Contribution ID: **118** Type: **Oral presentation**

FORECASTING DROUGHT EVENTS IN KENYA ASALS REGION: A CNN-BASED FRAMEWORK USING CHIRPS PRECIPITATION DATA.

Wednesday 23 April 2025 15:05 (20 minutes)

Aim: Food insecurity and economic instability have resulted from the severe effects of droughts on agricultural output in Kenya's Arid and Semi-Arid Lands (ASALs). These regions have faced increasing vulnerability due to erratic rainfall patterns, resulting in severe crop failures and livestock losses. Despite efforts to forecast droughts, existing techniques have frequently been imprecise, thereby hindering timely intervention. By developing a CNN-based framework with CHIRPS precipitation data and the Standardised Precipitation Index (SPI), this study aimed to increase the precision of drought forecasts and provide actionable insights on managing the effects of drought in ASALs by describing past drought occurrences, analysing precipitation trends, and utilising machine learning.
Method: The research involved preprocessing CHIRPS data, spanning from 1981 to 2024, to calculate SPI values and address missing data using the Inverse Distance Weighting (IDW) method. A CNN-based model that integrated precipitation's temporal and spatial characteristics was developed to forecast drought situations. The model was trained to identify spatial hotspots and forecast drought events across the 14 semi-arid counties in Kenya's ASAL region.
Results: To facilitate more informed decision-making for drought mitigation, this framework aimed to increase the accuracy and timeliness of drought predictions. When compared to conventional techniques, the CNN model performed better, improving the capacity to predict drought occurrences with more accuracy and spatial precision.
Conclusion: The results of this study offer a useful tool for enhancing resilience in Kenya's ASALs and informing proactive drought management strategies.

Keywords: CNN-Based, Chirps Precipitation Data, Forecasting Drought

Author: Ms MATHENGE, Bernice (African Centre of Excellence Data Science)

Co-authors: Dr BATAMULIZA, Jennifer (University of Rwanda); Dr K. MUTAI, Charles (Department of Mathematics, Physics and Computing, Moi University)

Presenter: Ms MATHENGE, Bernice (African Centre of Excellence Data Science)

Track Classification: Emerging Technologies to adapt and mitigate climate change effects: Big data and AI for climate change solutions