METEOROLOGICAL SERVICES DEPARTMENT

NEWSLETTER

ISSUE 4 | 2025

EVENTS LINE UP!

SAFE4ALL Living-Lab Technical Workshop

24 - 26 June 2025 | MSD-HQ

PHASE II CLIMSOFT Web Training Workshop

23 - 25 June 2025 | MSD-HQ

Minimizing Risk Through Science

CONTENTS

Meteorological Services Department of Zimbabwe

Cnr Bishop Gaul Ave & Hudson Ave, Belvedere

Box BE 150, Belvedere, Harare, Zimbabwe

Telephone: +263 (242) 778204 - 6, 778218, 778027

Website: www.weatherzw.org.zw

MSD Deploys CLIMSOFT Web For Real Time Data Integration

Climate Resilient Livelihoods
IN SOUTHERN ZIMBABWE

GOVERNMENT OF ZIMBABWE
GREEN CLIMATE FUND
UNDP

The delivery of accurate and timely weather and climate services to stakeholders across key socio-economic sectors relies heavily on the availability of high-quality meteorological data. This data is collected from various sources including manual and automated weather instruments. The integration of these diverse data streams into a unified system enhances the accuracy and timeliness of climate products and services aligning with global initiatives such as the Early Warning for All (EW4All) program.

Since December 2024, the Meteorological Services Department (MSD) has been working closely with IDEMS (Innovations in Development, Education and Mathematical Sciences) under the United Nations Development Programme (UNDP) Green Climate Fund (GCF) project, titled "Building Climate Resilience of Vulnerable Agricultural Livelihoods in Southern Zimbabwe," to modernize its internal data systems. This initiative aims to improve data capturing, quality control, archiving and accessibility for both internal users and external stakeholders, including: Zimbabwe National Water Authority (ZINWA), Department of Irrigation (DoI), Department of Agricultural Technical and Extension Services (AGRITEX).

Operationalizing the Data Integration Architecture

To address persistent challenges such as data backlog and limited access to real-time information, MSD is now operationalizing a new data integration architecture.

As part of this transformation, the department rolled out the Climsoft_Web platform, a web-based solution designed to support real-time data entry at station level, to 25 selected meteorological stations following a comprehensive 3-day training session held at MSD Headquarters in Harare from 7 to 9 May 2025. During this training, backlog data capturing was also addressed, with data being entered directly from the main source book to minimize duplication from other sources. These pilot stations serve as a testing ground to refine processes before a full national rollout.

Climsoft_Web training for MSD staff from 25 meteorological stations (Belvedere, Harare)

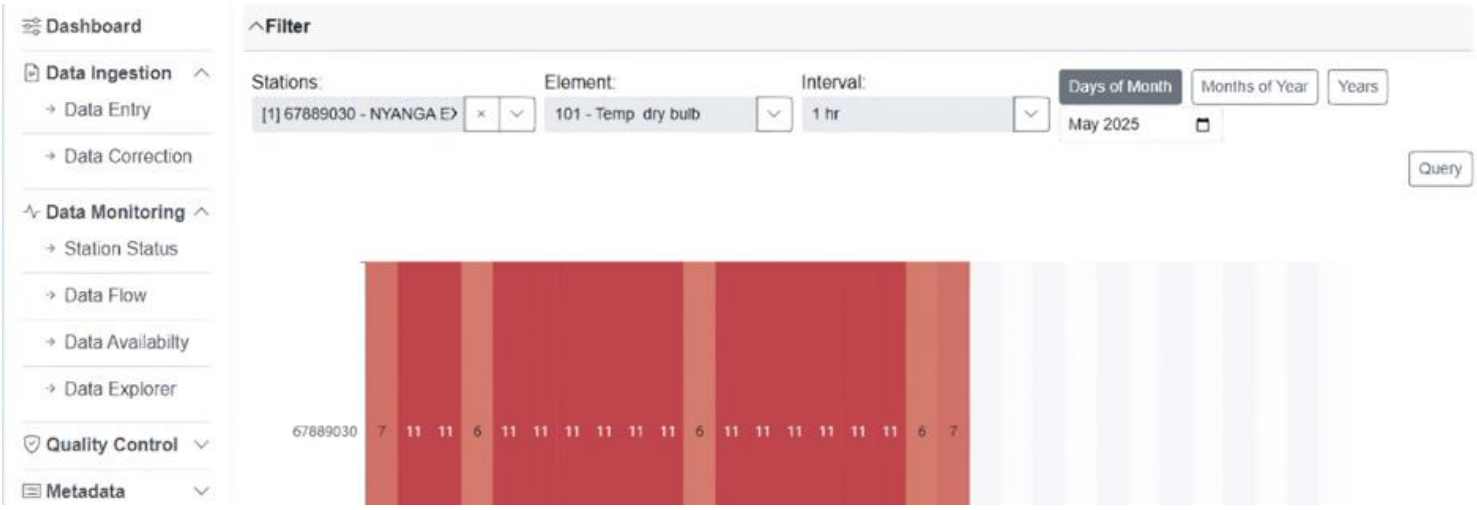
Implementation Program Overview

The broader implementation program was conducted between 7 and 13 May 2025, encompassing activities at both MSD Headquarters and two selected field stations.

MSD Deploys CLIMSOFT Web For Real Time Data Integration [Cont.]

Key objectives included: Configuring Climsoft_Web servers at MSD Headquarters, Creating station-specific data entry templates, Training MSD staff on system usage, including defined user roles and access rights, Testing and verifying data reception from the Climsoft_Web application, and Conducting physical inspections of data transmission mechanisms from AWS and manual stations

The training program included: Live server configuration, Hands-on use of the Climsoft_Web interface, Template development for live data capture, Sessions on data entry, monitoring, extraction, and compatibility with existing desktop systems, and Integration with the MSD v4 database.



Climsoft_Web user interface

Field Validation and Knowledge Transfer

From 12 to 13 May 2025, the MSD team conducted field visits to Rusape and Nyanga stations to validate system performance in real-world conditions. These visits confirmed that trained station staff were confident in operating the Climsoft_Web platform independently.

Furthermore, the MSD team successfully cascaded knowledge to additional observers who were unable to attend the initial training workshops, ensuring broad capacity building across the network.

Stakeholder Access and Future Outlook

With the Climsoft_Web system now partially deployed, external stakeholders already have access to real-time meteorological data via the platform. This development supports MSD's strategic goals outlined in Activity 3.2 of its annual and quarterly work plans, which focuses on: Operationalizing procedures for data exchange between ZINWA and MSD, Enabling real-time access to rainfall and weather observations and Enhancing integration with hydrological and seasonal forecast models. This milestone marks a significant step toward a more responsive, integrated, and stakeholder-driven meteorological service in Zimbabwe.

Challenges and Recommendations

While progress has been commendable, several challenges emerged during deployment:

Device Compatibility:

Inconsistent display of digital forms across different devices (phones, tablets, laptops) occasionally caused user confusion, though adaptation is improving.

Change Management:

Initial hesitation among staff was noted, largely due to uncertainties regarding how the system might impact their work routines and hours.

Data Connectivity Issues:

Although data bundles were provided, frequent depletion, especially when devices are tethered interrupted workflows. A more sustainable internet access solution is needed.

Looking Ahead

The Climsoft_Web platform remains under continuous development. Enhancements such as an integrated help menu and detailed user manual are underway. These tools, combined with structured follow-up training and improved connectivity solutions, will ensure the long-term success of this initiative.

Drought Occurrence in Zimbabwe: Recent Trends and Historical Extremes (1991/92 Drought)

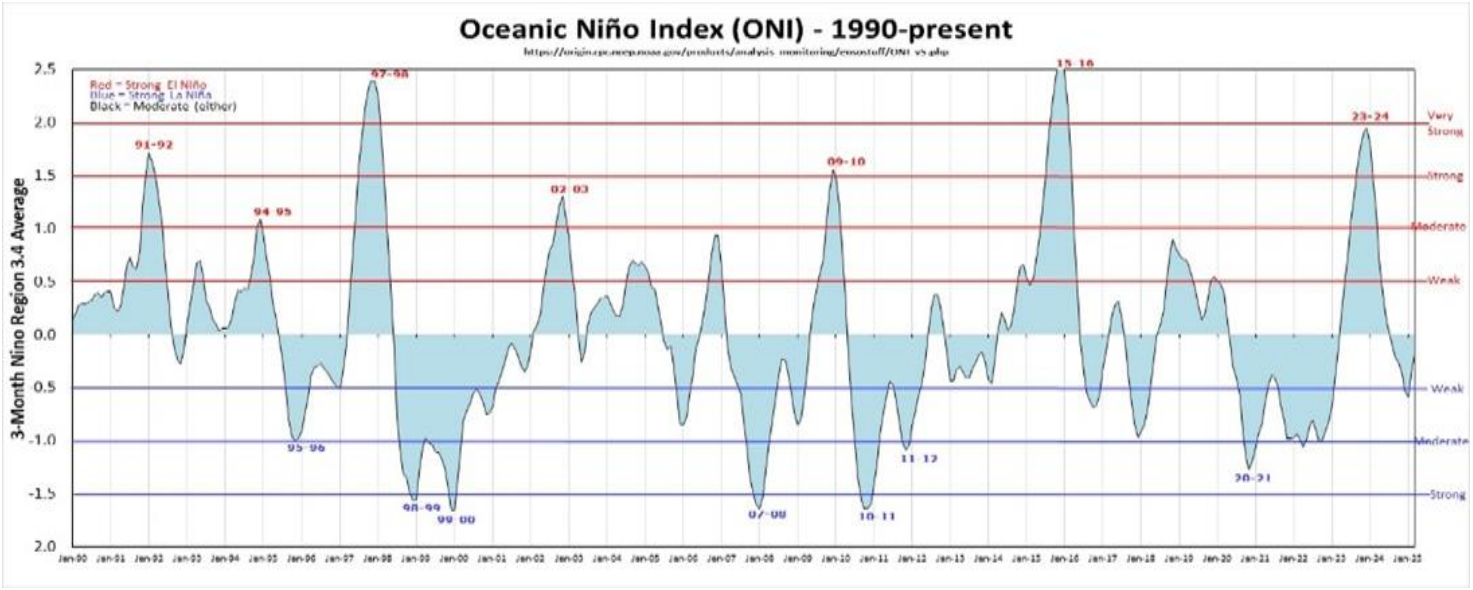
Isaac Masawana - MSD

Over the past decade, Zimbabwe has faced recurring droughts, exacerbated by climate change and shifting rainfall patterns. These droughts have severely impacted agriculture, water supplies, and food security in a country where over 60% of the population relies on rain-fed farming.

The main climate drivers in Zimbabwe are the three ENSOs (El Niño Southern Oscillation, La Niña, El Niño, and Neutral phases) and the IOD (Indian Ocean Dipole) as the global climate drivers, while the local drivers are the ITCZ, the Westerly Cloud Bands, and the Subtropical High-pressure systems.

Due to climate change, the frequency of drought occurrences and their severity have increased. The temperatures have also been on the rise, leading to excess heating in the atmosphere, which has increased the intensity and frequency of extreme weather events such as droughts, heatwaves, floods, and cyclones. All these hazards have affected Zimbabwe like any other country in the globe.

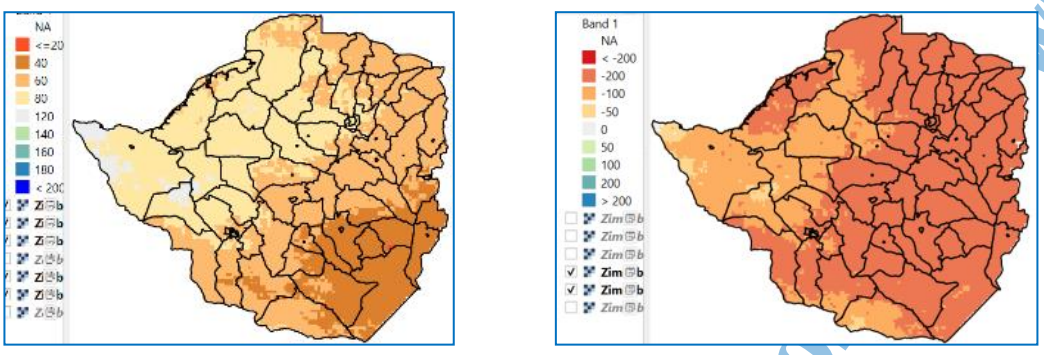
Recently, the country was hit by a severe drought during the 2023-24 season, which was one of the worst droughts in the last 30 years. This drought was declared by the President of Zimbabwe, H.E. Dr. E.D. Mnangagwa, in April 2024. This was induced by the El Niño conditions.



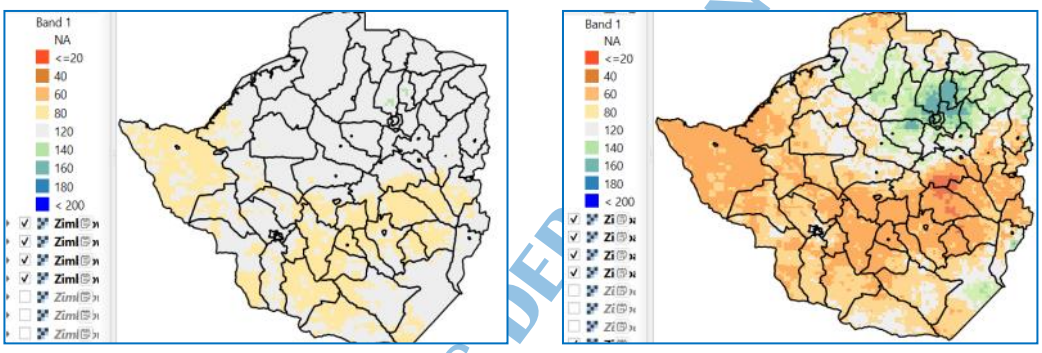
ENSO phases

The most severe droughts since 1990 occurred when the El Niño indices were positive, which include 1991-92, 1997-98, 2015-16, and 2023-24. These are the major droughts which were experienced in Zimbabwe. In terms of the severity of the El Niño indices, 1991-92 was just above strong magnitude, 1997-98 was above very strong, while in 2023-24, it was very strong. The impacts on the rainfall distribution are as shown on Page 6. In terms of the impacts of these El Niño severities on the rainfall distribution in Zimbabwe, they were different. The 1991-92 and 2023-24 droughts were the most severe since 1990, and they were very similar in terms of the rainfall anomalies.

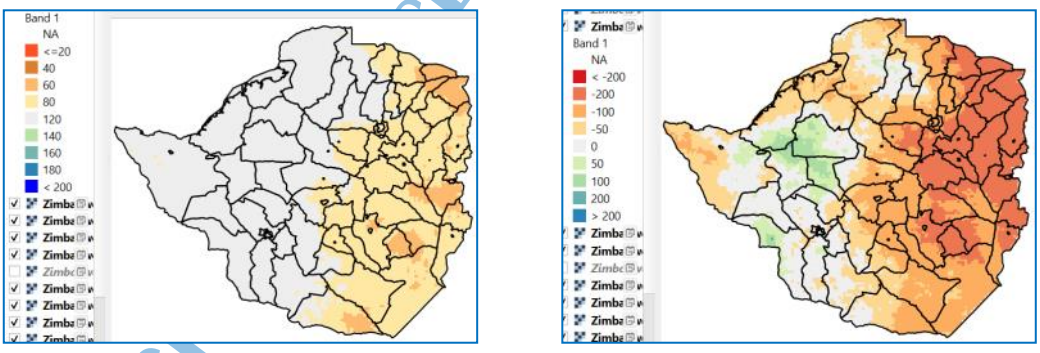
Drought Occurrence in Zimbabwe: Recent Trends and Historical Extremes (1991/92 Drought) [Cont.]



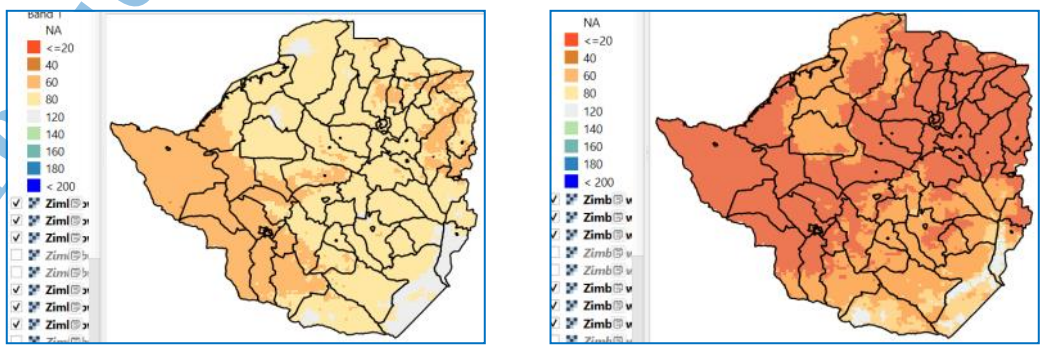
1991 - 1992 Drought



1997 -98 Drought



2015 -2016 Drought



2023 -2024 Drought

Empowering African Forecasters with Meteosat Third Generation for Enhanced Weather Prediction

Tapiwa Michelle Masawi - MSD

The training initiative led by EUMETSAT and the Kenya Meteorological Department (IMTR) marks a significant step forward in Africa's meteorological capabilities. By focusing on the newly operational Meteosat Third Generation (MTG) Meteosat-12 satellite, the program equips African forecasters with advanced techniques to improve weather monitoring, forecasting accuracy, and contribute to early warning systems. This initiative is set to transform how meteorological departments across the continent interpret and utilize satellite data, leading to more precise and timely weather predictions.

The training held from 12th to 16th May 2025 began with an official opening ceremony attended by key figures, including Dr. David Gikungu, Kenya's Permanent Representative to the World Meteorological Organization (WMO), and representatives from EUMETSAT and IMTR shown by Figure 1. The sessions provided a comprehensive understanding of MTG satellite imagery, with practical exercises reinforcing real world applications. Forecasters revisited RGB satellite data interpretation and observed live forecasting processes at the Central Forecasting Office, gaining firsthand insight into operational workflows.

A major highlight was the introduction of PUMA 2025, EUMETSAT's next-generation data processing system for MTG. This powerful tool offers higher spatial and temporal resolution than previous systems, enabling forecasters to detect weather patterns with greater precision. The ability to distinguish between low and high clouds, identify fog, smoke, and fires, and track lightning activity in real-time will significantly enhance short-term forecasting and nowcasting. The system's scalable server architecture allows multiple users, including remote stations and airports, to access critical data simultaneously, improving coordination and response times during extreme weather events.

One of the most valuable aspects of the training was the hands-on approach. Forecasters engaged in practical exercises, analyzing satellite imagery to predict weather systems and verifying their forecasts the following day. They also explored lightning data analysis using ADAGUC website, which is crucial for tracking severe storms and improving early warnings. Nighttime forecasting exercises further tested their skills, ensuring they can deliver

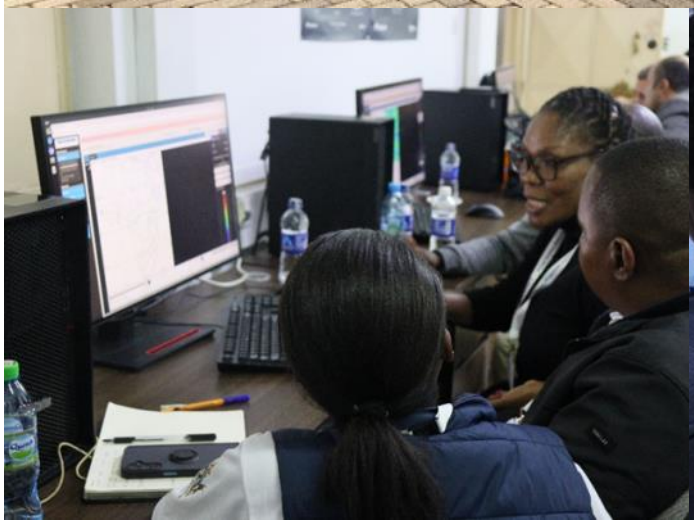
Michelle Masawi, Zimbabwe's participant presenting

accurate predictions around the clock. The training also emphasized the importance of regional collaboration. Forecasters from different parts of Africa shared observations and case studies, fostering knowledge exchange and improving collective forecasting capabilities. By the final day, participants presented detailed analyses of significant weather events, demonstrating their enhanced ability to leverage MTG data for real-world applications.

For meteorological departments, the benefits of this training are immense. Improved satellite data quality means more accurate weather models, leading to better public advisories and disaster preparedness. The integration of PUMA 2025 with existing systems like ClimSA ensures seamless data flow, enhancing climate monitoring and long-term planning. Additionally, the flexibility of remote access allows forecasters to work from different locations, ensuring continuity of services even in challenging conditions.

Ultimately, this initiative empowers African meteorological services to harness cutting-edge technology, reducing reliance on external forecasts and strengthening local expertise. With Meteosat-12's advanced capabilities and PUMA 2025's enhanced processing power, African nations are now better positioned to mitigate weather-related risks, protect vulnerable communities, and support sustainable development through reliable climate intelligence. The success of this program underscores the importance of continued investment in satellite technology and training, ensuring that Africa remains at the forefront of meteorological innovation.

Empowering African Forecasters with Meteosat Third Generation for Enhanced Weather Prediction Participants Photos



SAFE4ALL Living Lab: MSD & ZFU Conduct Field Visits in Materera and Furamera, Marondera

Opening Meeting at ZFU on Tuesday 6 May 2025

A meeting was held at the Zimbabwe Farmers Union (ZFU) offices in Milton Park with Guss Wiersma, a project coordinator from the Delft University of Technology. Mr. Wiersma gave an overview of the SAFE4ALL project to bring everyone up to date. One key message from the meeting was that the tools through the project will be co-created such that they are customised to the three countries that are in the project (Ghana, Kenya and Zimbabwe). These tools will be developed through a process that includes input from the users themselves. This approach is different from most other projects where end users are given a completed product. Instead, SAFE4ALL will involve users early so that the tools meet their actual needs. This will help ensure the tools are well received when the project is rolled out.

The tools under consideration include: The Climate Atlas, Uliza WI Chatbot, AI-based Nowcasting for thunderstorms, Hyperlocal Intelligence Engine for weather forecasting and the Multi Agent Enforcement Framework. These tools are at different levels of development which will be further enhanced working with the users in the three countries. From the round table discussion, a key concern was raised on the limited access to smartphones in rural areas, a requirement for some of the tools. Another issue was that most farmers are older and less familiar with technology, while younger farmers who are more comfortable with digital tools are fewer. This highlighted the need to encourage young people to get involved in farming. A plan for the next three days was done, which included visits to Furamera (Ward 14) and Materera (Ward 15) in Marondera, where automatic weather stations from TAHMO have been installed.

Field Visits on Wednesday 7 May 2025

Representatives from MSD and ZFU including Guus visited the two wards, starting with Materera. At Materera, the meeting started with introductions. Dr. Kuipa from ZFU Engineer Mazhara, Mr. Mason Mawoyo and Mr. Moven Manjowe from MSD took turns to speak to the farmers about the purpose and value of the weather stations. They encouraged the community to protect the equipment from vandalism, as the stations are there to serve them. The farmers were also given the chance to ask questions, which were answered clearly and respectfully. They were then shown around the weather station. Blessed Mutize from MSD explained how each part of the system works to make the technology less intimidating. The same activities were repeated at Furamera, wrapping up the day.

Living Lab Workshop on Thursday 8 May 2025

A Living Lab workshop was held in Marondera at Chipiwa Lodge. The discussions during the workshop were fruitful. Attendees included Agricultural Extension Officers, the Department of Irrigation, Local Government, MSD, and ZFU. The workshop focused on defining the roles and goals of each stakeholder in the Living Lab. A roadmap was developed for the upcoming months. A breakout session allowed participants to work in five groups to discuss key questions: 1. What is your profession? 2. What expertise do you bring to the Living Lab? 3. What are your goals within the Living Lab? 4. What do you want to learn? 5. What would you like the outcomes to be? From these discussions, the final goals, key milestones, responsible stakeholders, and completion timeframes were mapped out.

Final Planning Meeting on Friday 9 May 2025

The week ended with a final meeting at MSD headquarters. The focus of the meeting was planning ahead, including setting a date for the next Living Lab workshop. It was agreed that the next session will likely take place by the end of June, after the roadmap has been refined. These activities carried out during the week showed strong collaboration at the national level and set a clear direction for the SAFE4ALL project which is in its second year of implementation.

SAFE4ALL Zimbabwe Field Visits and Living Lab Workshop, May 2025

Wednesday 07 May 2025: Field Visit in Materera, Ward 15

Thursday 08 May 2025: Living Lab Workshop Breakout session at Chipiwa Lodge, Marondera

Thursday 09 May 2025: ZFU & MSD Group Photo after Final Planning Meeting at MSD Headquarters

Training on Impact-Based Forecasting (IBF) for Anticipatory Action

Linos Ncube - MSD

The Southern African Development Community (SADC) member states are tasked to respond to differing disaster risk scenarios, ranging from snowstorms, to heat waves to flood, cyclone and drought risk. In supporting the SADC Region, IFRC, FAO and WFP are jointly implementing an ECHO-funded project titled Building capacity in Southern Africa to enable effective disaster risk management through regional systems for inter-agency anticipatory action using a multi-hazard, multi-sectoral approach.

Impact-Based Forecasting (IBF) has been identified as a transformative approach to weather forecasting that focuses on predicting the potential impacts of weather events rather than just the weather conditions themselves. Instead of simply forecasting what the weather will be (e.g., heavy rain, strong winds), IBF aims to forecast what the weather will do (e.g., flooding, infrastructure damage, disruptions to daily life). By integrating hazard data with information about exposure and vulnerability of populations, assets, and infrastructure, IBF provides actionable insights that enable proactive measures to mitigate the impacts of natural hazards.

Participants posing for a group photo

The Training on Impact-Based Forecasting (IBF) for Anticipatory Action was organized by the Regional Anticipatory Action Working Group (RAAWG) in collaboration with the South African Weather Service (SAWS) and Red Cross Red Crescent Climate Centre. It was from 13th to 15th of May 2025, and was attended by representatives from Meteorological Services, disaster managers (from government departments and Red Cross) and media personnel.

Representatives were from five countries, namely Zimbabwe, Zambia, Mozambique, Lesotho and South Africa. On the first day of the workshop, SAWS presented on an overview of Impact-Based Forecasting (IBF) where they led in discussions on impact tables. Impact tables allow forecasters and disaster managers to associate the most likely impact level with an area with the likelihood of impact to occur. The impact level then determines where on the risk matrix an expected event lies. Impact tables are based on disaster management knowledge and experience.

- Range from nothing significant to widespread life threatening
- Tables customized per hazard (rain, wind, snow, etc.)
- Tables generalized for country
- Impact level depends on vulnerability in local area to impacts

Minimal	Minor	Significant	Severe
Day to day activities not affected but some *small scale* impacts occur	Some *local* incidents, minor disruptions, 'business as usual' for emergency responders	Disruption to day to day routines and activities, mostly *localised*. *Short-term* strain on emergency responder organisations	*Widespread,* Prolonged disruption to day to day routines and activities *Prolonged* strain on emergency responders organisations.

Sample Impact Table

During the second day of the workshop, there was a closer look at the Risk Matrix and Communication of Messages. To produce a risk matrix, forecasters identify the likelihood of an expected hazard in tandem to its potential impact. A risk matrix helps to determine the level of a warning depending on the likelihood and impact of the expected hazard. In Zimbabwe, dissemination of early warning information is done through various media in collaboration with the Department of Civil Protection (DCP). The media include community radios, WhatsApp platforms, SMS, print and electronic media among others.

Training on Impact-Based Forecasting (IBF) for Anticipatory Action [Cont.]

In front: Linos Ncube presenting on IBF progress in Zimbabwe

The training required countries to give updates on the IBF progress. For Zimbabwe, it was highlighted that progress had been made in the implementation of IBF through coordination by the DCP. This arrangement has enabled the Department to leverage on already existing structures in the rollout of the IBF. Simulation exercises have also been done which have assisted in continued improvements in the forecasts. The Department has so far produced rainfall, thunderstorm, strong winds, temperature, and ground frost impact tables. However, rainfall tables still need to be improved. Each of these tables outlines threshold, severity and possible impacts of a hazard to targeted areas. These were developed in collaboration with our stakeholders through the Civil Protection structures.

On the third day, a disaster simulation exercise was held in Katlehong community in Ekurhuleni municipality.

Drone pilot monitoring activity in the community

South African Weather Service issued a disaster warning of heavy rainfall and tornado that was expected in the community around 1400hrs on the 15th of May 2025. Community members were told to evacuate to a safe place which was the community hall. The movement and response of community members was monitored using a drone. Some of the community members responded well to the call while others took longer to arrive at the evacuation centre. Upon arrival members of the community were informed that it was a simulation and there was no need to panic. An in-depth discussion was held on how disaster information was relayed and their expectations in future. Some of the key points highlighted were use of local language in information dissemination, using trusted communication channels like local leadership, and broadcasting information through local radio station.

Moving forward the following SOPs were made

- *Training of media personnel in interpreting or translating weather and climate information to the public*
- *Timely release or dissemination of forecasts to the media especially radio stations before their knock off time*
- *Producing forecasts in 16 official languages if possible for better communication and understanding of weather information to leave no one and no place behind.*
- *Collaboration with different stakeholders other than disaster management such as tourism, health, transport thereby providing sector specific impact based forecasts*
- *Continuous training of forecasters for improved forecasts*
- *Continuous collaboration with other countries to share success stories, challenges and enable learning from each other for continuous improvement.*

Conclusion

Zimbabwe is one of the countries that has embraced the Multi-Hazard Early Warning for All Initiative, aiming not to leave any place and no one behind. The country is part to the September 2022 Maputo Declaration on Commitment by SADC Member States to bridge the time gap between Early Warning and Early Action. The Early Warnings for All (EW4All) initiative aligns with the country's developmental strategy (NDS1). The NDS1 prioritizes increasing investment in Disaster Risk Management Systems including early warning systems and contingency planning to enhance the country's preparedness in the face of hazards. Impact based forecasting is beneficial to the country and efforts are ongoing in developing the Early warnings For All Road map to ensure its sustainability.

SAFE4ALL AFRICA

Invitation to SAFE4ALL Technical Workshops Zimbabwe Living Lab

June 24th - 26th, 2025, Meteorological Services Department, Belvedere, Harare, Zimbabwe

We are pleased to invite you to participate in the upcoming SAFE4ALL Technical Workshops taking place from 24th to 26th June 2025 in Harare, Zimbabwe.

These workshops will provide a unique platform to engage with key stakeholders, explore SAFE4ALL tools in practice, and contribute to their ongoing development and application. Sessions will focus on weather stations, data integration, and climate resilience, offering space for hands-on learning and exchange.

The detailed agenda is provided on the second page of this invitation. For any questions or additional information, feel free to get in touch with us. We look forward to your participation and valuable insights.

Best regards,

Spyros Paparrizos
Coordinator of the SAFE4ALL project
Wageningen University & Research

Save the date

Partners

Funded by

This project is funded by the European Union's Horizon Europe research and innovation program under grant agreement No 101137814

www.safe4allafrica.eu

Sign up HERE and stay updated!

Safe4all Africa | safe4all_africa | SAFE4ALL Africa

SAFE4ALL AFRICA

Workshops Overview

Climate Change and Resilience

This workshop introduces the core concepts of climate change and resilience in an engaging, practical format. Participants will explore the science behind climate change, understand local vulnerabilities, and discuss actionable strategies to respond to both sudden shocks and ongoing stresses. The session will also highlight real-world examples from African cities and rural communities, helping participants reflect on how to build stronger, more adaptable systems locally.

DROPapp

The DROP app is a hydro-climate information service that offers 1-, 7-, and 14-day weather forecasts, while also integrating local weather updates submitted by farmers. It will be showcased as an innovative service designed to support smallholder farmers in Zimbabwe with tailored weather and soil moisture insights. By combining scientific data and local knowledge, it aims to enhance climate-smart decision-making for improved agricultural outcomes.

eWaterCycle

The eWaterCycle platform is designed to make hydrological modeling more accessible and user-friendly. We've also seen strong results using it in educational settings, particularly with students (BSc Thesis Projects & master course/thesis-projects). We invite you to explore eWaterCycle and would greatly value your participation and feedback as we continue to develop and improve the platform. Hopefully you will be able to implement our platform in your further research! *(Note: If you are able, please bring a laptop, as this will be a hands-on session.)*

Foodsheds

The Foodshed Information Service is a co-designed tool reflecting real risks and priorities across food systems. This workshop will focus on identifying useful indicators for various actors along the food value chain and pinpointing the most critical moments in the farming season using crop calendars. Your contributions will help ensure the service captures local realities and better supports timely, informed decision-making.

Uliza-WI Chatbot

Uliza-WI is a Telegram-based chatbot that delivers timely, localized weather updates and agricultural advice tailored to the needs of smallholder farmers. It includes decision-support tools such as 7-day and seasonal forecasts, crop and livestock recommendations, and extreme weather alerts—accessible anytime via mobile phone. The workshop will introduce the chatbot to farmer groups and collect their feedback to guide further development.

METEOROLOGICAL SERVICES DEPARTMENT

'Where Science Meets The Sky'

ZIMBABWE

Vision

A world class provider of meteorological, climatological and seismological products and services by 2025.

Mission Statement

To provide customer and stakeholder driven quality seismological, weather and climate services for socio economic development.

Core Values

- **Teamwork:** We value unity of purpose
- **Equality:** We offer equal status, rights and opportunities to all
- **Customer focus:** We prioritize and address customer needs.
- **Transparency:** We are open to scrutiny
- **Integrity:** We have strong moral principles
- **Creativity:** We focus on innovation and continuous improvement.
- **Accountability:** We take responsibility for one's own actions.