

Early Warnings for Southern Africa

HIGHLIGHTS

13 November 2024

Under the WISER programme, led by the Met Office in the UK and funded with UK International Development, the Weather and Climate Information Services for Africa (WISER) Early Warnings for Southern Africa (EWSA) international consortium has been working in this region since mid-2023 to co-produce novel early warning alerts (known as 'nowcasts') for severe weather events, which are accessible and useful to communities at risk and those tasked with disaster risk reduction. Early warnings based on nowcasts and for thunderstorms can help communities prepare in a way that saves lives. EWSA is also a very practical way of contributing to the United Nations' Early Warnings for All (EW4All) initiative led by the World Meteorological Organization (WMO). EW4All aims to ensure that every person on Earth is protected by early warning systems by 2027. To ensure accessibility among all population groups, EWSA has a particular focus on including women and people with disability in the co-production process. <https://wiser-ewsa.org> | nomie@kulima.com

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NEWS

At the time of writing this, the WISER EWSA team is five weeks into the king-size testbed – an unexpected yet welcome expansion of the EWSA project's activities but in keeping with a principle of good co-production: being flexible. Katharine Vincent explains how this came about.

Upgrading to a king-size testbed in Mozambique, South Africa and Zambia

Earlier this year, the WISER EWSA project arranged southern Africa's first testbed. The Zambia Meteorological Department (ZMD) hosted the main event, with additional centres in Mozambique and South Africa.

Southern Africa's first nowcasting testbed in January–February '24

The two-week event in the middle of the rainy season brought together forecasters, meteorologists, user engagement specialists, representatives of disaster and disability organisations and community members in a split-site event. At ZMD, forecasters and meteorologists trialled new tools and techniques to issue nowcasts every couple of hours, and then evaluate their reliability.

These evaluated nowcasts were received by a select group of 'community observers' in Kanyama, who provided feedback three times per day on where and when rain fell, and the impacts that it had. At the same time, disaster and disability organisations and community members participated in interactive sessions designed to raise awareness of weather information more broadly, and to provide feedback on different presentations of information.

The process of issuing nowcasts, and the content of the messages, improved significantly over the two weeks as everyone learned together. And the prototype process showed great potential.

But we had one challenge. Zambia was unusually dry in this period. There had been very heavy rainfall a few weeks earlier in January – which ended up precipitating a cholera outbreak. The lack of rainfall during our testbed meant that the forecasters and meteorologists did not have enough live events to work from to practice their techniques. And people in Kanyama were highlighting that it would be useful to have the early warnings throughout the rainy season. And so the idea for the king-size testbed was born. It is the logical next step to expand the efforts of 2024 and move towards fully operational nowcasting services in all three countries.

Scaled up ambition in the king-size testbed for the 2024/25 rainy season

The king-size testbed has several new and improved features relative to the early-2024 edition.

1. Length: The king-size testbed started on the 1st of October 2024 and will run to the 30th of April 2025, covering the full duration of southern Africa's summer rainfall season. To make this process manageable with existing forecaster capacity, a system has been devised for the nowcasting process only to be triggered when extreme rainfall is anticipated – the type of rain that will lead to severe impacts. This is different from the last testbed, when nowcasts were issued regularly throughout the day, even when rainfall was not anticipated. Nowcasts will continue into the night only when we are forecasting heavy rain.

2. Official status: During the king-size testbed, nowcasts will be officially issued by each weather service, alongside their existing products. They will be transmitted through their existing communication channels, and thus available nationally.

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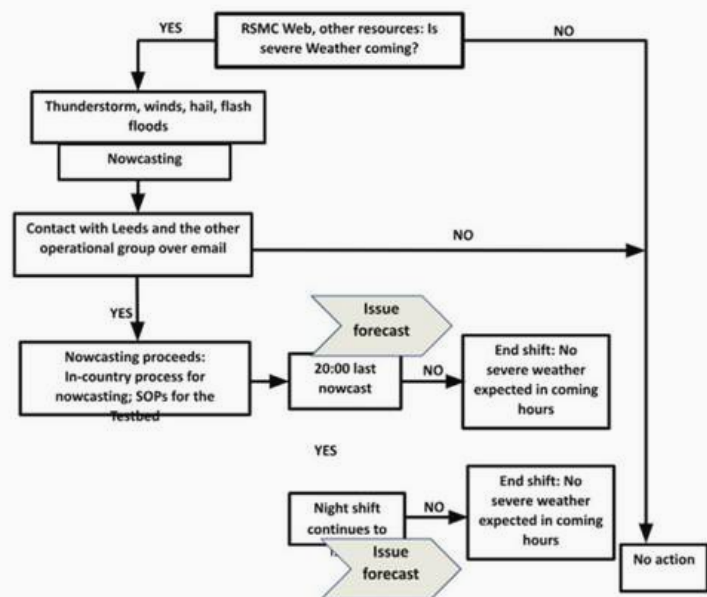
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This is different from the last testbed, when messages were marked with a disclaimer, “This is a test message. Do not distribute”, and they were only shared with the predetermined select group of community observers who had been trained to provide feedback.

3. Scale of feedback mechanism: During the king-size testbed, community observers have graduated to an expanded ‘community mobiliser’ role. They will continue to provide verification feedback on where and when it rained, and with what effect – but they will initiate this feedback themselves by completing a simple online form once at the end of each day on which rain has fallen. They will also act as spokes within a hub-and-spoke network, actively supporting the distribution of nowcast information throughout their communities and obtaining feedback on the presentation and utility using pre-guided question and discussion topics that will be provided through regular meetings facilitated by the WISER EWSA community engagement leads.

Embedded within the king-size testbed there will still be a two-week ‘intensive’ testbed. In 2025, the main event will be in Mozambique, with additional centres in Zambia and South Africa, and with each centre hosting members of the international project team. During this intensive period, as in the 2024 version, nowcasting will take place 24 hours a day, with messages issued regularly regardless of the intensity (or absence) of rainfall, and feedback received three times per day. Also, as in 2024, there will be some additional community activities to raise awareness of how to access and use weather information. And as part of the expansion ambition, participants from met services in Botswana, Malawi and Zimbabwe have been invited to participate.



King-size testbed decision-flow process

Reflecting on the king-size testbed's first month

To support collaboration, daily briefing meetings and intensive nowcasting event (INE) online meetings are scheduled, enabling forecasters, researchers, testbed coordinators, community engagement leaders and relevant partners to remain connected throughout the testbed period. By aligning day-to-day operations and fostering ongoing engagement, the testbed team is well-prepared to handle the dynamic weather conditions anticipated during this six-month initiative, maximising responsiveness and ensuring communities receive timely, actionable forecasts.

In the first month, South Africa conducted **four** INEs, Mozambique activated **five**, and Zambia called **one** INE. Each INE provided a unique opportunity to test nowcasting methods and engage communities directly. SAWS tested its own customised nowcasting template, which received positive feedback from community observers for its clarity and effectiveness. Meanwhile, INAM in Mozambique and ZMD in Zambia communicated nowcasts using unofficial formats but allowing them to gather valuable feedback for refining future communication tools.

Lessons and process improvements

Thus far, the king-size testbed has offered opportunities to learn several lessons:

Nowcasting process:

- **Empowering local ownership of nowcasting:** The king-size testbed is enabling INAM, SAWS and ZMD to take ownership of the nowcasting process, building confidence in managing severe weather forecasting independently. This empowerment is crucial for resilience, as it ensures that forecasting improvements continue beyond the project, with local teams fully equipped to implement and adapt nowcasting processes into their operations.
- **Further refinements to the nowcasting process:** Introducing ‘exit protocols’ for ending the nowcasting and adjusting thresholds based on community insights to ensure nowcasts remain relevant and timely.
- **Standard operating procedures:** Following the nowcasting standard operating procedure (SOP) ensures a smooth and consistent process. The SOP includes the protocols and the agreed templates for disseminating nowcasting information. Following the SOPs during an INE helps to identify areas that need refining, ultimately benefiting the roll-out of nowcasting alerts by the NMHSs post-project.
- **INAM forecasters have highlighted the need to develop an impact table to guide their *impact-based nowcasting* process.** SAWS has provided an example that could be useful for both INAM and ZMD in developing their own impact tables, in collaboration with relevant organisations in each country.

Community feedback:

- **Kanyama (Zambia):** The community has provided structured and helpful feedback through the Google form, ensuring that the WISER EWSA team has well-organised and accessible feedback. They have actively provided feedback to report rain, even when they do not receive an INE.
- **Katlehong (South Africa):** The community hub is very active in providing feedback. The project works with the community leaders in SAWS to ensure that the feedback is structured similarly for consistency and clarity. As the community observers face challenges accessing and completing a Google form, they use their WhatsApp group to give feedback. The SAWS engagement team has helped to guide community observers to structure their messages, and the team then uploads feedback onto the form to facilitate overall analysis. This demonstrates the importance of an NMHS that is involved in and accessible to its target communities.
- **Boane (Mozambique):** Not all community observers have smartphones. Those with access, submit feedback on the Google form on behalf of others. While this might slow down feedback collection, forecasters and community engagement team members are encouraging observers to actively document weather impacts to validate nowcasts.



Flagged

The WISER EWSA team from Mozambique shared that they found the use of flags (a procedure of the INGD – the disaster management institution) corresponding to the level alert of the day helpful as a further measure to communicate an approaching weather threat.

The SAWS team took this to heart and a flag system – and commensurate awareness-raising efforts – will be implemented in Katlehong before the end of 2024.

Project status and highlights

Preparation for the testbed in the region

Co-production and Testbed Preparatory Co-design Workshops took place during 2024 in Mozambique from 19 May to 23 May, in Zambia from 5 to 9 August, and in South Africa from 13 to 16 August.

Participants in all three countries included the WISER EWSA project team and other representatives from the NMHSs, community observers and mobilisers – some new to the project, and intermediary organisations dealing with disaster risk management and reduction, humanitarian aid, people with disabilities, and other vulnerable groups in the three countries. Some government departments and media organisations also attended part of the meetings.

The link between the project and the UN's EW4All initiative was highlighted in all the meetings, and the team shared critical weather and climate information, including nowcasts, and explored how to interpret these effectively. Community observers and other stakeholders shared their perspectives on the root causes of disasters and exchanged ideas of how these could be mitigated and responded to when they occur.



Above, left: In South Africa, community observer Mpho shared how the weather in Katlehong varies and how susceptible the local school is to flooding. When it floods, the children must go home and many cannot traverse flooded areas. The drainage system is not serviced, she said, and when it rains, it becomes blocked. She emphasised the importance of teaching people not to throw things in the drains. Right: More than 200 people attended the awareness-raising event on day four. The audience included learners from two schools, including the Ekurhuleni School for the Deaf. Two students from the Nokulunga Primary School presented their learnings from the automated weather station at the school and the impacts of flooding. The Kofifi Dance Group from Nokulunga Primary entertained the guests, adding a cultural touch to the event.

Off the beaten track

Illustrating the diversity of collaborators and platforms necessary to maximise the potential of early warning systems, HAMNET participated in the South African programme. HAMNET is the emergency communications division of the South African Radio League. It shared its Common Alerting Protocol (CAP), an ITU-developed electronic system (ITU X.1303) designed for global emergency alert dissemination. It uses XML-formatted alerts transmitted via communication channels, such as cellular networks, TV, radio, digital radios, pagers, and alerting devices.

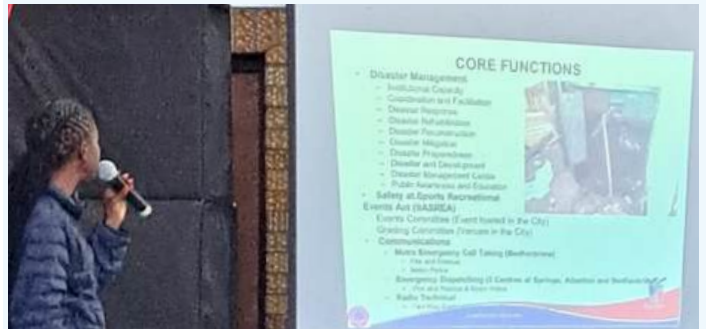
Community observers integrated into SDMCs

A key achievement of WISER EWSA in Mozambique and Zambia has been the integration of community observers into local disaster management committees. In Mozambique, these committees typically have 18 members, INGD has agreed to integrate three community observers with disabilities into the Boane committees to make them more inclusive. In Zambia, last year's drought led to the reinvigoration of Satellite Disaster Management Committees, and in Kanyama, it has been agreed to integrate last year's community observers and train new SDMC members to play a community mobilising role in the king-size testbed. The integration bodes well for the sustainability of NMHS-DMC-community collaboration about disaster risk reduction post-project.

CAP's structured format ensures reliability and standardisation in emergency communications. Discussions focused on CAP's accuracy and implementation in Mozambique and Zambia, with alert reach reliant on regional CAP-compatible systems.



Some of the participants in the first day's workshop in South Africa.



The role and functions of the disaster management services in the Ekurhuleni Municipality clarified to community members and organisations in Katlehong.

Getting the word out in Katlehong on social media



Improved forecast quality in Zambia

Greater capacity of Zambian forecasters to use a wider variety of forecast tools has led to an improvement in the accuracy and quality of short-term forecasts that are issued on a daily basis.

Micah Namukoko from ZMD elaborates.

The quality and accuracy of weather forecasts issued by Zambia Meteorological Department have improved as a result of capacity and access to forecasting tools enabled by WISER EWSA. ZMD forecasters have been trained by SAWS, in its role as a Regional Specialised Meteorological Centre (RSMC) from 2023–24.

Training comprised online and face-to-face sessions. Sixteen forecasters participated in the 2024 testbed and gained operational experience generating and issuing nowcasts, using additional forecasting tools that they formerly did not use (e.g. NFLICS, NWC-SAF and AGADUC) or did not regularly use (RSMC website, EUmetsat).

These products are now routinely used to generate the daily forecasts, particularly those issued at midday to cover the afternoon period from 1200–1800 (NFLICS, NWC-SAF AGADUC and EUmetsat). In addition, the RSMC website is used to supplement the PUMA 2015 Synergy model to generate two-day forecasts issued at 16:00.

“The use of new forecast tools has led to greater accuracy and reliability of weather forecasts issued to stakeholders in Zambia. The products provide details of storm activity and predicted movement, which allows higher resolution forecasts... The training provided to Zambian forecasters through the WISER EWSA project paved the way for practical operational experience in the use of the tools and methods for nowcasting in the 2024 testbed.”

Zambian Stakeholder Engagement Day

On 7 August 2024, the Permanent Secretary of the Ministry of Green Economy and the Environment, Dr Douty Chibamba, opened the Stakeholder Engagement Day and confirmed his support, and that of the Minister, of the WISER EWSA project. He said, “There are times that even when a good weather forecast is given, people still perish. This is often a timing issue.”

The timing he referred to concerns the differences between ‘weather forecasts’, with which most people are familiar, and ‘nowcasting’, which gives more detailed weather information with shorter time frames, typically between two and six hours. A forecast might warn people that rain is expected over the next day or two the next week, but a nowcast might identify that in the next two to six hours thunderstorms could be expected in certain areas.

“Key components of the EWSA project, specifically targeting socially disadvantaged urban populations, include enhancing the capacity of the NMHSs in southern Africa, understanding the decision-making context of urban populations to set alert levels, and ensuring that the co-produced nowcasts effectively reach those who need them to mitigate risks,” Dr Chibamba explained.

“Climate change affects all of us, but its impacts are particularly on our urban communities in Zambia. Daily, many people face the challenges of irregular rainfall, extended droughts and expected weather events. For those living in disadvantaged urban areas, these issues can disrupt life. It is crucial to improve our weather forecasts.

Early warnings and nowcasting can help people prepare for extreme weather conditions and make informed decisions to protect themselves and their families. This is especially important for communities that are already vulnerable to the impacts of climate change,” he added.

He shared that the Zambian Government had recently completed the installation and activation of 20 automatic weather stations across the country. These are expected to improve the coverage and frequency of weather observations significantly.

“These stations transmit data every 10 minutes, and we anticipate that the testbed event will use data from the Zambia Meteorological Department network for real-time weather assessment and validation of nowcasting techniques. Nowcasting will enable weather forecasters to monitor the development of the intensity of thunderstorms and provide any warnings about the expected path within the next two hours by collaborating with other populations, including disadvantaged groups. We aim to ensure timely delivery of these warnings, including direct alerts via cell phones. People must understand the necessary actions to take upon receiving a warning to minimise the risk.”

“This workshop is more than just a meeting. It is a collaborative effort to engage with stakeholders and define the role of end users and intermediary organisations in expanding the dissemination and use of weather and climate information. Together, we aim to enhance the resilience and preparedness of our communities in the face of weather and climate challenges.”



PS Dr Douty Chibamba (front, with red tie) with participants from the stakeholder engagement day.



An interactive session determining how people currently access and would like to access weather-related information and what they wish to understand better about early warning-related issues.

Getting the word out in Lusaka on social media

The image shows two social media posts. The first is from RCV News, dated 07 Aug, featuring a photo of Dr. Douty Chibamba and text stating that he has stressed the need to improve weather forecasting in the country. The second is a Facebook post from the Ministry of Green Economy and Environment - Zambia, dated 07 Aug, with the headline "IT IS CRUCIAL TO IMPROVE WEATHER FORECASTING TOOLS - DR CHIBAMBA". The post text says: "Lusaka, Wednesday, 7th July, 2024 - Ministry of Green Economy and Environment Permanent Secretary Dr. Douty Chibamba says it is crucial to improve weather forecasting tools for more accurate early warnings that will help people prepare for extreme weather conditions and make informed decisions to protect themselves and their families." To the right of the Facebook post is a screenshot of a radio broadcast interface for "CHAT BACK" on 09:15, featuring two women and the text "Join ZMD via phone as they discuss the 2024/25 Rainfall Season Forecast on Radio Christian Voice from 9:30 CAT to 11:00 CAT. Have your questions answered."

Engagement and advocacy in Mozambique

The first week of the May '24 Co-production and Testbed Preparatory Co-design Workshop in Mozambique featured the project's first Engagement and Advocacy Day in this country. The Engagement and Advocacy Day aimed to raise awareness of the project and nowcasting with high-level stakeholders, garner support, and identify possible synergies for upscaling the communication of weather forecasts and early warning alerts.

Additional objectives included making corporate stakeholders aware of the economic opportunities of short-range prediction to begin a dialogue around the possibility of corporate funding; and providing a platform for interactive sessions, discussions, and networking opportunities to strengthen collaboration in Mozambique.

Local and international participants included representatives from government, international aid organisations, the media, the scientific community, and end users.

The Permanent Secretary of the Ministry of Transport and Communications (MTC), Ambrósio Siteo, on behalf of the Minister of the MTC, Dr Mateus Magala, opened the international gathering.

Siteo said, "Mozambique, due to its geographical location, is cyclically vulnerable to extreme weather and climate events, the devastating impact of which is of great concern to us, as we continue to witness loss of human life, displacement of people, destruction of infrastructure, which foster food insecurity and other vulnerabilities and have an immensely negative impact on several key sectors of the country's economy and development."

In February/March 2023, Tropical Cyclone Freddy – one of many that have hit the country over the years – affected 10 of the country's 11 provinces, triggering a spike in water-borne diseases, affecting 1.18 million people, displacing 192 000, and destroying 132 000 homes.

Siteo added, "I am pleased to note that this project combines the efforts of the Meteorological and Climate Information Services and the Early Warning for Southern Africa initiative, called WISER EWSA. This initiative fits within the combined national and international efforts to realise the aims of the United Nation's Early Warnings for All initiative."

He said that climate change must be considered throughout the nation's planning process, and as such, Mozambique prioritises climate and environmental issues at presidential level. It is implementing several initiatives to improve weather forecasting and supports a massive expansion of early warning systems to protect people from the increasingly extreme impacts of weather.



Above: The project team visited Chinika Secondary School in Kanyama, Zambia. This is one of the schools where a rain gauge has been installed and training conducted on how to manually read it. At the invitation of the deputy head teacher, the team met with advanced secondary school (grade 11 and 12) students and their geography teacher. Besides an impressive awareness of real-world problems (climate change, sanitation and health etc.) and eloquently sharing their ideas for addressing these, the students demonstrated an understanding of weather and climate, and familiarity with ZMD. They expressed an interest to be involved in the testbed. The project team is following up discussions with the Department of Basic Education to see if it will be possible to accommodate this wish for involvement in some manner. The ethics clearance to work with over-16 year olds with parental permission has been granted by the University of Leeds.



Above: Participants in Kanyama were divided into six groups to identify effective communication strategies to maximise community outreach of early warning information. Suggestions from the teams, comprising community members and intermediary organisations, included holding weekly community meetings to gather and share feedback; using art such as drama, dance, and poetry to convey messages; leveraging digital communication tools like WhatsApp and SMS; using megaphones for broader reach; conducting door-to-door information campaigns; engaging community leaders, councillors, and church leaders in message dissemination; creating local WhatsApp groups for real-time updates (bearing in mind that this incurs data costs); and considering revisiting transportation methods, like using bicycles or motorbikes, to spread messages. Earlier in the day, Ward Councillor Fred Mumba in Kanyama confirmed that people are "glued to" WhatsApp and social media. He said leaflets and posters are good communication methods, but the best method would be through the District Office to reach other ward councillors who can take the message to their constituents.



Above: PS of the Ministry of Transport and Communications Ambrósio Siteo (front, centre) is flanked on his right by the project's Principal Investigator, Douglas Parker (Leeds), and General Director of INAM, Adérito Celso Félix Aramuge, on his left.

Weather information and early warning: Community awareness-raising

The two-week Mozambican visit started in Boane where project team members met with community members – some of whom were new to the concept of early warning systems and nowcasting. The following photo file gives a snapshot of the visit.



Top: Getting to grips with the project, and weather symbols and terminology. Bottom: Group work to identify the different types of weather phenomena and their impacts.



Top: Community observers and disaster management committee members discussing the former's new roles as mobilisers for testbed 2. Media outlets – TV Surdo, TV Mirimar, and FORCOM – shared how they go about disseminating information. (FORCOM is the National Radio Community Forum.) Community members treated the audience to a cultural interlude. Bottom left: Also in attendance was a national music legend, Bata, who has a sight disability and who has undertaken to compose a song in aid of early warning systems (watch this space!). Bottom right: User engagement lead in Mozambique, Gilda Monjane, in the television spotlight.

Visit to a resettlement centre

The team visited a resettlement centre where the people who were affected by the flooding in 2023 and February 2024 were resettled by the government through the INGD. Subsequent to the visit, Gilda Monjane from Kulima Integrated Development Solutions captured the following narration (minimally edited) by one of the community members now living in the resettlement centre. Real-life stories like these must add impetus to the efforts to make early warnings and nowcasting – with the practical follow-up actions by community members and disaster management agencies – a reality as soon as possible.

We arrived here in March 2024. We used to live at the TEDECO Community. We were brought here in an emergency situation by Boane municipal cars because there were floods. First, we were accommodated at the local primary school.

We slept in the classrooms and during the day we stayed outside the classrooms because learners were using the classrooms. For about a month. Then we were distributed land and tarpaulins or plastic to stretch out and sleep inside. We didn't receive food. Every family had to search/look for their food. We don't have radios or TV sets and so we don't receive any information. There is no power in the community. Our cell phone batteries went off and we could not communicate with our extended family members to let them know about our situation and location.

Life is good here because it doesn't get flooded when it rains. We do not think/plan to return to the place where we lived because we suffered a lot, and we saw people dying and our lives were also at risk.

We have many challenges. The tents don't help much. Our families have many members, and we don't fit inside very well to sleep comfortably. It gets very cold. When it rained, it was very cold and rainwater came in. We got wet and the little clothes and food got wet. In the community we don't have running water. We depend on water from small wells that we dig and the water is not very clean. There is no infrastructure in the neighbourhood. We don't have a market, hospital, secondary school. Women give birth in the tents with the help of other inexperienced women.

There is no running water or electricity here. We used two solar kits offered by Gilda to recharge our cell phones.

Nobody promised us to build houses. We must build our houses with our resources/money. A basic house with two bedrooms can cost up to 150 thousand Meticaes (approximately US\$2000). If someone or an entity/institution wants to help us, we are willing to give our labour in exchange for work to obtain money to build a basic house because we are suffering. Our children always have coughs and malaria.

Some families have already managed to have space to do agriculture and this helps a lot to have the minimum to eat. If possible, we would like to have seeds and working tools. There is a lack of rain to produce in certain places.



Top: Dwellings that are now home to the resettled community. Centre: Food for about 40 people was sponsored by individual project team members after the visit to the centre in May 2024. Bottom: The community's source of water which they dug themselves and the setup for food preparation.

Getting the word about nowcasts and early warnings out in Mozambique



Television interview with (far left) user engagement lead in Mozambique, Gilda Monjane; and (centre & left) INAM and its role in generating information for adverse weather events featured.

Experiences on the ground

The following is a sample of responses from community observers and intermediary organisations in the three countries about receiving early warning information. Some said it gives them time to collect their kids from school or arrange for them to get to safety if their homes are in danger. It also gives them opportunity to implement water-diversion methods such as sandbags.

“I see the need of these early warnings they can save a lot of lives and property.”

“I love that nowcasting adds an extra dimension to early warning.”

“Co-producing early warning alerts for urban populations - this information can also be relevant beyond urban populations.”

“We can send information to our communities and help the elderly and people with disabilities to be safe before, during and after disasters.”

“We think the information is useful as it helps us to be prepared in advance. As soon as we become aware of an extreme event, we take precautions.”

“When the rain falls at night, we take many risks, but because we want to save lives, we risk our lives. Sometimes some families refuse to leave the area, but we take the children to the safe place; we wish we could have a safe place to put the kids [and] to collect and keep people for a few days. A permanent place where people could know where to go in case of floods.”

“The information about early warning is useful. A lot of things changed for the positive sense after we started receiving the EW information. We now receive warnings about the occurrence of rain, strong winds and other events. We can also subsequently notify other people in the community.”

“We would like to proceed producing maps of the communities. It is very important to have the maps of the communities because they can help us to have information about the rivers, lower parts of the community and in the district, and also get information on where the people who most need help live. Our priority is to get information to the elderly, women and people with disabilities.”

“We face challenges working with some community leaders because we, the members of the committees, remove people from the lower areas, but when people come to buy land, the community leaders sell the lower parts. Some resettled people return to areas that get easily flooded.”

Someone else related that instead of hiding somewhere waiting for the rain to stop, they know when to take an umbrella or a raincoat. Or if it will rain later in the day, they carry their gumboots with them so that their shoes aren't ruined.

“I clearly see the significance of nowcasting for the prevention or mitigation when disasters occur.”

“We carry out simulations at community meetings using sheets/fabrics with colours that illustrate the expected weather.”

“The information about early warning is new to us in the district. Our institutions did not pay attention to EW before the WISER project. We found it a kind of revolution as it is useful and brings positive impact.”

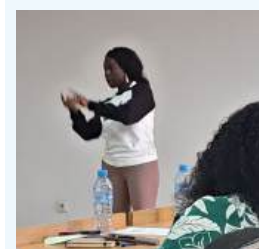
“This info which has helped Kanyama can also help others in Zambia. It can help someone find a shelter [in time] or it can help someone manage their business.”

“When I receive the weather information (early warning), I inform/warn my family and the people who also do farming near the river. When there are signs of lightning or thunderstorms, many teachers tell/warn us not to send children to school.”

“I noted that in the early warning, INAM prioritises impact-based forecasting. They make the prediction taking into account the impacts that this phenomenon will bring. For example, when we are told that a 50mm rain is coming, we have to know the impact it will create. How heavy the rain will be. As a community observer, we need to know what measures to take according to the impact that this event will have.”

Ensuring everyone is included

WISER EWSA's community engagement team has an explicit focus on including people with disabilities in awareness raising events and as community observers. The team works with many disability organisations as intermediaries. People with mobility challenges have been accommodated by ensuring that meeting venues are accessible for wheelchair users. Where this has not been possible, ramps have been added to key access points and, recently in Zambia, mobile toilets were hired. Sign language interpreters offer simultaneous 'translation' of presentations and discussions to those with hearing disabilities, and care is taken to ensure that people with sight disabilities have a community member present to assist them with moving about unfamiliar territory. Materials prepared for the meetings, for example agendas and presentations, also aim to cater for a range of literacy levels.



Signing: Top left: Mozambique user engagement meeting; top right: Kanyama; and bottom left: Katlehong awareness day.

Ensuring community members know how to understand and act on weather information

Following feedback that visual material is preferable, posters were designed and printed to be put up in October during the king-size testbed at key locations with a lot of foot traffic in the three centres. Participants in the Kanyama workshop had an opportunity to deliberate about the content and what would work best in the communities, for example visuals with the text. The first poster (a series of three is envisaged over the course of the king-size testbed) features basic information about weather symbols and the best course of action during main extreme events – heavy rains leading to flooding, lightning, and extreme heat. The posters were done in the primary languages of each target area (English and isiZulu for Katlehong, English and Nyanja for Kanyama, and Portuguese and Changana for Boane).



WISER EWSA developed a series of easy-to-understand, **colourful icons** that the project team can use in their communiques, as relevant. Icons represent heavy rains, lightning, heat, and inclusivity. A sample follows:

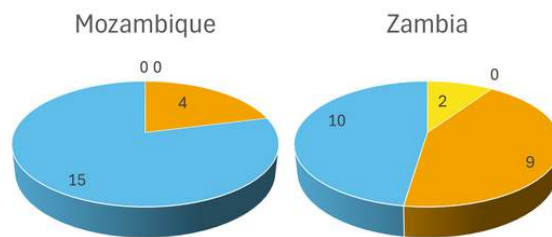


Concerning the **weather symbols** specifically relating to heavy rains, thunderstorms, and severe heat, ZMD has agreed to use the WMO-recommended symbols while INAM, which had its own symbols for heavy rain and thunderstorms, has added the WMO-recommended symbol for severe heat.

Increasing understanding among a wider range of stakeholders

The Kanyama and Boane workshops included an evaluation form completed by 40 external stakeholders. One question measured the level of enthusiasm for 'nowcasts' after the two-day workshop.

- I can see some value in further exploring the opportunities.
- I and/or my organisation should collaborate actively in supporting these services
- I am not convinced that they are a critical investment.
- They have value to some groups but not in my sector.



Short range weather forecast socio-economic benefits

Ongoing – and pivotal to the project – is the evaluation of business models of forecast delivery, combined with the project's socio-economic benefit analysis.

The business models will estimate the economic sustainability of providing early warning information through nowcasts and forecasts in terms of long-term running costs. Delivery of short-range forecasts and nowcasts needs (but currently lacks) effective business models in Africa and creating these will be a landmark for the continent.

During the Zambian and South African Co-production and Testbed Preparatory Co-design Workshops, WISER EWSA team members from Tyrsky Consulting and the Finnish Meteorological Institute ran focus groups on the socio-economic benefits of the project, focusing on assessing the value of warning services and exploring sustainable resourcing models, such as public-private partnerships, particularly with industries like insurance.

The team is currently conducting research to provide evidence of the socio-economic benefits for countries expansion of early warning systems. They are exploring viable resourcing models for the entire value chain – from observations via data processing and fore/nowcasting to communication of (advance) warnings, enhancing and supporting last-minute preparedness, informing rescue and response, and initial recovery. Interviews are being held with several stakeholders representing sectors most dependent on weather information or most affected by severe weather events.



Community members in Zambia workshop questions capturing the context and background to gain a better understanding of the economic situation.

Mozambique



South Africa



Zambia



Standard operating procedures for nowcasting

Significant work is being done on developing and refining standard operating procedures (SOPs), aiming to assist the NMHSs to deliver standardised products and services. The SOPs are seen as a basis document that the NMHSs can use to move forward and are thus a key output of the project. Each NMHS has its own 'operational' SOP that goes beyond nowcasting, for example, bulletins that must be done at certain times of the day. Key to remember is that there will not be a one-size-fits-all solution; the project team wants to ensure that the SOPs more accurately reflect the priorities for forecasters and their respective environments, so that they can get the most important outputs (messages to users) in time.

For the project's benefit, some alignment is needed between the countries, and the SOPs will assist with striking a balance between what forecasters are expected to do on a regular basis and the project's objectives.

Recognising that introducing new SOPs requires a mind shift, the intention is that adaptations should happen with the least amount of disruption to current procedures. In the end, the project wants to see a system that works at each of the NMHSs. Intensive nowcasting events provide the ideal in situ environment to hone SOPs.

The first testbed (January 2024) identified some SOP areas for improvement. Regarding nowcasting-related SOPs, a need for in-depth training was identified to ensure forecasters know which products to use. Other aspects getting more attention include the size of nowcast areas, the impact levels, and exploring better ways to plot maps and find or develop better software.

SOP development remains a priority throughout the king-size testbed and into the intensive testbed (testbed 2) in January and February 2025.

Platforms identified as best suited for the dissemination of early warnings include:

- WhatsApp;
- The SAWS app in South Africa;
- The FASTA app in Mozambique and Zambia; and
- Community radio stations servicing the target communities.

Using these platforms falls into the remit of the NMHSs while other methods will be implemented by DRR organisations or assigned community mobilisers, for example:

- The coloured-flag warning system;
- Using loud hailers; and
- Issuing information at public gathering places, including 'shebeens', churches, clinics etc.

Participants in the CAP training, held in Maputo from 14 to 18 October 2024, were tasked with creating CAP posters. The WMO's Vicente Vasquez Granda (right) presented the training and the Certificates of Recognition. Approximately 40 forecasters were trained in CAP, with an emphasis on embedding these protocols in the SOPs to ensure the timely and effective dissemination of warnings, particularly to vulnerable communities.



Common Alerting Protocol

The forecasters at the NMHSs are receiving CAP training, which is also a priority of the UN EW4All initiative. The intensive training equips them to implement this into their operational nowcasting or early warning procedures.

CAP is a free, cloud-based tool for creating and publishing alerts that are designed for some uniformity of messaging. CAP messages considers that people need to know where to access messages and correctly interpret the warning. They also need to know how to react and be able to follow through on that action.

Each alert has a message identification; sender identification; sent date and time; message status, type, and scope; and other relevant information. The information is classified according to event category, type, area type, urgency, severity, and certainty, among others.

To avoid abuse of the system and compromise its legitimacy, a hierarchy of access determines who can compose and approve messages. The approver must ensure that the messages are legitimate and truthful. Multiple 'alerting authorities' can have the rights to issue alerts, for example the Red Cross, the INGD (the Mozambican disaster management institution) and DNA (National Disaster Management Institute in Mozambique).

Before issuing an emergency alert, the following must be considered:

- Potential impact;
- Location of the event;
- Urgency;
- Severity;
- Certainty; and
- Actions to be taken.

The CAP system is hosted on the Severe Weather Information Centre's [website](#), which aims to enhance "the availability of authoritative warnings and information related to extreme and/or potentially high-impact weather, water, and climate events from WMO Members". It is one of the core components of the WMO Global Multi-hazard Alert System Framework in support of the EW4All initiative.



Project team members out and about

16–17 October, Maputo, Mozambique

Participated: Together for Inclusion (TOFI) meeting



The Mozambican Ministry of Women and Social Affairs invited Gilda Monjane (*centre, striped shirt*) to participate in a meeting of institutions working with people with disabilities. The WISER EWSA Boane project was seen as a good example of inclusion.

16–18 October, Lilongwe, Malawi

Participated: CLARE REPRESA and WISER Early Warnings Workshop

Katharine Vincent presented a poster on WISER EWSA at the workshop “Building resilience in southern Africa: Research to support early warning for all in a changing risk landscape” that was hosted by the CLARE REPRESA project and WISER from 16–18 October in Lilongwe, Malawi.

The workshop was attended by representatives of the REPRESA project from Malawi, Madagascar and Mozambique, representatives of other CLARE projects BASIN, INACCT and PALMTREES, and Malawi-based stakeholders from national government, traditional leadership, and development partners.

Particular discussions around the poster concerned communication channels and how to issue nowcasts, bearing in mind the immediacy of the message; and the feedback mechanism for community verification and feedback on content and presentation.

More broadly in the event, there was excitement that REPRESA evidence shows that early warning is being received and understood by around 80% of people. However this still means that 20% are not receiving that information – and finding out how to include them is key to meet the commitment under EW4ALL of having everyone on Earth covered by early warnings by 2027.



WISER Early Warnings for Southern Africa (WISER-EWSA)

Katharine Vincent¹, Douglas Parker², John Marsham³, Nico Kroese⁴, Estelle de Coning⁵, Jolene Gonçaves⁶, Moch Nhamukoko⁷, Ashaan Perrier⁸, Chris Taylor⁹ and the WISER-EWSA team

¹Malawi Integrated Development Solutions, SA, ²University of Leeds, UK, ³South African Weather Service, ⁴WMO Regional Office, Switzerland, ⁵Mozambique National Institute of Meteorology (INMET), ⁶Centre for International Forestry Research, ⁷University of Zimbabwe, ⁸Centre for Earth and Health (CEH), UK, ⁹Centre for Earth and Health (CEH), UK

Vision and Motivation
Recognising the damage that hurricanes cause, particularly in urban areas, EWSA is ensuring the availability and accessibility of inclusive early warnings on the 0–48h timescale, especially ensuring around nowcasting information for the 0–6h timescale, which is transformational for southern Africa.

Scientific Innovation: Nowcasting
Training in taking place of forecasters in Mozambique, Zambia and the region on nowcasting techniques through the WMO Regional Specialized Meteorological Centre at the South African Weather Service.

Process Innovation: Co-production
Alert levels are being co-produced through an inclusive process during the last few – targeting women and people with disabilities in urban communities in Boane (Mozambique), Kufwene (South Africa), and Kanyama (Zambia).

Southern Africa's First Testbeds
A testbed in Jan-Feb 2024 enabled real-time testing of forecasting and nowcasting, with forecasters and researchers jointly creating forecasts through innovative products and real-time observations. Products were verified and feedback given on presentation (for accessibility) by trained community observers who received the prototype message.

Scaled-up Ambition to Leave a Legacy
The 2024-25 long-term testbed will occur over the 7 months of the rainy season. Nowcasts will be officially issued by met services and communicated using their official channels. The upgraded roles of community members include continuing to verify and provide feedback as well as sharing messages with their communities and raising awareness of weather information and early warnings. Other SACC met services have been invited to participate in training and the intensive two-week testbed period (Jan-Feb 2025). Additional work to develop business plans aims to identify mechanisms to ensure sustainability of nowcasting services post-project.

WISER Weather and Climate Information Services

UK International Development

30 September–4 October, Benin

Participated: 16th EUMETSAT User Forum for Africa



WMO's Estelle de Coning (*left, top*) delivered a well-received presentation on the EWSA project. Pilar Ripodas (*left, bottom*) from NWC-SAF, who is also an advisory board member of EWSA, highlighted the presentation's value in demonstrating NWC-SAF's impact in Africa. It highlighted the importance of incorporating forecaster feedback into testbed products, improving product relevance and increasing forecaster engagement and morale.



14–17 July, Cape Town, South Africa

Participated: Adaptation Network-Colloquium Mobile Journalism Masterclass



This masterclass on creating video content using smartphones targeted those working in communication roles in community member-based organisations. EWSA shared the event notification on its Katsheh WhatsApp group, resulting in one community observer, Ms Bonisiwe Pewa, attending. She presented on the WISER EWSA project, emphasising the importance of early warning information.

19 June, online

Participated: EOTEC-DevNet



Nico Kroese gave a talk on the WISER project and its links with the EW4All initiative to an Earth Observation Community of practise (link: <https://eotecdev.net/about/>)

6 June 2024, University of Bristol, UK

Participated: Africa Meteorological and Climate (MAC) Meeting



Simon Ageet presented on, ‘An end-to-end evaluation of nowcasts during the WISER EWSA testbed’. Africa MAC is a forum for UK researchers who work on African weather and/or climate.

22–24 April 2024, Brussels, Belgium

Participated: Expert Meeting on the Robustness of Climate Change Information for Decisions



Advisory board member Coleen Vogel mentioned WISER EWSA co-production processes in a keynote, ‘Reflections on climate science, information, policy and practice’. Katharine Vincent included project examples when presenting an intervention on cities.

18 April, Brussels, Belgium

Keynote Talk: Weather Forecasts Save Lives Meeting



Doug Parker presented project aims and activities to a meeting of policymakers from the European Commission, UN Environment Programme, the FCDO, and other interested parties.