WISER –Early Warning for Southern Africa(EWSA)

NWCSAF CDOP4 Users' Workshop 2025

Hellen Msemo[1], Estelle De Coning[1], Douglas Parker[2]

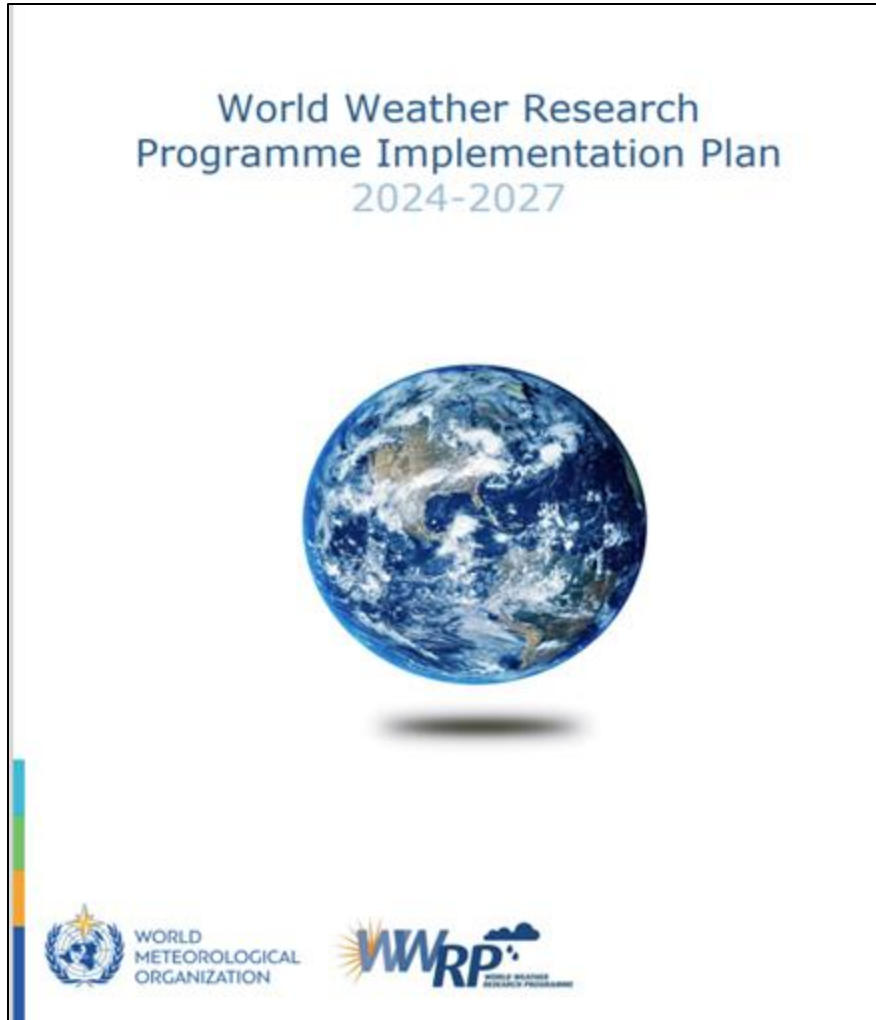*[1]The WMO, World Weather Research Programme*

[2]The University of Leeds- UK

Introduction

- ✓ World Weather Research Programme of WMO - ADVANCE initiative

- ✓ WISER-EWSA project

- • Conclusion

WWRP Implementation Plan (2024- 2027)

World Weather Research
Programme Implementation Plan
2024-2027

WORLD METEOROLOGICAL ORGANIZATION

- Builds on extensive results from previous core projects (PPP, S2S and HIWeather)

- Research co-created with physical and social scientists to better ensure useful outcomes

- Explicit emphasis on designing weather warnings to meet the challenges of a changing climate

- Research that specifically incorporates vulnerable populations

WORLD METEOROLOGICAL ORGANIZATION

WISER

WWRP World Weather Research Programme

Aiding Decision-making in Vulnerable Africa with Nowcasting of ConvEction (ADVANCE)
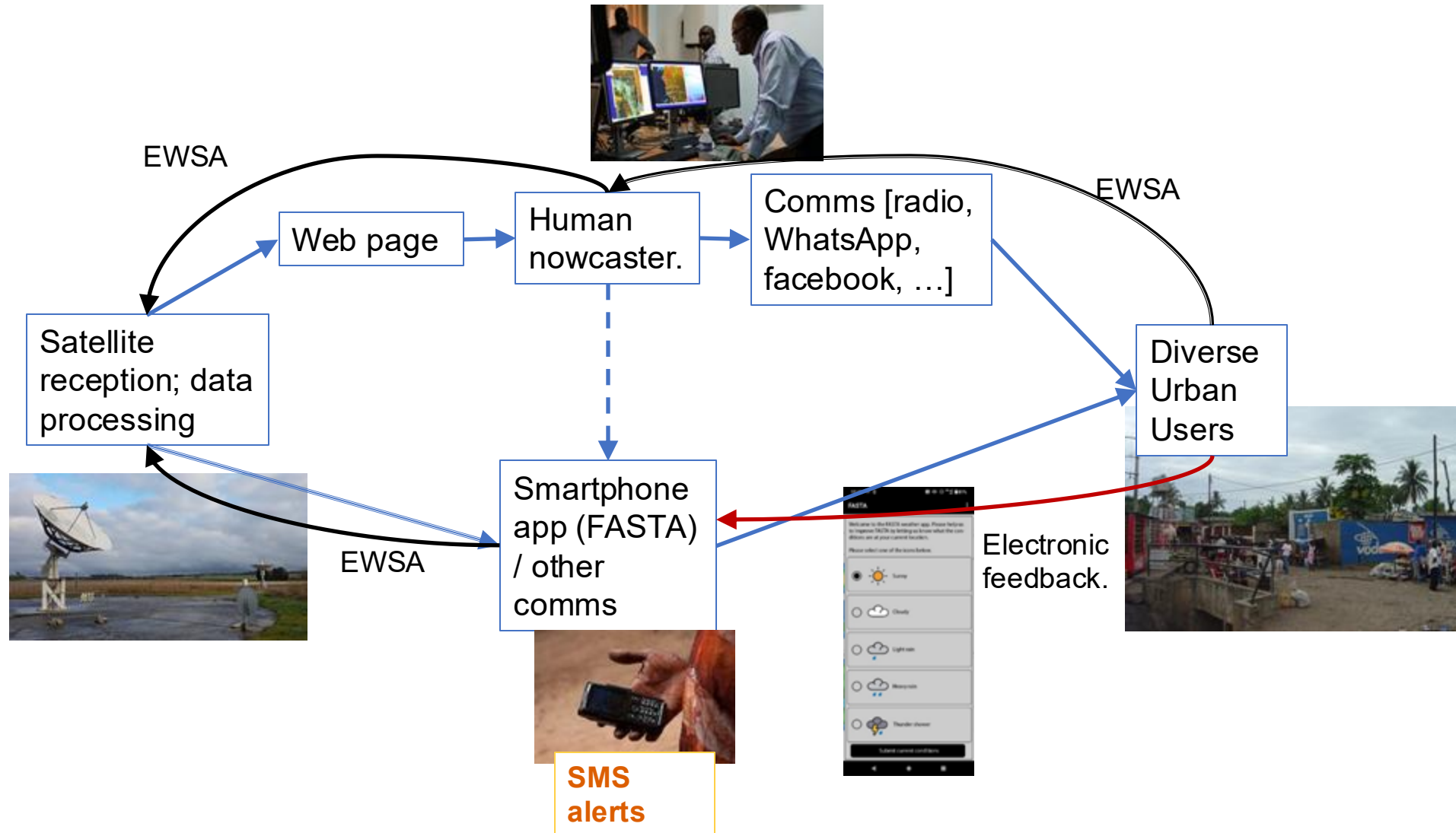
- Advancing Nowcasting with Deep Learning techniques (ANDel) - aimed at enhancing weather forecasting in West Africa

- [Weather and Climate Information Services (WISER): Early Warnings for Southern Africa (EWSA)](#)

- Climate Risk and Early Warnings (CREWS) Central Africa

- Climate Risk and Early Warnings (CREWS) East Africa

- Resilience and Preparedness to Tropical Cyclones over Southern Africa (REPRESA)

- Flood Early Warning 4 Ethiopia: Urban Flood Warning for Africa as a step towards Early Warning for All

WISER-EWSA Aim

To transform the access of **socially disadvantaged urban groups in Southern Africa** to short-range early-warning systems (EWS) **on the 0-48h timescale,** and we will especially **innovate around nowcasting information for the 0-6h timescale,** which is transformational for Southern Africa.

Novel end-to-end process: From community needs through to operational meteorology and scientific innovation.

WISER-EWSA-User Centred

EWSA

EWSA

Web page → Human nowcaster. → Comms [radio, WhatsApp, facebook, …]

Satellite reception; data processing

Diverse Urban Users

EWSA

Smartphone app (FASTA) / other comms

Electronic feedback.

SMS alerts

WORLD METEOROLOGICAL ORGANIZATION

WISER Weather and Climate Information Services

WWRP WORLD WEATHER RESEARCH PROGRAMME
World Weather Research Programme

Objectives

- **Strengthen capacity** for co-producing nowcasts and forecast EWSs

- **Reduce risk** of extreme storms for diverse urban populations

- **Identify business models to ensure sustainability**

- **Stimulate regional demand for nowcasts** as part of a suite of weather and climate information

Outcomes

- **Effective risk-reduction/resilience-building** based on enhanced EWS

- **Financially sustainable nowcasting information provision** throughout Southern Africa

Impact

- **Saved lives and property** through increased climate resilience.

Floods Affect About 100 Families In Lusaka

Tropical Weather Forecasting

Do not assume that forecast products for Africa are as good as those for the Global North,

"... even post-processed forecasts are hardly better than climatology."

Vogel et al. 2020.

▪ **Tropical convection is inherently unpredictable on time-scale of days**

1-day raw ECMWF skill

1-day postprocessed ECMWF skill

[Blue is skilful]
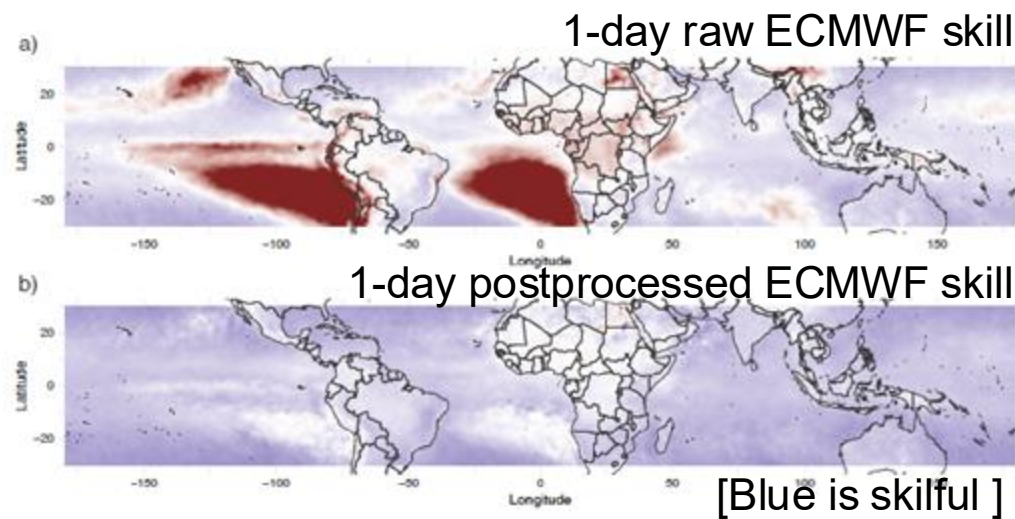
Only 44% of Africans have any access to early warnings.
- Cullmann *et al.* (2020) 2020 State of climate services …, WMO-No. 1252. ISBN 978-92-63-11252-2

Nowcasting

FASTA

https://view.eumetsat.int/productviewer?v=default
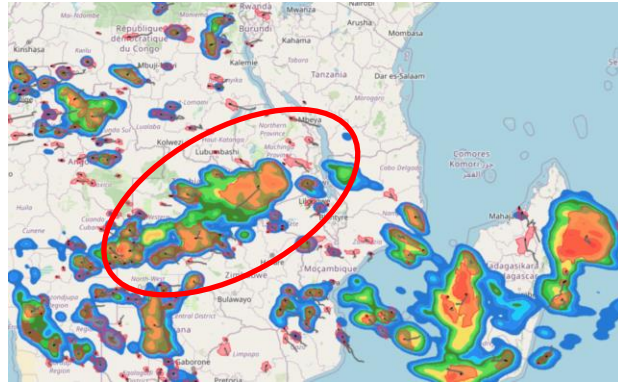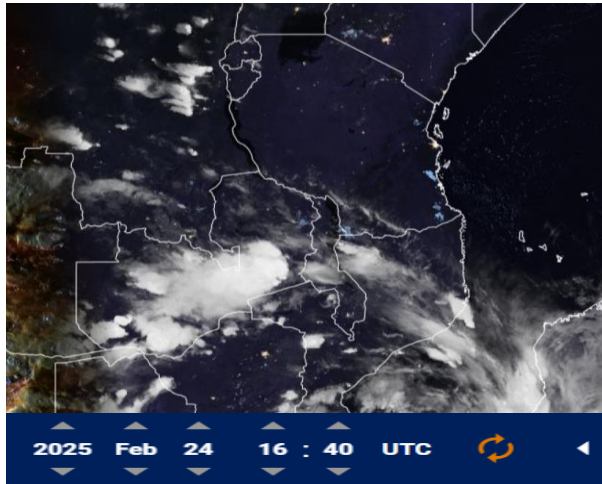
Real-time information on weather hazards, and a short prediction (0 – 6h).
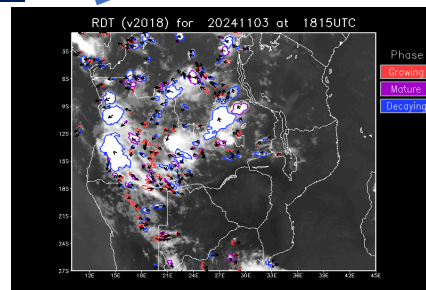
"All the data shows … that when people get a warning and they take [it] seriously, they can rescue themselves … They need 1 hour, not more." Bruno Merz, Helmholtz Centre Potsdam, quoted in *Science*, 2021

Artificial Intelligence & Machine Learning

- AI/ML is revolutionising weather prediction
  - Huge potential for Africa

Observation 11:15 LT

Observation 13:15 LT

11:15 forecast for 13:15 LT
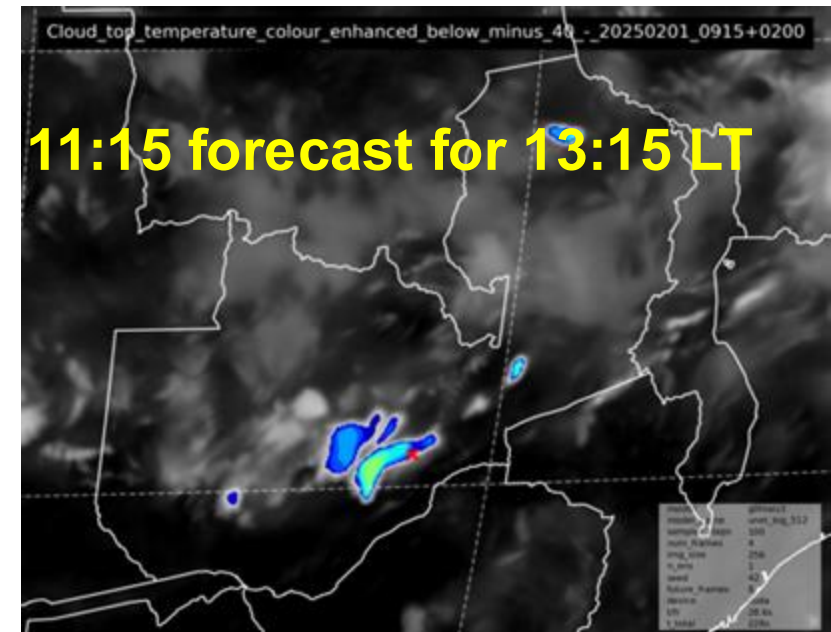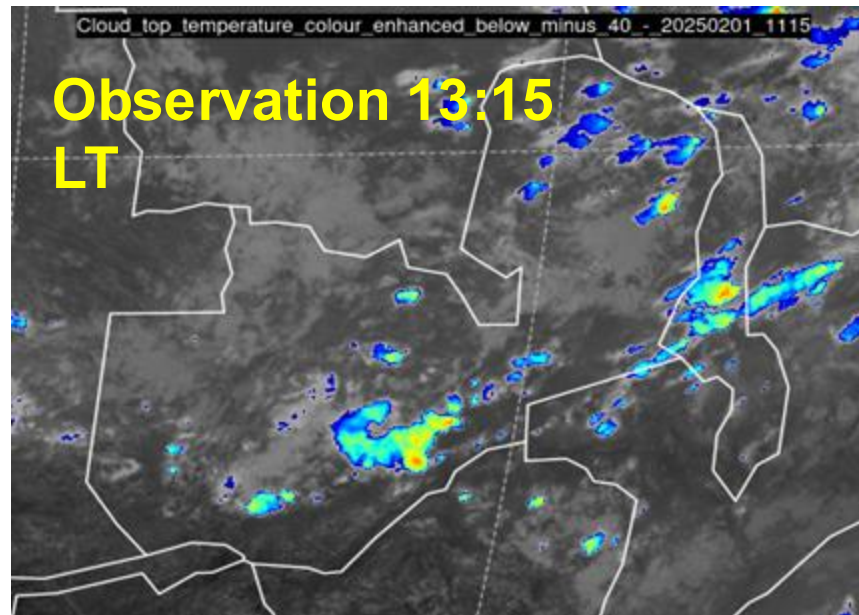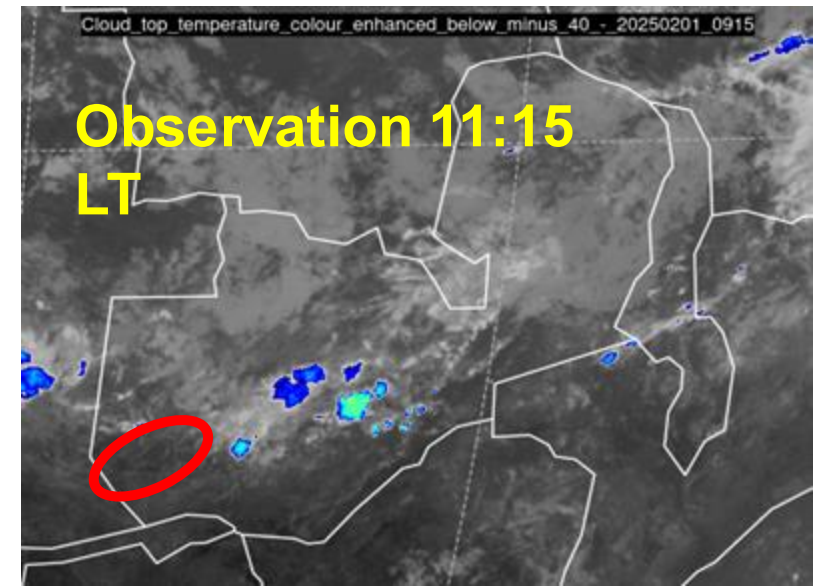
1st WISER-EWSA Testbed 29th Jan – 9th Feb 2024

- ✓ Main hub was in Lusaka – Zambia (SAWS and INAM)

- ✓ Participants- Meteorologists, academics, economists, user-engagement specialists and community observers

2ND TESTBED

WISER EWSA uses a king-size testbed to inform decisions!
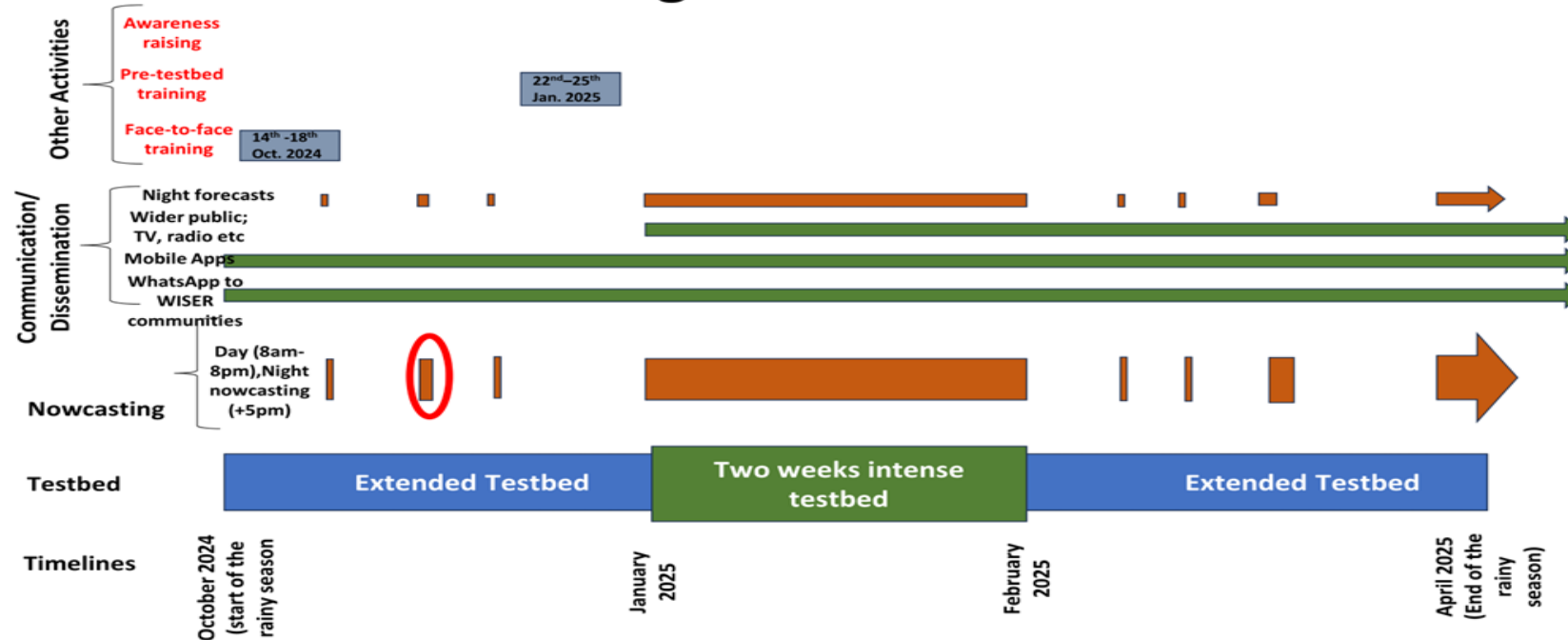
✓ Train of forecasters

✓ Daily briefing 9:00am

- Start of extended testbed period: **1st October 2024.**

- Nowcast to be issued throughout the period via **NMHS communication channels.**

- **During extended period we shall only nowcast when necessary!**

WISER EWSA: Testbed 2Z

- **Real-time** forecasting and nowcasting by forecasters & researchers.

- Using **Standard Operating Procedures** for user-focussed forecasting and nowcasting developed from testbed 1.

- Forecasts **communicated to users**, with **user feedback**

- **Evaluation** of forecasts, and products, including from user perspective.

- Test new products including **Artificial Intelligence/Machine Learning** tools

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WISER
Weather and Climate Information Services

WWRP
WORLD WEATHER RESEARCH PROGRAMME
World Weather Research Programme

Economic Benefits
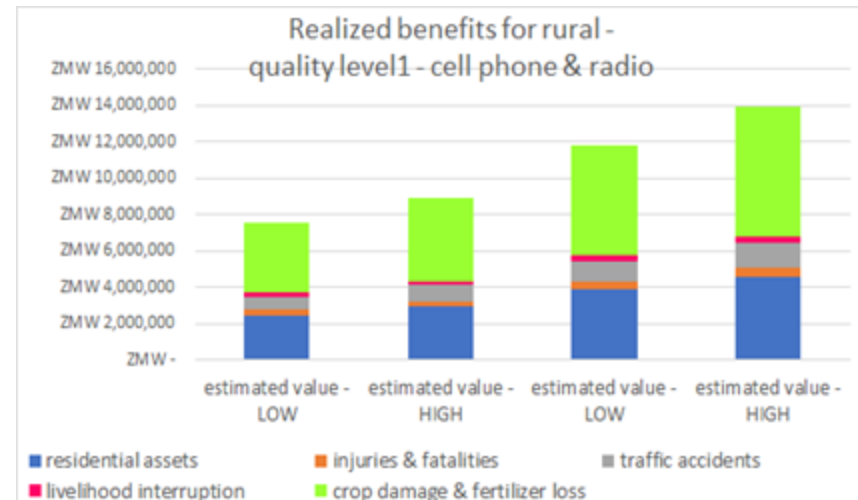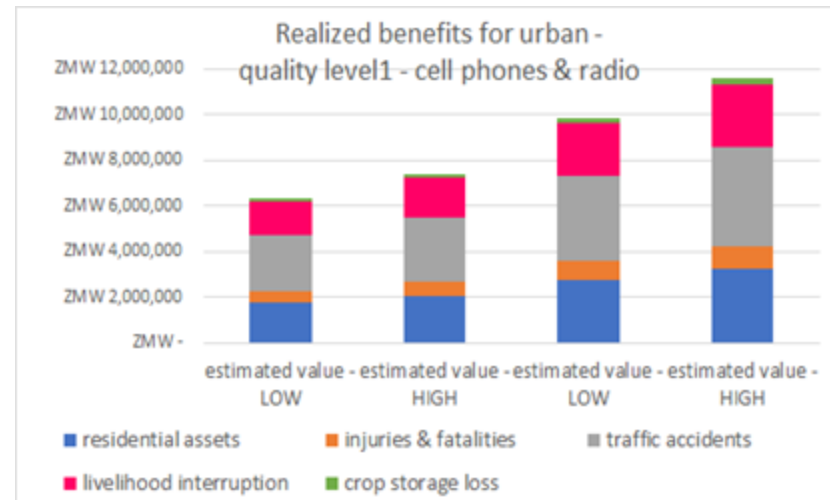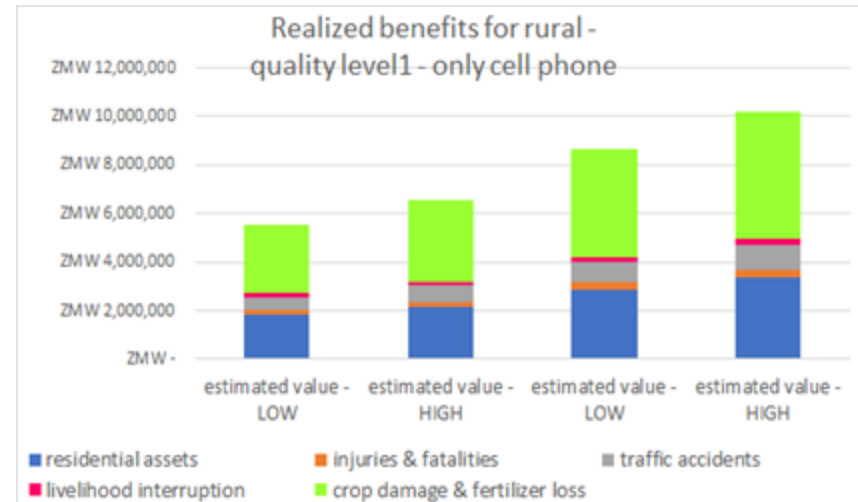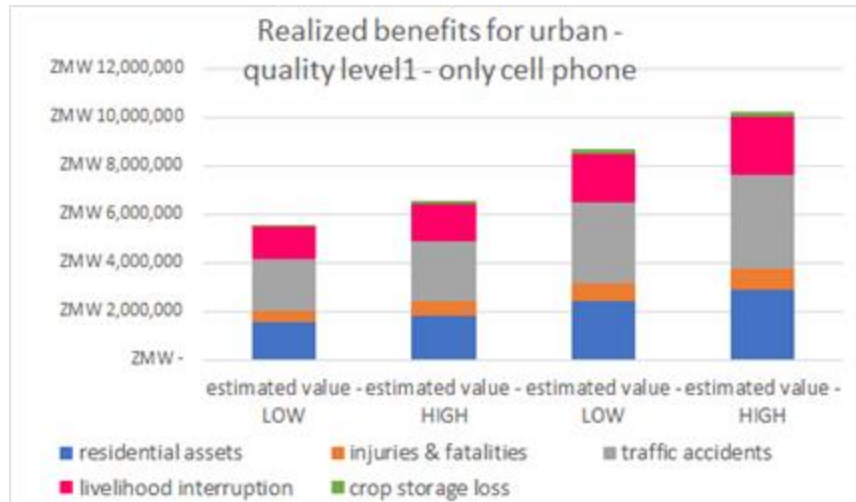
Summary

- **Co-production** of useful and accessible weather warnings for vulnerable urban populations

- **Satellite-based nowcasting**, including new **AI/ML** tools, allow improved early-warnings
  - Demonstrable skill and value to users

- Significantly **built capacity** of forecasters in 3 countries, with benefits to 3
 more

- Established **communication** channels (e.g. FASTA App, WhatsApp, radio…)

- Evidence that **economic benefits far outweigh costs**

Thank You

For any queries, please contact:
Hellen Msemo: hmsemo@wmo.int

For more information, consult
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Meteorological Organization
(wmo.int)

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