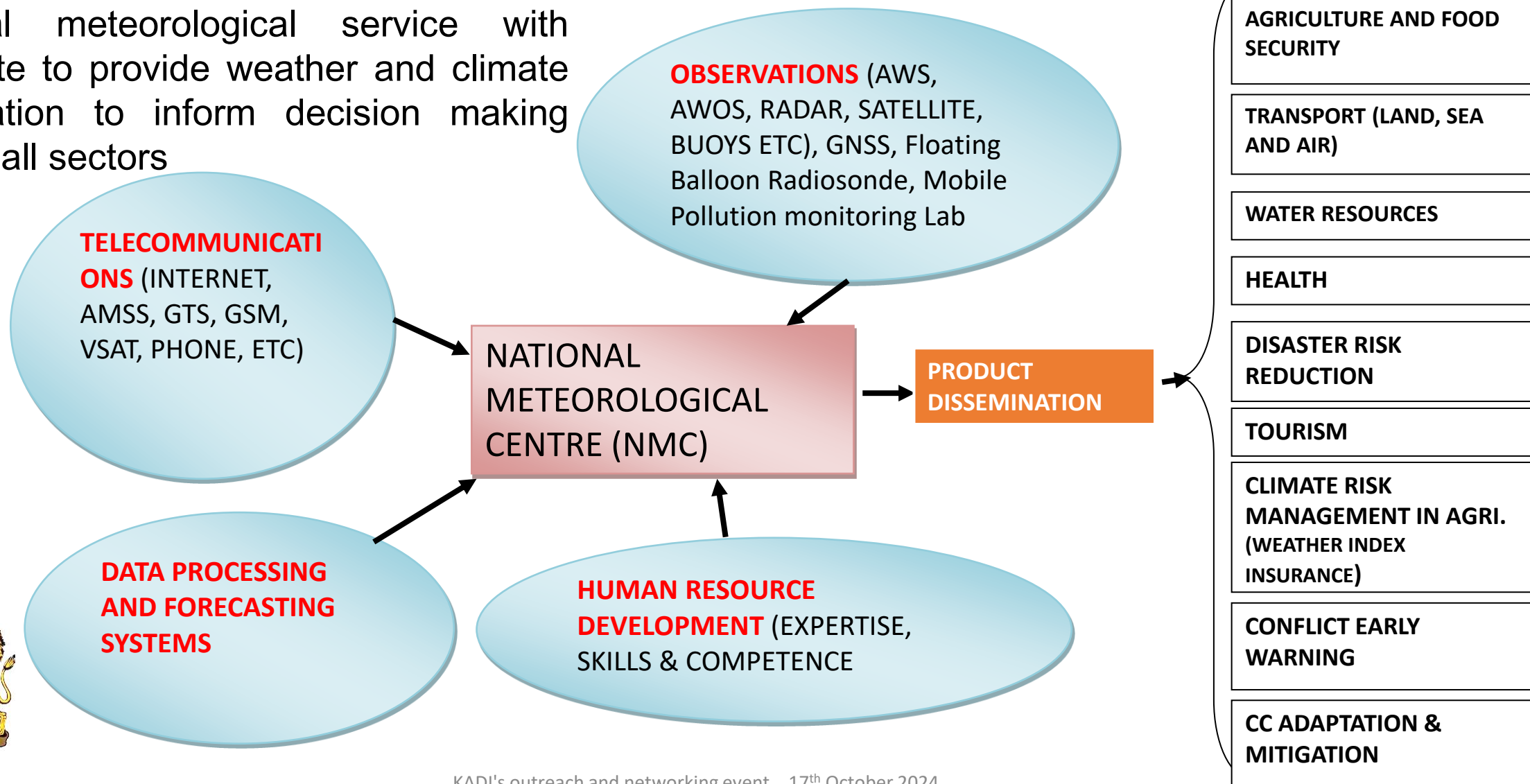
Towards Improving Early Warning Systems in Kenya:

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

Dr Richard Muita, PhD - KMD

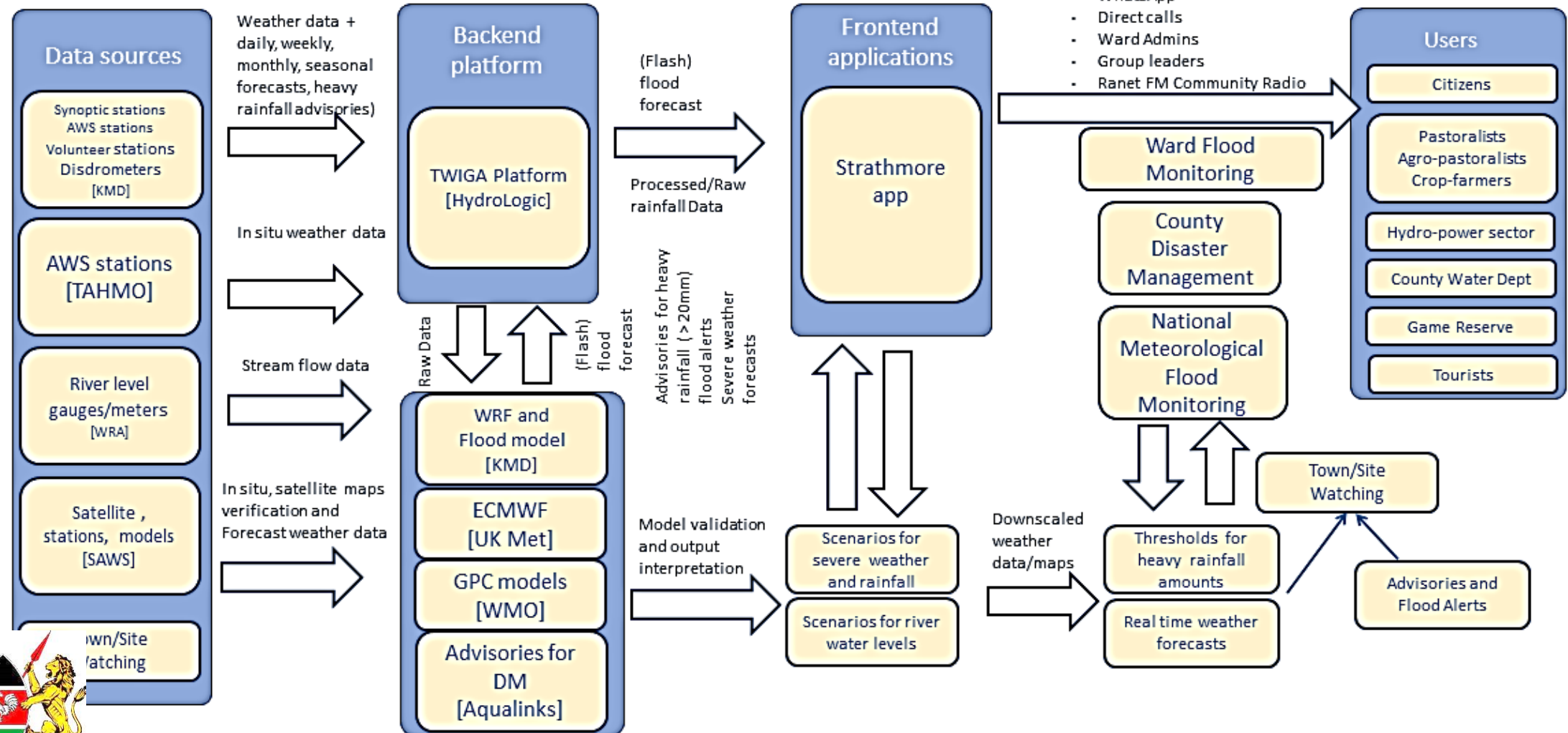
Background

- Kenya Meteorological Department is the national meteorological service with mandate to provide weather and climate information to inform decision making across all sectors



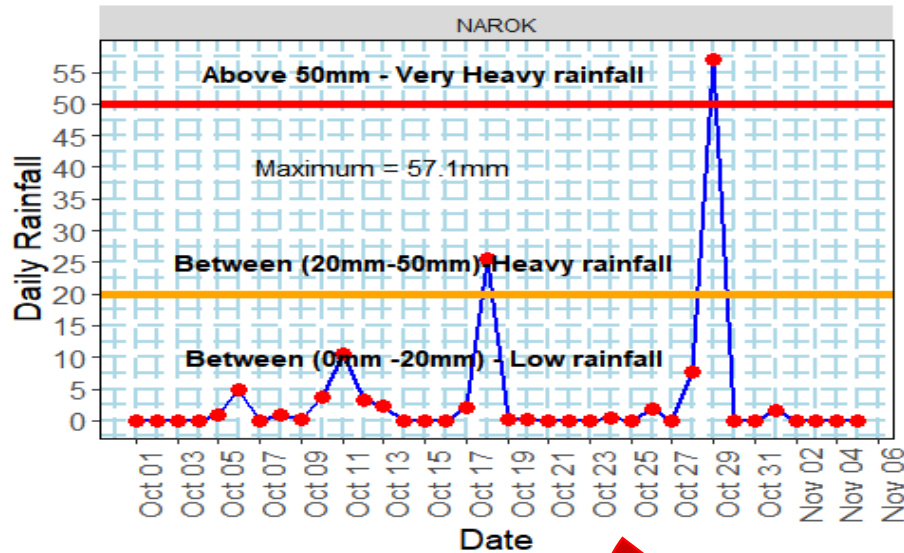
1) TWIGA-TRANSFORMING WATER, WEATHER, and CLIMATE INFORMATION THROUGH IN SITU OBSERVATIONS for GEO-SERVICES in AFRICA.

Early Warning Service-Heavy Rainfall and Flooding in Narok County



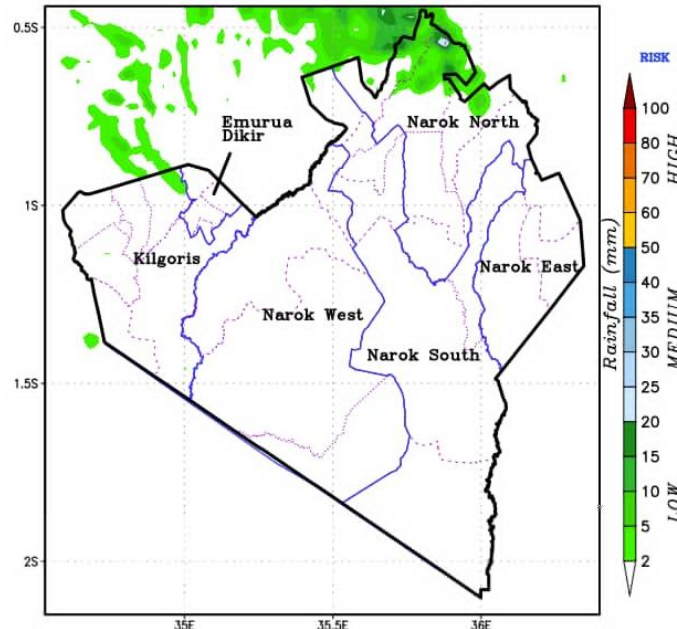
TWIGA-TRANSFORMING WATER, WEATHER, and CLIMATE INFORMATION THROUGH IN SITU OBSERVATIONS for GEO-SERVICES in AFRICA.

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

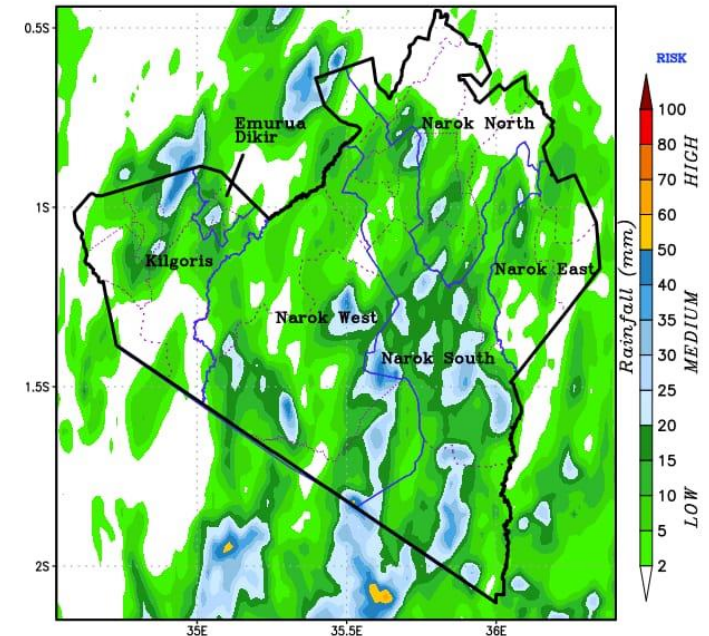


- Running of Weather Research and Forecasting (WRF) model on 24hour basis (main domain over Kenya-5km, nest over Narok – 2km)
- Product dissemination through WhatsApp platform –packaged for over 200 end-users

24Hr RAINFALL FORECAST FOR NAROK COUNTY
[Valid 09 am 01JUL to 09 am 02JUL 2022]



24Hr RAINFALL FORECAST FOR NAROK COUNTY
[Valid 09 am 19JAN to 09 am 20JAN]



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

FEWS domain in KENYA

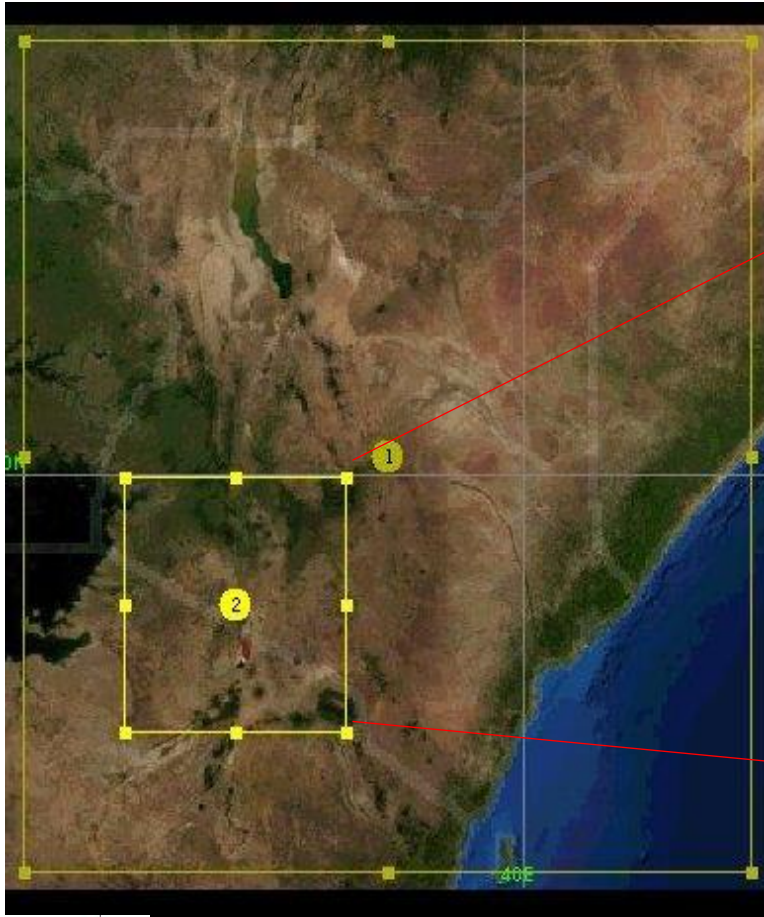


Fig 1: FEWS network of Mara and Ewaso basins in Narok County

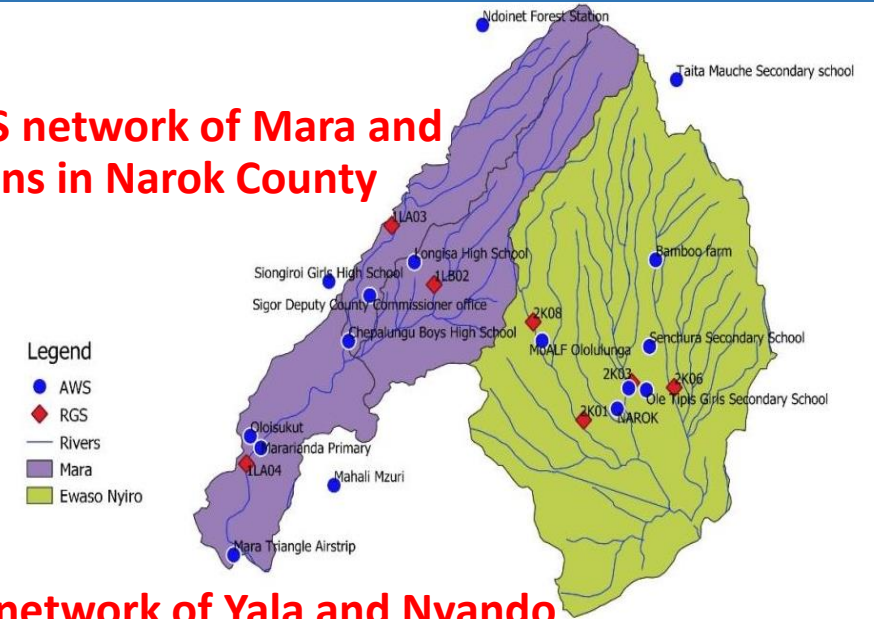
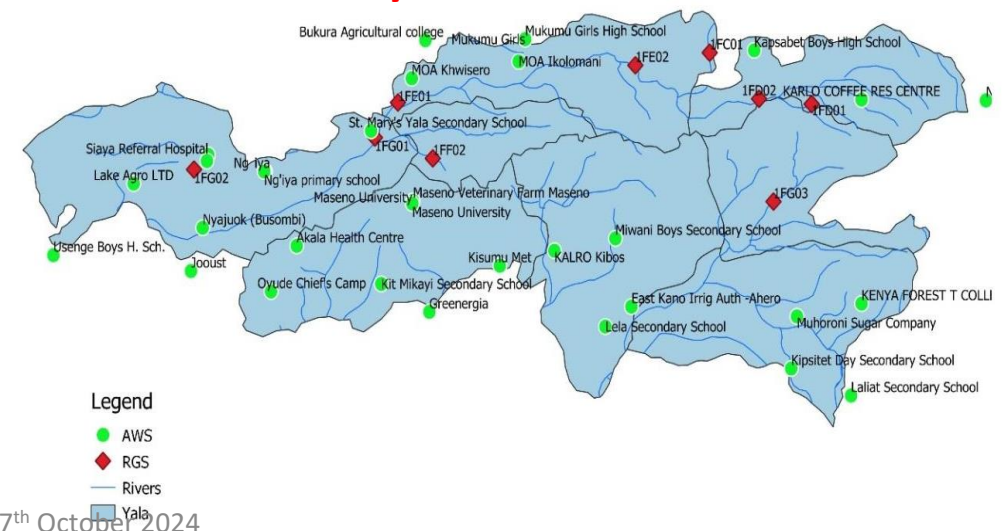
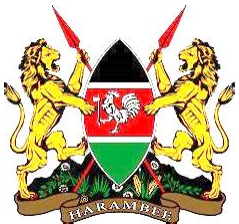
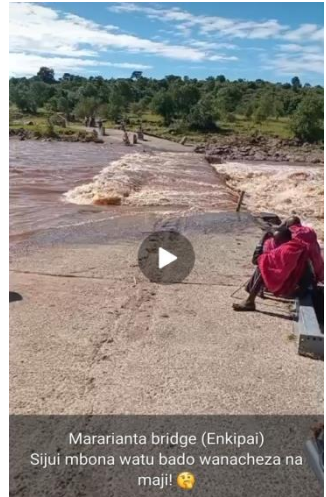


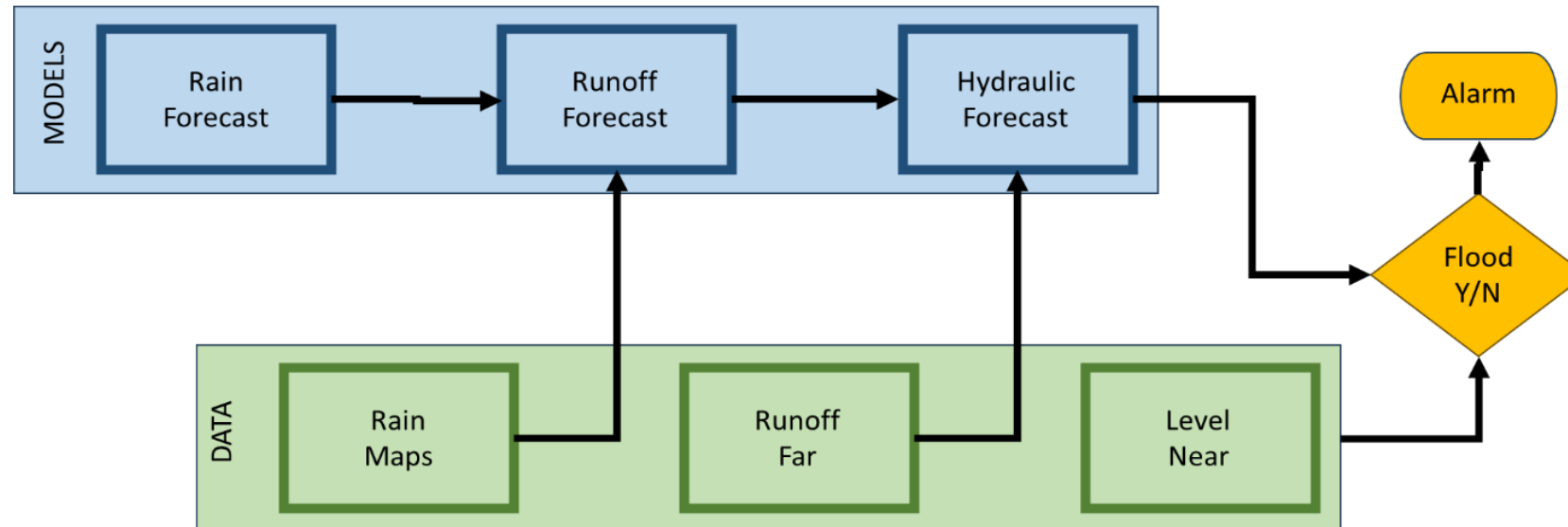
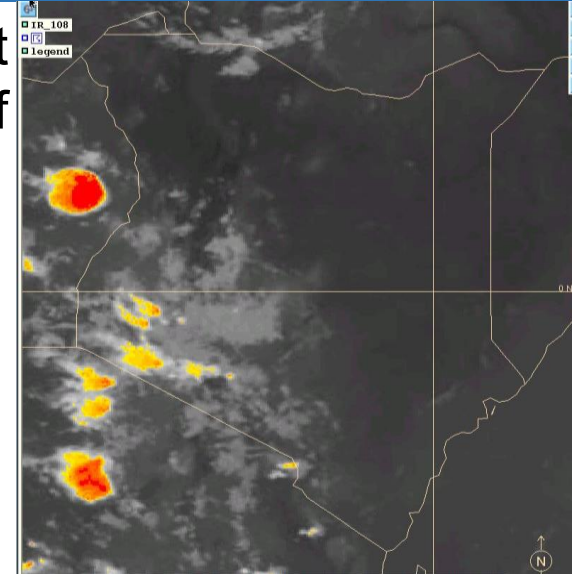
Fig 2: FEWS network of Yala and Nyando basins in Kisumu County



TEMBO -Transformative Environmental Monitoring to Boost Observations in Africa

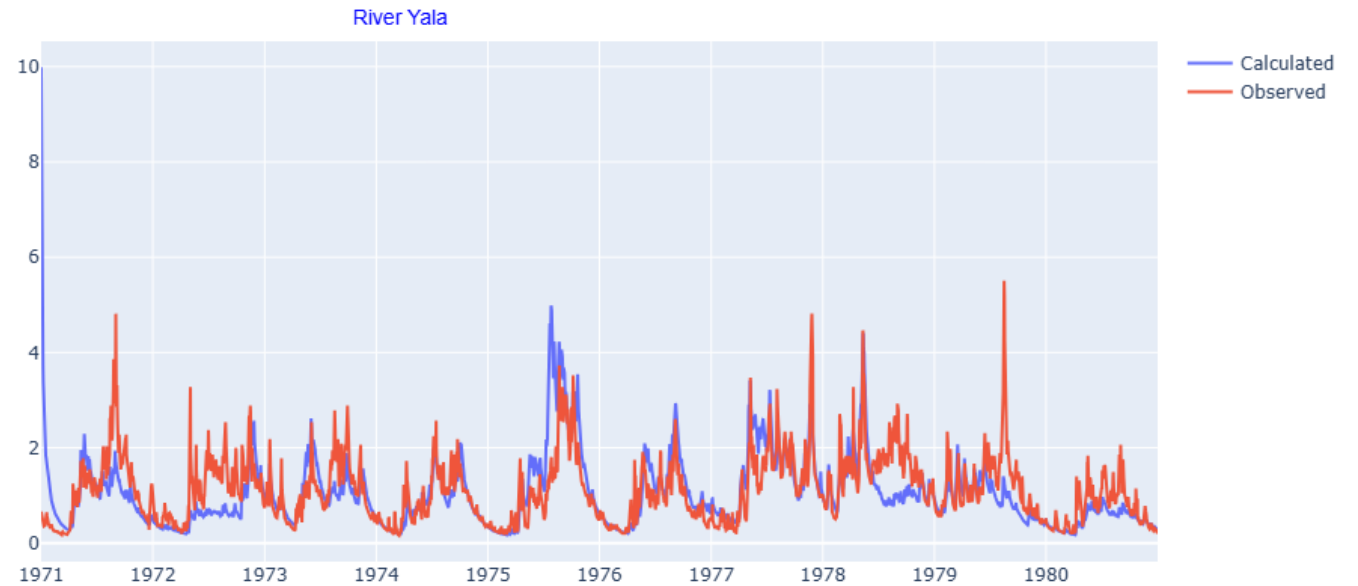
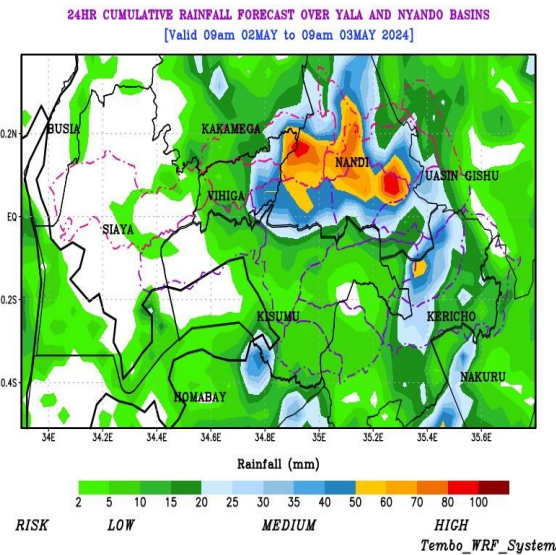
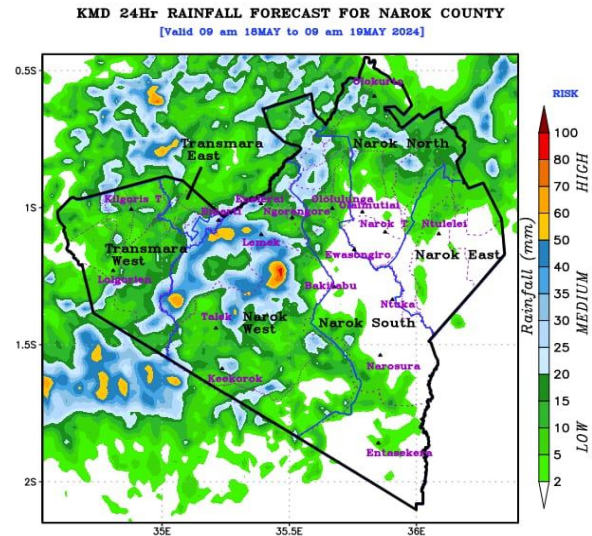


- **TEMBO** Africa project builds on **TWIGA** project which aimed at providing flood early warnings (FEWS) to address impacts of floods in Narok county of Kenya.
 - Since 2023, focus is on key basins in Narok (Mara & Ewaso) and Kisumu (Yala and Nyando).
 - The FEWS in the basins comprises
 - 1. **WRF**-model for heavy rainfall and flood risk forecasting
 - 2 **GR4J** model; for hydrological flood forecasting

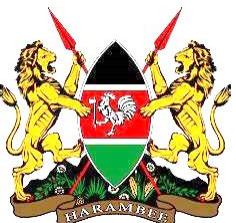


TEMBO- Flood Early Warning Service

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

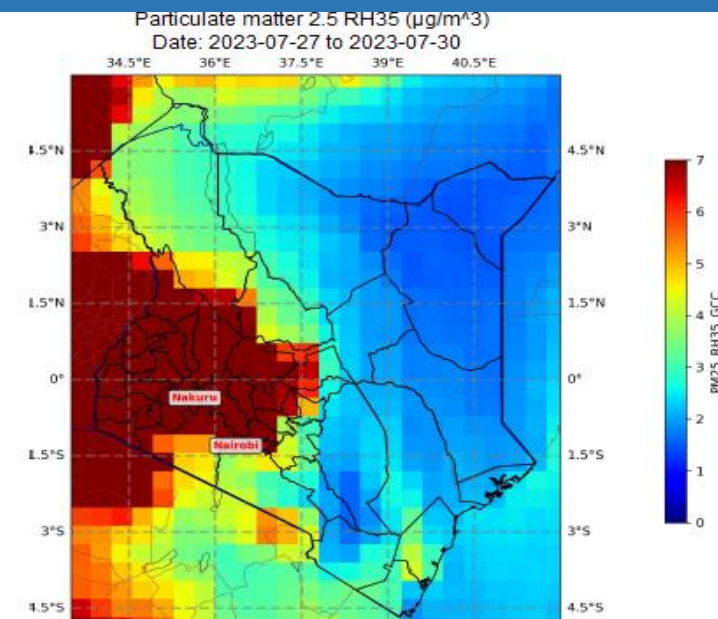
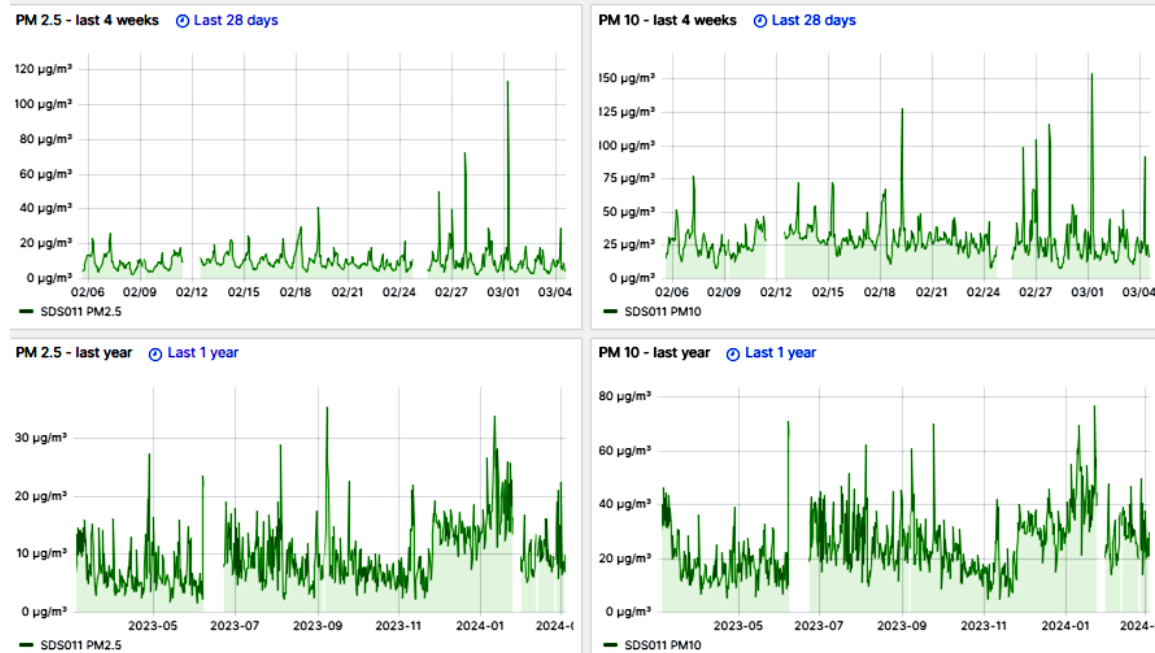


Streamflow for YALA

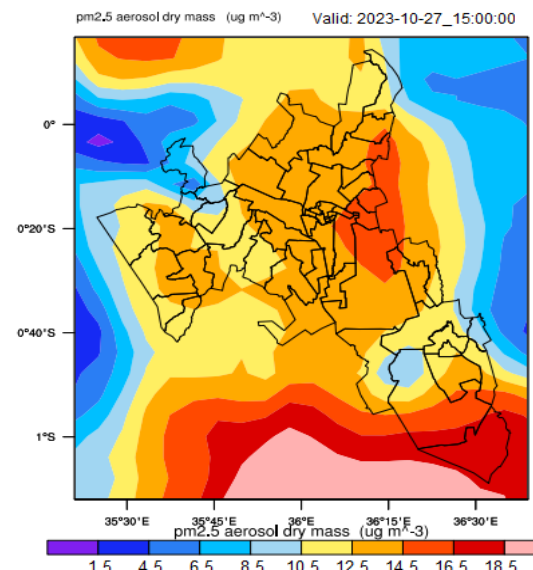


3) KMS –KMD partnership

Status, Quantification and Early Warning System for Short Lived Climate Pollutants in Kenya

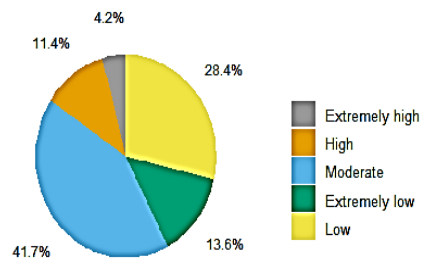


SLCP PM2.5 CONCENTRATION IN NAKURU COUNTY

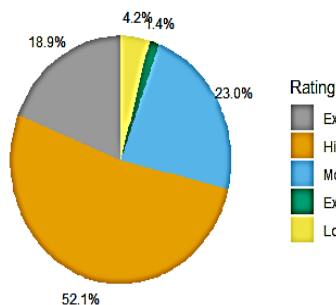


Dispersion model for early warning monitoring of SLCPS in Nairobi and Nakuru

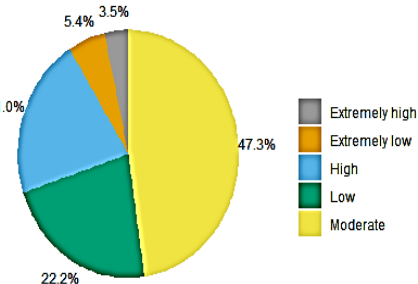
A) Lorries



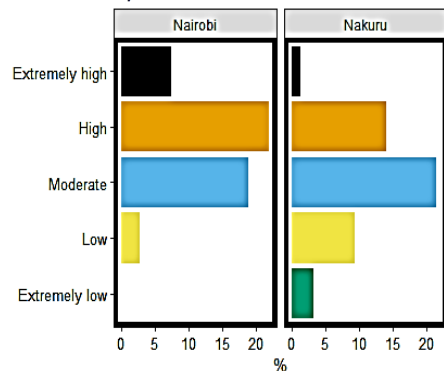
B) Motor cycles



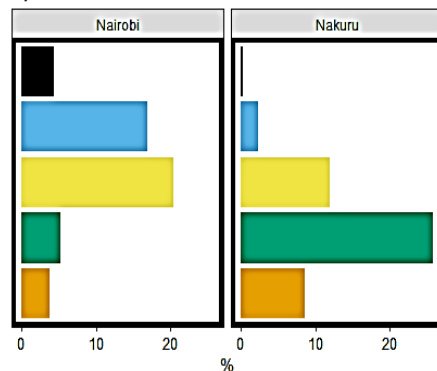
C) Vans



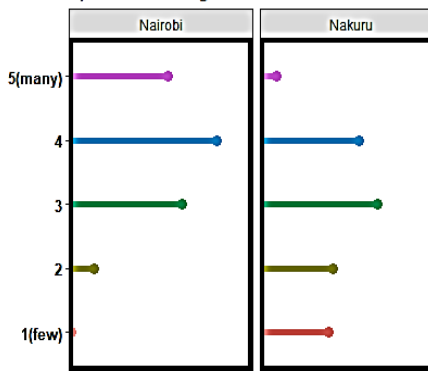
D) Cars



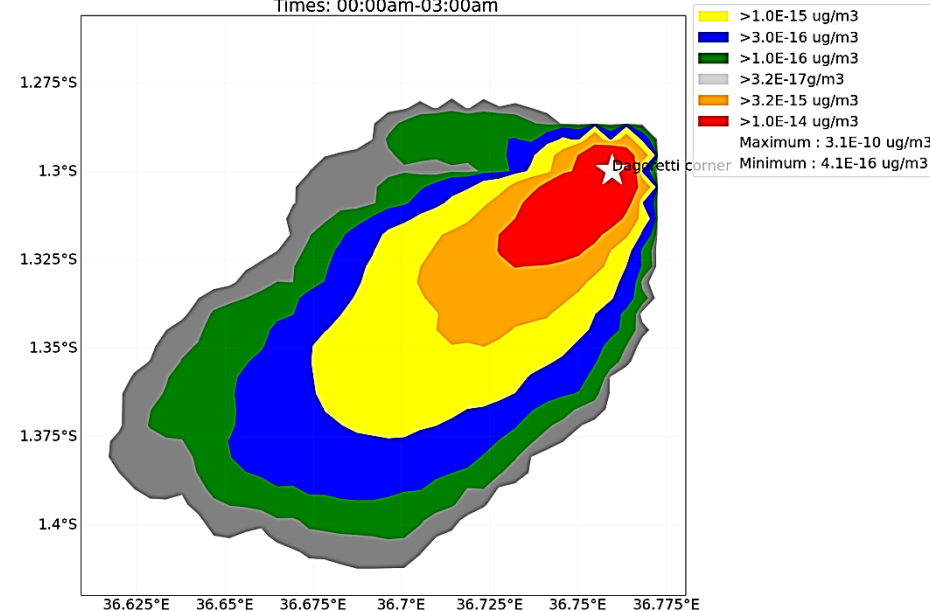
E) Buses



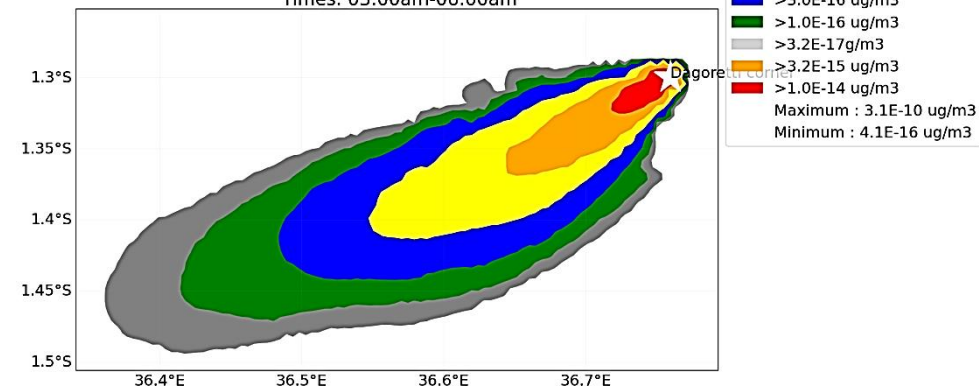
F) Vehicles rating



Dispersion Model
location : Dagoretti Corner
Date : 06 March 2024
Times: 00:00am-03:00am



Dispersion Model
location : Dagoretti Corner
Date : 06 March 2024
Times: 03:00am-06:00am



4) Ozone Monitoring



Picture 3: Thermoscientific 49i

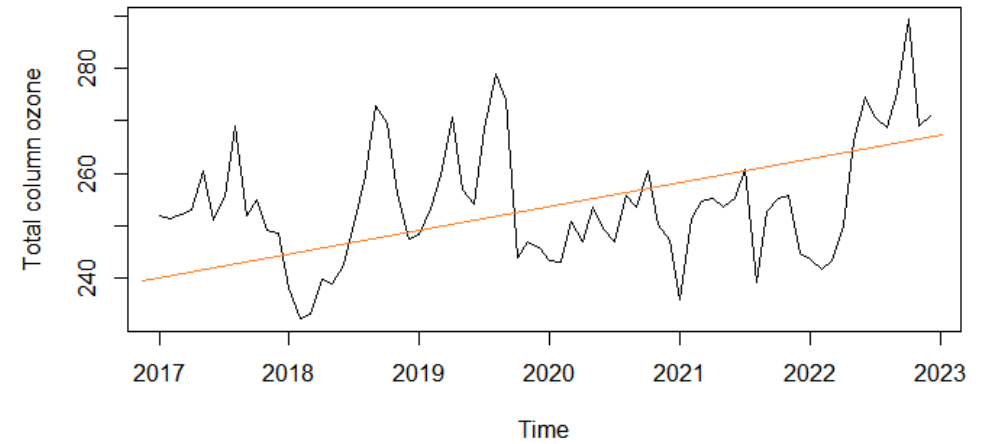


Figure A: Total column ozone over Nairobi from 2017 - 2023

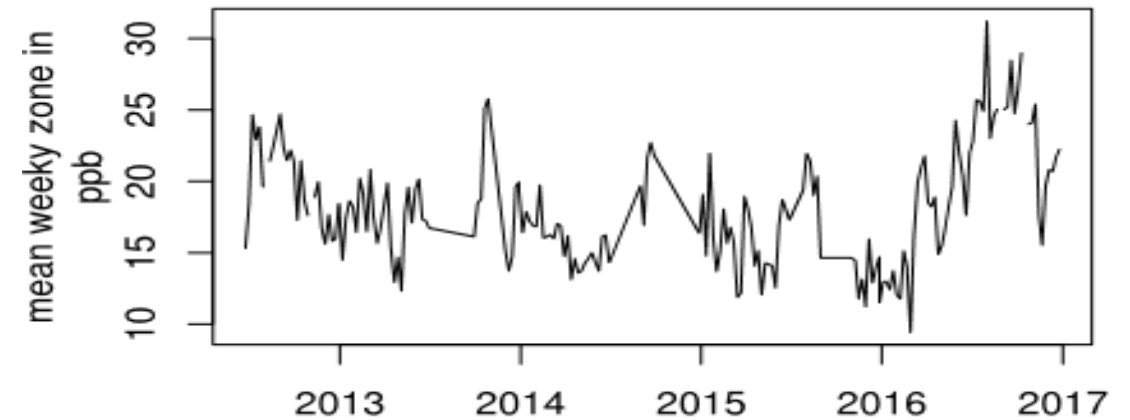


Figure: Mean weekly surface ozone in ppb at the Nairobi station between 2012 and 2017

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