ANTICIPATORY ACTION

WFP
World Food Programme

SAVING LIVES
CHANGING LIVES

Anticipating Drought:
Reaching the last mile through early warning messages in southern Africa

A regional case study on developing and disseminating messages to communities ahead of El Niño-induced drought

October 2024

Cover:

Woman in Lesotho using a shade net to protect her crops from sun, following recommendations from the Last-Mile Early Warning Messages (LMEWM).

Contents

1. Background

In Southern Africa, 47.4 million people were already facing food insecurity when the El Niño event struck the region in 2023/2024 (WFP, 2023). This event exacerbated the crisis by delaying the onset of the main rainfall season (November to April) and causing below-average rainfall across countries in the region. This shortfall in precipitation coincided with the lean season, disrupting the planting period and ultimately leading to reduced crop yields.

To mitigate the impacts of the predicted below-average rainfall in the Southern Africa region, WFP embarked on a groundbreaking Anticipatory Action (AA) programme since 2019. AA aims to prevent or reduce humanitarian impacts by taking proactive measures before anticipated hazards threaten lives and livelihoods. AA is implemented during a window of opportunity between the issuance of a forecast and the expected onset of the climate shock. The approach relies on pre-agreed plans that outline necessary activities, reliable early warning information, and pre-arranged financing, which is released predictably and rapidly when an agreed trigger point is reached. In July 2023, Lesotho, Madagascar, Mozambique and Zimbabwe reached their triggers for moderate and severe drought ahead of the rainy season, unlocking around US$14 million in pre-arranged AA finance.

As part of the AA activations, WFP supported a range of actions across the four countries, including the development and dissemination of Last-Mile Early Warning Messages (LMEWM) and climate information services to over 1.2 million people (see Figure 1). LMEWM involves the timely dissemination of weather alerts and advisories to communities, particularly in vulnerable areas to enable them to act ahead of the disaster. Early Warning Messages (EWM) form the foundation of AA, providing communities with critical lead time to take proactive measures, while other AAs provide resources and capacity to act on advisories (See figure 3).

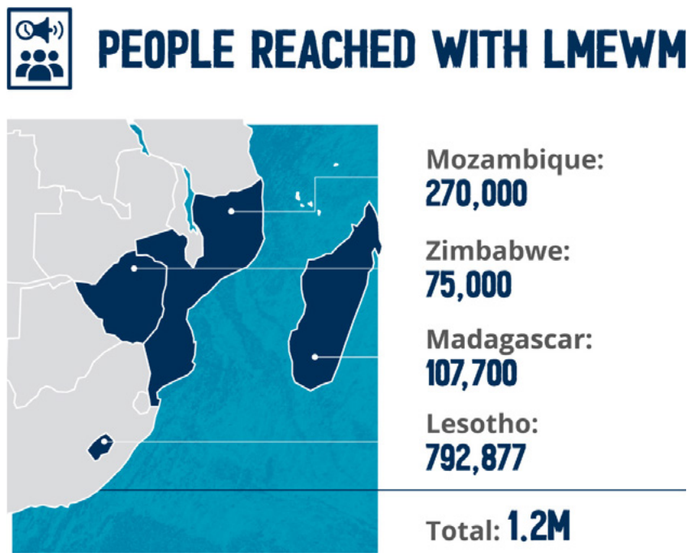

Figure 1. People reached with LMEWM

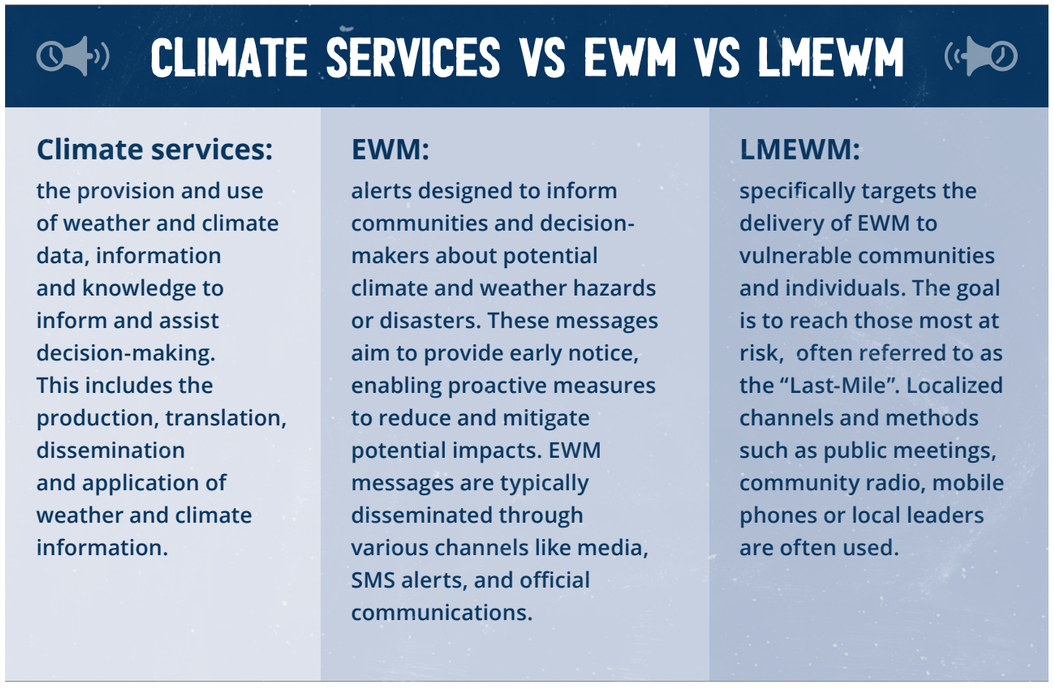

Figure 2. Difference between Climate services, Early Warning Messages (EWM) and Last-Mile Early Warning Messages (LMEWM)

Other anticipatory actions implemented include anticipatory cash-based transfers (CBT), rehabilitation of water points, sustained provision of safe water supplies for both domestic use and agriculture and distribution of drought-tolerant inputs. This comprehensive approach, which combines LMEWM with other anticipatory actions, helps to reach a broader audience, including those not specifically targeted by AA interventions, by employing diverse communication channels that facilitate widespread information sharing. By leveraging LMEWM's extensive outreach, this aimed to reduce the impact of drought on vulnerable communities and support the broader population. A complete overview of the AAs implemented can be found in Figure 3.

Smallholder farmers harvesting crops in Lesotho.

Figure 3. Overview of Anticipatory Actions implemented

1.1 Objectives and Methodology

This regional case study examines the development and dissemination of LMEWM during the El Niño events in Southern Africa and has the following objectives:

i. Demonstrate the role of LMEWM as an anticipatory action.

ii. Outline the process of developing LMEWM and the stakeholders involved.

iii. Explore how climate services programming supported the development and delivery of LMEWM.

iv. Document good practices, lessons learned and recommendations for effective planning and implementation of LMEWM as part of an AA activation.

The comparative analysis was conducted across the four countries and information was gathered through post-activation endline evaluations (assessments of the projects effectiveness and outcomes), Key Informant Interviews (KII) and survey responses from key stakeholders. These stakeholders include AA focal points from WFP Country Offices, National Meteorological and Hydrological Services (NMHS), Ministry of Agriculture and other relevant ministries such as Ministries of Health and Water, National Disaster Risk Management (DRM) agencies, and partner organizations such as the Food and Agriculture Organization of the United Nations (FAO), Save the Children, and Red Cross National Societies.

Women watering dry soil in preparation for planting in Mozambique.

2. Last-Mile Early Warning Messages as an Anticipatory Action

LMEWM is crucial in anticipatory action to ensure timely and effective ex-ante measures, particularly in vulnerable and remote communities. Early warning is among the most cost-effective measures for reducing devastating impacts and losses from climate disasters (UNESCO, 2024). By facilitating early and accurate information dissemination, communities can safeguard their livelihoods, by taking necessary actions to minimize impact of the anticipated disaster.

Disseminating LMEWM alongside other AA activities has proven effective in enhancing understanding of the anticipated climate shocks and, hence, in enabling AA. When targeted end-users received LMEWM, they made better decisions and greater adoption of other AAs. For instance, some LMEWM encouraged practices like water harvesting or planting of drought-tolerant seeds. When farmers received these advisories alongside AAs, such as seeds, shade-structures, or cash assistance, they were better equipped with the resources to make informed decisions. This was vivid during the 2023/2024 activations, where farmers experienced that while maize fields dried out, they could harvest from the drought-tolerant crops they had planted as recommended in the LMEWM. This integrated approach ultimately resulted in more effective application of LMEWM and greater uptake of other AAs.

LMEWM generally reach a broader audience than other AA activities (Lesotho Endline, 2024), often extending beyond the initially targeted end-users. This occurs as disseminated information continues to spread through word of mouth and existing community networks. In Mozambique, key stakeholders reported that the disseminated LMEWM spread throughout the province, demonstrating the wide reach and impact of LMEW dissemination and its effectiveness in bolstering awareness and preparedness of individuals and communities.

2.1 The Effectiveness of LMEWM

During the 2023/2024 activations, representatives from NMHS, ministries and other organizations across the four countries observed an enhanced flow of weather information among farmers and community members, leading to more frequent discussions on weather and preparedness. Community members valued the diverse distribution channels, and farmers who followed the advisories noted improved preparedness and resilience against previous dry conditions. For example, in Zimbabwe, the Department of Agricultural, Technical and Extension Services (AGRITEX) noted that farmers who adhered to advisories were in better conditions this year compared to previous dry spells. Adopters of the messages implemented practices such as water harvesting, planting drought-tolerant seeds, and using shade nets. Stakeholders are optimistic about LMEWM's role, asserting that continued investment will further enhance disaster preparedness, food security, and the safeguarding of vulnerable livelihoods.

> **"IF WE CONTINUE TO INVEST IN EARLY WARNING MESSAGING, WE WILL ACTUALLY SAVE THE ASSETS AND LIVELIHOODS OF PEOPLE"**
>
> - Key Informant Interview, Zimbabwe

An endline assessment of LMEWM across the four countries provides key insights into their effectiveness for both AA beneficiaries and a control group (See figure 4). The LMEWM successfully reached 74.5 percent of AA beneficiaries and 60.3 percent of the control group, demonstrating their broad reach. Both groups reported high rates of on-time message delivery, with 84.5 percent of AA beneficiaries and 83.5 percent of the control group receiving messages promptly. This widespread dissemination underscores LMEWM's effectiveness in extending beyond the target group, thereby enhancing overall community resilience and preparedness for climate-related disasters.

To ensure clarity, LMEWM aimed to use simple, actionable language and were translated into local languages: Sesotho in Lesotho, Mahafaly and Bara in Madagascar, Shangana in Mozambique, and Shona in Zimbabwe. As a result, 78.3 percent of AA beneficiaries found the messages easy to understand, compared to 70.3 percent of the control group, indicating better comprehension among AA beneficiaries. Satisfaction with the content was similar between the two groups, with 71 percent of AA beneficiaries and 69.5 percent of the control group expressing contentment. Additionally, 69.5 percent of AA beneficiaries reported effectively applying the information versus 63.5 percent of the control group. These slight differences suggest that LMEWM are more effective when disseminated through broader AA programmes, leading to better understanding, and utilization of climate advisories.

Overall, while the differences are modest, they indicate that AA beneficiaries experienced better outcomes in receiving, understanding, and applying LMEWM. This demonstrates the success of the AA programme in enhancing the impact of early warning messages.

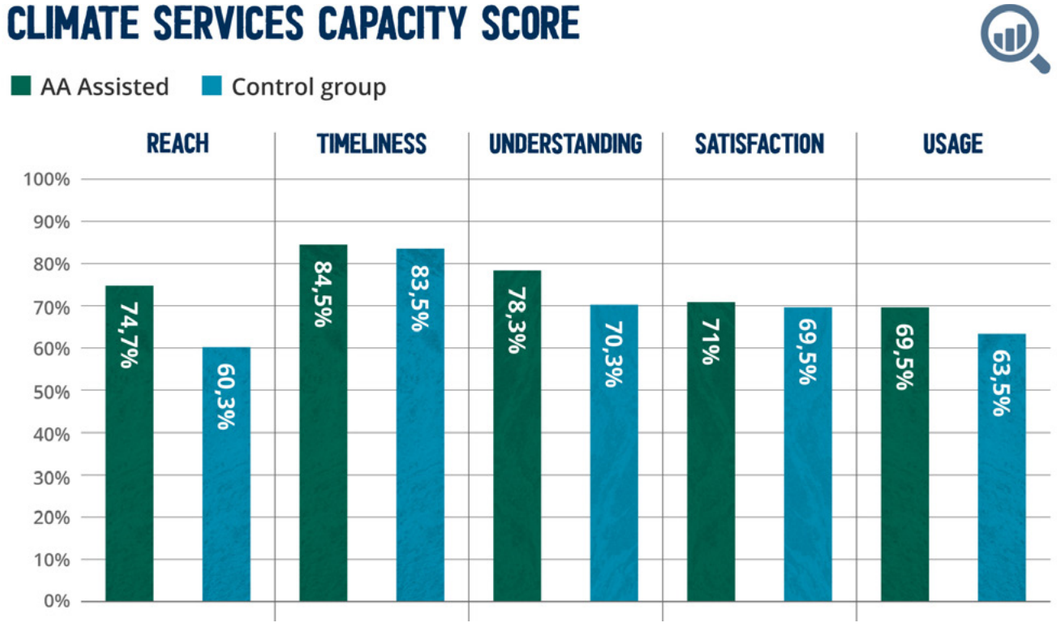

Figure 4: Average climate services capacity score results from the endline evaluation from the four AA Activated countries, 2024

3. Developing and Disseminating Last Mile Early Warning Messages for El Niño-induced Drought

3.1 Capacity Strengthening of Stakeholders

During the 2023/2024 activations, representatives from NMHS, ministries and other organizations across the four countries observed an enhanced flow of weather information among farmers and community members, leading to more frequent discussions on weather and preparedness. Community members valued the diverse distribution channels, and farmers who followed the advisories noted improved preparedness and resilience against previous dry conditions. For example, in Zimbabwe, the Department of Agricultural, Technical and Extension Services (AGRITEX) noted that farmers who adhered to advisories were in better conditions this year compared to previous dry spells. Adopters of the messages implemented practices such as water harvesting, planting drought-tolerant seeds, and using shade nets. Stakeholders are optimistic about LMEWM's role, asserting that continued investment will further enhance disaster preparedness, food security, and the safeguarding of vulnerable livelihoods.

3.1.1. CAPACITY STRENGTHENING OF NHMS

The 2023/2024 El Niño activation illustrated the benefits of long-term collaboration between WFP and NMHS. Strengthening NMHS capacities resulted in more robust drought forecasting, monitoring, systems and the generation of high-quality early warning and climate information products. Targeted training and downscaling of forecasts were pivotal in developing and monitoring triggers and providing accurate weather information.

With support from WFP, NMHS staff in Mozambique and Zimbabwe received training in trigger development and monitoring. In Zimbabwe, WFP's collaboration with AGRITEX and the Meteorological Services Department (MSD) facilitated the co-development of trigger mechanisms for AA, with the model's full transfer to MSD currently ongoing. Through Long-Term Agreements (LTAs) with the University of Reading (UoR), WFP facilitated training of the MSD in the use of climatological software. This enabled MSD to generate area-specific graphs, which proved valuable for developing and visualizing historical climate and temperature data.

An Agricultural Extension Officer shares climate information and advisories with a local farmer in Zimbabwe.

In Mozambique, WFP's support to the National Institute of Meteorology (known in Portuguese as Instituto Nacional de Meteorologia or INAM) contributed to significant advancements, including the production of annual seasonal forecasts at the national level and bulletins with downscaled relevant information at province and district level. Following the support, Mozambique transitioned from the absence of a drought Early Warning System to establishing a comprehensive climate database and digitization of historical climate data. This historical database allows for better analysis and understanding of long-term climate patterns, which enhances the accuracy of predictions and the effectiveness of preparedness strategies. NMHS officials were also trained to access the online database and downscale information to provide area-specific insights to local communities.

In partnership with WFP, the Columbia International Research Institute for Climate Society (IRI) supported the capacity strengthening of the General Directorate of Meteorology (DGM) in Madagascar and Lesotho Meteorological Services (LMS). In Madagascar, WFP and IRI provided training to DGM staff to improve seasonal and sub-seasonal forecasting and supported the development of models to determine triggers and thresholds.

> **"THE DGM NOW USES THE IMPROVED SEASONAL FORECASTING MODELS, THANKS TO TRAINING SESSIONS FACILITATED BY THE IRI"**
>
> - Key Informant Interview, Madagascar

Ahead of the 2023 El Niño event, a comprehensive analysis in Lesotho revealed gaps in LMS's data quality and modeling capabilities. To address these challenges, WFP, through its LTAs with the IRI, facilitated critical advancements in data analysis, accessibility, and functionality. This included developing a platform for storing LMS data, integrated with IRI's systems, satellites, and global platforms, enabling enhanced data triangulation and improved forecasting accuracy. These enhancements allowed LMS to conduct both seasonal and more precise sub-seasonal forecasting, better anticipating and preparing for weather-related hazards. Additionally, WFP introduced a high-performance computing (HPC) system, supplemented by five laptops (an extension of the HPC), to support the rapid processing of multiple data sets, further boosting forecast accuracy and confidence. WFP also supported the DMA in integrating these improved forecasts into EWS for timely dissemination of LMEWM. A significant achievement was the development of the Map Tool, which uses historical and continuously updated data, such as from the annual Lesotho Vulnerability Assessment, to validate patterns and current predictions, particularly for drought triggers. The DMA was trained on this tool, which is accessible to government entities, ensuring that the information remains actionable for early warning and decision-making. These advancements collectively improved forecast accuracy and confidence, enabling earlier predictions and more precise trigger monitoring.

3.1.2. CAPACITY STRENGTHENING OF AGRICULTURAL EXTENSION OFFICERS

Agricultural Extension Officers (AEOs) must be capacitated to comprehend, interpret and communicate LMEWM effectively. In Zimbabwe and Mozambique, WFP supported capacity strengthening by training Agricultural Extension Officers (AEOs) through Participatory Integrated Climate Services for Agriculture[1] (PICSA) in collaboration with the University of Reading (UoR). Prior to the activation, AEOs in both

1 Participatory Integrated Climate Services for Agriculture (PICSA) is a step-by-step participatory approach for CS agricultural extension that combines historical climate data and forecast with farmers' contextual knowledge for participatory planning to inform decision-making about agricultural practices. The approach includes "training of trainers" of government extension workers and intermediaries who subsequently train farmers on the PICSA approach.

national and provincial level were trained to interpret seasonal climate forecasts, assess climate risks and integrate climate services into agricultural practices. The AEOs further relay tailored information to farmer groups led by a "lead farmer," each overseeing approximately 10-15 farmers.

During the 2023/2024 activation, Zimbabwe leveraged the ongoing PICSA activities, utilizing the pool of trained experts to train additional AEOs in Chiredzi, Hwange, and Binga districts. Due to time constraints, the training focused on key components of the PICSA approach rather than the full methodology, ensuring AEOs were capacitated to comprehend and disseminate forecast information and advisories. Alongside supporting training of AEOs, WFP complemented government efforts by distributing tablets, data and fuel for motorbikes, enabling AEOs to reach farmers promptly. Throughout the season, both pre-existing and newly trained farmers received 10-day forecasts and advisories from AGRITEX through WhatsApp groups, which they further disseminated to farmers.

Experiences from the 2023/2024 activations indicate that farmers participating in these initiatives are accustomed to receiving climate services and utilizing LMEWM for informed decision-making, compared to farmers without such exposure. Consequently, districts with pre-existing PICSA initiatives, such as Masvingo district in Zimbabwe, displayed increased preparedness and responsiveness to LMEWM. Furthermore, pre-trained AEOs demonstrated stronger capacity to disseminate timely LMEWM through established structures compared to those trained during the activation. Their heightened awareness and technical understanding of weather hazards, along with their ability to respond appropriately, illustrate the significant impact of continuous investments in climate services. This ultimately enhances the effectiveness of LMEWM and bolsters community resilience against climate-related risks and disasters.

> **"WHEN THE AA ACTIVATION HAPPENED, WE COULD LEVERAGE ON THESE TRAINED EXPERTS TO SUPPORT THE IMPLEMENTATION IN THE DISTRICTS THAT ACTIVATED"**
>
> - Key Informant Interview, Zimbabwe

Farmers in Zimbabwe discuss their farming season plans, incorporating insights gained from PICSA training.

Farmers in Madagascar are preparing compost baskets, as indicated in the early warning message, to address the challenges posed by drought in their farming activities.

3.1.3. STRENGTHENING COLLABORATION THROUGH TECHNICAL WORKING GROUPS

Effective implementation and prevention of duplicated efforts hinge on robust collaboration among NMHS, government agencies, and implementing partners. In each country, WFP enhanced collaborative planning by supporting the establishment of Technical Working Groups (TWG), comprising of NMHS, relevant ministries, and implementing partners (see section 4). These groups are tasked with developing triggers and thresholds, and they collaborate to define and share roles and responsibilities in the implementation of AA activities. Their heightened awareness and technical understanding of weather hazards, along with their ability to respond appropriately, illustrate the significant impact of continuous investments in climate services. This ultimately enhances the effectiveness of LMEWM and bolsters community resilience against climate-related risks and disasters.

In Zimbabwe, district-level TWGs, coordinated by the Department of Civil Protection, comprise AGRITEX, District Development Coordinators, Environmental Management Agents, the Zimbabwe National Water Authority (ZINWA), and Livestock Departments. WFP facilitated the formation of these groups in the AA districts and supported them with resources to convene quarterly meetings. Additionally, MSD organized monthly meetings where NGOs, along with public and private sector entities, collaborated to assess impacts and needs, ensuring that LMEWM initiatives remained responsive to community requirements. Stakeholders reported that this investment led to heightened engagement, enabling the production of more timely and customized advisories for early warning. They also noted that the enhanced capacity boosted their motivation and confidence in the value of LMEWM.

In Mozambique, a national TWG was established in 2020 to oversee all AA and EW activities, composed of stakeholders such as INAM, the National Institute for Disaster Risk Management and Reduction (known in Portuguese as Institution Nacional de Gestção e Redução do Risco de Desastres or INGD), the Ministry of Agriculture and Rural Development (known in Portuguese as the Ministério da Agricultura e Desenvolvimento Rural or MADER), and various sectors and development partners. The TWG is divided into three subgroups, with INAM leading the one focused on Early Warning. In Gaza province, technical committees were formed to design province-specific LMEWM. During the 2023/2024 activation, Gaza province led LMEWM development at the provincial level for the first time, establishing new structures and roles. Despite being new in leading disaster communication, the province level TWG demonstrated strong technical capability. The implementation of LMEWM was further strengthened by the establishment of a unified Anticipatory Action Plan (AAP) shared between the Government and partners. This collaboration ensured strong ownership, well-coordinated planning, clear role allocation and distribution of districts, thereby preventing duplication of efforts.

In Madagascar, the national TWG, comprising DGM and technical experts, is coordinated

by the National Office of Risk and Disaster Management (Known in French as Bureau National de Gestion des Risques et des Catastrophes or BNGRC). The TWG held monthly meetings and effectively discussed monitoring triggers and institutionalization of AA within other DRM schemes. There is an ongoing initiative to decentralize the efforts by establishing a TWG involving local actors from the activating districts in the south.

Meanwhile, in Lesotho the implementation of AA was led by a national Early Warning TWG coordinated by DMA and composed of stakeholders including LMS, Ministries of Agriculture, Water Affairs and Health, and technical experts such as Lesotho Red Cross Society, Department of Soil and Water Conservation and Department of Nutrition. Recognizing the need for clear guidelines, WFP facilitated the creation of a Terms of Reference (ToR) for the TWG, ensuring roles and responsibilities were clearly defined before the activation. The TWG, collaborating through both formal meetings and a WhatsApp platform, played a crucial role in aligning District and Village Disaster Management Teams (DDMT and VDMT) responsible for tailoring and disseminating localized LMEWM. Following the activation and release of the seasonal outlook, WFP supported the TWG in convening a forum where LMEWM were developed. Through strong communication and preparedness, the TWG could coordinate the operational plan and readiness activities, enabling the development of LMEWM once triggers were met.

3.2 Co-Development of Last-Mile Early Warning Messages

Developing effective LMEWM and advisories requires collaborative, cross-sectoral efforts that integrate the multifaceted impacts of weather hazards on communities and livelihoods. Depending on local structures, the co-development process can be carried out at the national, provincial or district level. Involving district officials such as AEOs and community representatives ensures that advisories are relevant and applicable to local contexts.

> "THIS TIME THERE WAS LESS DUPLICATION OF EFFORTS BECAUSE WE IDENTIFIED THE RESPONSIBILITIES OF EACH ACTOR, AND IT ALL WORKED SMOOTHLY"
>
> - Key Informant Interview, Mozambique

In all countries, the NMHS issued the forecast and shared it with the group responsible for co-developing LMEWM. While messages typically align with the agricultural season and activities, they are produced across various sectors, such as water, health and nutrition, therefore necessitating cross-sector collaboration to deliver clear and unified advisories to end-users dealing with the interconnected impacts of hazards. This collaboration typically occurs within the TWGs. In Lesotho, the advisories were co-developed by the national-level TWG. In Zimbabwe, district-level Content Development Committees consisting of MSD and AGRITEX were responsible for co-developing advisories. In Mozambique, the TWG at the provincial level led the co-development process, and in Madagascar, WFP collaborated with partners such as OCHA and FAO to develop the advisories.

After co-development, the advisories were usually further translated to local languages (see section 4.5) and tailored before dissemination to enhance their contextual relevance. For example, in Zimbabwe, the District Content Development Committees (DCDC) shared the messages at the district level and AEOs, based at either the village or Ward level, further tailored them. In Lesotho, LMEWM were shared from the national level to the District Disaster Management Teams (DDMT), who further relayed them to the Village Disaster Management Teams (VDMTs). DDMTs and VDMTs tailored the LMEWM to ensure contextual relevance.

The advisories were developed during the activation based on available information from the NMHS and the capacity of the respective groups to convene and create them. In Zimbabwe, forecasts were issued every 10 days, prompting the development of advisories on the same schedule. In Mozambique, advisories were produced monthly. In Lesotho and Madagascar, advisories were not revised during the activation period despite updated forecasts were available from LMS and INAM, respectively. This suggests the potential for more frequent updates to LMEWM in future activations.

To ensure accuracy and clarity, LMEWM and advisories undergo a validation process, involving NMHS and other relevant stakeholders. This process varies between countries and sometimes between ministries. Message validation is crucial to maintain end-user trust, and robust validation procedures are imperative to ensure that LMEWM accurately reflects weather predictions and expected impacts.

3.3 Dissemination of LMEWM

LMEWM dissemination during the El Niño-instigated activations involved various methods tailored to recipients' livelihoods, technology access, and languages, varying by districts to meet local needs. Across all countries, LMEWM were a part of the AAPs, therefore their dissemination was coordinated with other actions and tailored to align with the timelines of these AAs. For example, in Mozambique, agricultural advice was provided during CBT cycles to encourage the use of resources in accordance with the recommended practices. This coordinated approach ensured that LMEWM complemented and enhanced the impact of other AAs.

> "AFTER WE VISITED THE COMMUNITY, THEY SAID THEY COULD UNDERSTAND THE SITUATION BETTER AND WERE MORE ABLE TO ACT ACCORDING TO THE ADVISORIES"
>
> - Key Informant Interview, Lesotho

All four countries effectively used multiple channels to meet the diverse needs of end-users across districts. Traditional media like TV, radio, and news outlets provided broad dissemination, while digital platforms such as SMS, WhatsApp, Facebook, and YouTube facilitated targeted and interactive information sharing. In Lesotho and Madagascar, public gatherings were effective for last-mile communication, enabling direct community engagement and addressing questions and concerns. Madagascar also employed creative methods like puppet shows to convey information in an engaging, accessible way. These methods were particularly effective in the southern regions of the country where illiteracy is high.

Community radio stations proved highly effective for localized dissemination. Familiar with local contexts, these stations tailored and conveyed information in local languages, ensuring clarity and understanding within communities. In Mozambique, a WFP-supported partnership with the Institute of Social Communication (known in Portuguese as the Instituto de Comunicação Social or ICS) enabled the use of community radios to broadcast messages across districts. To extend the reach to areas without radio coverage, mobile radios were employed. In Madagascar, WFP and partners enhanced dissemination by distributing radios and establishing 92 community radio listening groups led by Community Agents. These agents received training as LMEWM dissemination began, to improve their understanding and use of the climate information. The groups

met monthly to listen to forecast information and discuss advisories, significantly raising awareness among specific groups like women and people with visual impairments.

AEOs played a crucial role in dissemination in Zimbabwe, with Mozambique and Lesotho also using them to a lesser extent. This approach enabled direct communication with farmers, relying on trusted lead farmers to deliver tailored advice in a language understandable to local farmers. Although this method may not reach as wide an audience as technological channels, its impact was significant. Farmers actively engaged in discussions, received personalized, up-to-date information, and made more informed decisions, thereby enhancing the overall effectiveness of the dissemination process.

Reaching shepherds and herders in remote regions posed a challenge in Lesotho, as they are often inaccessible through conventional communication channels like public gatherings or social media. However, by exploring alternative methods, such as distributing solar radios and direct engagement when they were in more accessible areas at lower altitudes, stakeholders found more effective ways to connect with these isolated groups. Such innovative solutions underscores the importance of ensuring that even the most remote populations are reached and included.

4. Best Practices and Lessons Learned

The activations across southern Africa highlight a diverse range of challenges and offer valuable best practices and lessons learned. The following section presents these practices and lessons, organized by key themes, highlighting the most effective approaches to guide the development and dissemination of LMEWM.

4.1 Optimizing Stakeholder Collaboration

Promote effective collaboration and timely co-development processes

The co-development of LMEWM should be initiated immediately after the seasonal forecast issuance. This approach gives stakeholders enough time to engage, consolidate, and validate advisories, thus improving the integration and accuracy of LMEWM. Furthermore, when TWGs collaborate actively before the activation and convene regularly, development and dissemination processes are more effective. For example, in Mozambique, stakeholders collaboratively designed a system using well-established TWGs and a deep understanding of cropping calendars, resulting in strong ownership and clear processes for developing LMEWM. Especially for newcomers to AA and LMEW initiatives, establishing routine stakeholder meetings is vital for sustainable collaboration and structured processes. WFP can strengthen collaboration by facilitating regular stakeholder interactions and communications through working groups.

Adopters of the messages implemented practices such as water harvesting, planting drought-tolerant seeds, and using shade nets. Stakeholders are optimistic about LMEWM's role, asserting that continued investment will further enhance disaster preparedness, food security, and the safeguarding of vulnerable livelihoods.

Decentralize and tailor the co-development process as relevant

Effective co-development processes should be appropriately decentralized to tailor relevant and locally applicable advisories. Limited district-level customization may impede local ownership, causing delays in LMEWM development. In addition to strengthening local ownership, decentralized approaches and involvement of local communities is critical to ensure the messages are tailored and understandable among end-users. Active involvement of communities and integration of local knowledge can contribute to stronger trust, which is pivotal for the effectiveness of LMEW dissemination (see section 4.4).

Ensure cross-sectoral integration

Lessons from Zimbabwe underscore the importance of a comprehensive co-production approach to address multifaceted impacts and develop unified messages. Recognizing the value of collaborative efforts, Zimbabwean entities like MSD have partnered with entities like the Department of Civil Protection (DCP) and the Zimbabwe National Water Authority (ZINWA) to issue joint statements, ensuring coherent messages and alignment among intermediaries. As Zimbabwe prepares for the next activation, similar collaborative models are being pursued in the agriculture, health, and energy sectors. MSD together with stakeholders in Zimbabwe, aims to establish a National Framework for Climate Services (NFCS) to enable coordinated efforts and issue integrated advisories tailored to the country's diverse sectors.

Train stakeholders

WFP plays a critical role in supporting training and capacity strengthening to improve co-production processes and ensure stakeholders are capacitated to fulfill their respective responsibilities. Comprehensive training and capacity strengthening to all stakeholders involved in developing and disseminating LMEWM is key to ensure comprehension of forecasts and capacity to effectively develop and communicate LMEWM and advisories. The training should be conducted well in advance as part of readiness activities to ensure the timely delivery of LMEWM.

4.2 Enhancing Dissemination Channels

Diversify communication channels

Employing diverse channels enhanced inclusivity and wide reach of LMEWM. Across all countries, public gatherings facilitated general information sharing. In Lesotho, community members highlighted the value of direct contact, which allowed them to receive information firsthand, ask questions, and deepen their understanding and readiness to act on the advisories. Radio, with its extensive geographical coverage, was crucial for reaching the a wide audience, including elders and people with disabilities. Partnering with community radio stations was particularly effective when local radio channels supported the translation of messages and broadcasted in local languages. Additionally, social media platforms such as Facebook and YouTube were effective in engaging the youth population.

Disseminate climate services continuously

It was observed that disseminating climate information throughout the year, beyond AA activations, enhanced understanding and adoption of LMEWM for informed decision making. In addition to strengthening the dissemination structures and systems, regular dissemination of weather information also sustains awareness efforts. Furthermore, such initiatives can help identify gaps, providing an opportunity to test and improve dissemination channels before activations.

Invest in climate services initiatives and strengthen Agricultural Extension Officers (AEOs) capacity

The 2023/2024 activations underscore the

benefits of investing in regular climate services initiatives for improved LMEWM dissemination. Firstly, AEOs with prior training and experience in communicating climate information disseminated LMEWM more effectively. Secondly, farmers accustomed to receiving such information were adept at using it for effective decision-making. Thirdly, having implemented initiatives like PICSA allowed for adapting and customizing tools, facilitating additional AEOs training by experienced experts as needed during activations. Still, in Zimbabwe, it was observed that AEOs trained well in advance were more effective in outreach compared to those trained just before or during activations. Thus, strengthening AEOs capacity and establishing clear protocols and dissemination procedures well before delivering LMEWM ensures more accurate and timely dissemination.

Address logistical barriers

Despite having access to mobile tablets or radios, many end-users across the four countries struggled to access information due to network coverage gaps and inadequate mobile data access, which requires financial resources. In Zimbabwe, efforts by the Government and INGOs to provide data support were often neither timely nor reliable, impeding dissemination. Similarly, AEOs in areas with poor network coverage faced financial challenges, such as needing fuel for motorbikes to access information. Overcoming these logistical and financial hurdles is essential for the successful use of digital platforms in dissemination.

4.3 Fostering Timely Partnership

Establish partnerships in a timely manner

Establishing partnerships as part of readiness activities allows for immediate dissemination once EWMs are developed, giving end-users ample time to make informed decisions to mitigate the impact of the disaster. For organizations and local institutions expected to be involved in the implementation, it is advisable to establish Long-Term Agreements (LTAs) or other suitable arrangements well in advance of activation.

4.4 Building Trust in LMEWM

Deliver accurate of LMEWM over time

Improving the accuracy of LMEWM is crucial to build trust among end-users, especially for slow-onset hazards like drought, where impacts may not be immediately visible. Building trust is a gradual process, typically achieved through consistent and accurate LMEWM delivery. Insights from the 2023/2024 activations indicate that as countries implement AA and deliver accurate LMEWM, confidence in the warnings grows, prompting communities to respond more proactively. For instance, after the seasonal forecast predicted below-normal rainfall in Zimbabwe, heavy rains in mid-October prompted many farmers to plant crops despite MSD's warnings. This led to yield losses when the dry spell unfolded. However, as farmers noted the accuracy of the forecast as the season progressed, confidence in MSD grew. Similarly, Mozambique's investment in improving predictions led to heightened trust in forecasts, resulting in more proactive measures as end-users increasingly acted on tailored LMEWM.

Early Warning Message received ahead of the drought in Mozambique.

Enhance end-users' understanding of probabilistic forecasts

In addition to delivering accurate and tailored advisories, trust is built by strengthening awareness on the probabilistic nature of forecasts. By emphasizing that forecasts indicate probabilities rather than certainties, communities can better manage expectations and reactions to deviations from predictions. Clear communication about associated likelihoods, coupled with nuanced and understandable LMEWM, fosters long-term trust, and minimizes the adverse effects of potential inaccuracies in the forecasts.

Integrate local and scientific knowledge

Adoption of Indigenous Knowledge Systems (IKS) ensures that LMEWM are not only scientifically rigorous but also culturally resonant with local communities. Studies on IKS in Zimbabwe and Lesotho found that while users generally do not trust IKS or scientific forecasts in isolation, they prefer a combination of both for reliable climate information services (WFP, 2022). Looking ahead, Zimbabwe and Lesotho recognise the value of IKS, and are exploring ways to integrate local knowledge into forecasts to improve forecast precision, and foster stronger community trust and engagement with climate information.

> "SOME COMMUNITIES EMPHASIZE THE IMPORTANCE OF INDIGENOUS KNOWLEDGE. WE WANT TO IDENTIFY WHICH PRACTICES ARE STILL RELEVANT TODAY, AND HOW THEY CAN BE INTEGRATED WITH EXISTING SCIENTIFIC EARLY WARNING SYSTEM"
>
> - Key Informant Interview, Lesotho

4.5 Effective Translation of LMEWM

Disseminating LMEWM in local languages

Disseminating LMEWM in local language enhances effectiveness and adaptation among end-users. In Lesotho, LMEWM were disseminated in Sesotho, the major language, However, with increasing mobility in the southern region, Xhosa is becoming more prevalent. To ensure inclusivity for all language groups, regular assessments should determine the necessity of translating LMEWM into additional languages.

Leverage on partnerships for translation

The process of translating LMEWM varies across different contexts. A successful practice in Madagascar and Mozambique involved using community radios to translate messages into local languages. In Madagascar LMEWM were translated from Malagasy into Mahafaly in Betiooky district, and Bara in the Betroka district, while in Mozambique, messages were translated from Portuguese into Shangana in the Gaza district. In Zimbabwe, District Content Development Committees translated messages into Shona. When resources for translation are limited, leveraging LTAs or organizations like Translators Without Borders (TWB) can also be beneficial for translation in certain contexts. Translation enhanced accessibility, comprehension and the use of LMEWM across diverse linguistic communities within and beyond the activating districts.

4.6 Enhancing LMEWM Understanding

Packaging of LMEWM in user-friendly language

Ensuring comprehension goes beyond translation; it requires the use of simple and easily understandable terminology. A key takeaway from the four countries is the importance of simplifying language in LMEWM communication to bridge the gap between technical terms and user understanding. For example, technical terms like “isolated,” “scattered,” or “widespread” rainfall are often misinterpreted, as observed in multiple countries. Similarly, phrases like “below normal rainfall” assume that users have a clear understanding of what “normal” means, which may not be the case.

> “SAYING 'BELOW-NORMAL' IS ONE THING, BUT ONCE YOU SPEAK OF WHAT THE IMPACT WILL BE AND WHAT PEOPLE SHOULD DO, IT LEADS TO ACTION. SHARING THE IMPACTS HAS MADE A HUGE DIFFERENCE”
>
> - Key Informant Interview, Zimbabwe

The use of percentages and phrases such as “40 percent chance of rain” can also be confusing, as end-users might interpret them as indicators of rainfall amount rather than likelihood. Instead, providing clear explanations about the expected form of rain and its implications improves understanding and preparedness. Enhanced clarity on impacts builds trust by aligning forecasted conditions more closely with individuals’ observations, reducing misinterpretation and strengthening the overall understanding of forecasts over time.

Awareness raising to communities

In addition to nuanced, clear, and understandable content, effective LMEWM requires community awareness about weather patterns and their impact on climate and livelihoods. Insights from the 2023/2024 activations indicate that farmers involved in pre-existing climate information services initiatives better understand weather impacts and are more skilled at using this information for decision-making. In Lesotho, engaging with community members during the dissemination and assessing their understanding of LMEWM helped identify and address misunderstandings, aiding the effective tailoring of future messages. Overall, regular exposure to climate information services and community engagement ensures that LMEWM are understandable and effectively used.

> “IT IS DIFFICULT TO CONVEY MESSAGES IF PEOPLE LACK UNDERSTANDING OF WEATHER PATTERNS AND IMPACTS. THAT’S WHY WE MUST ENSURE THAT THERE IS COMMUNITY AWARENESS ABOUT CLIMATE IMPACTS”
>
> - Key Informant Interview, Lesotho

4.7 Promoting Inclusive LMEWM

Understand the vulnerabilities and identify groups currently excluded

Inclusive LMEWM requires a comprehensive understanding of vulnerabilities and opportunities among diverse end-user groups. Specifically, tailoring content and prioritising dissemination channels that effectively reach individuals with disabilities, women, and youth. To effectively reach underserved groups in LMEW delivery, it is crucial to evaluate current processes and approaches to identify gaps and excluded groups.

Strengthen partnerships with Civil Society Organizations (CSOs) and community representatives

Collaborating with CSOs and umbrella organizations, such as the Lesotho Council of NGOs (LCN), enhances inclusiveness by leveraging their expertise in identifying vulnerabilities and their established networks for effectively reaching the last mile. Additionally, involving community representatives in crafting targeted dissemination strategies is crucial, as they bring localized knowledge of vulnerabilities and individual needs. The involvement of representatives from the Vulnerability Assessment Committee in Lesotho was particularly beneficial during the drafting process, providing local context and highlighting key vulnerabilities.

Promote inclusive dissemination of LMEWM

LMEWM are only as useful as they are accessible, therefore countries benefitted from expanding both dissemination channels and format to increase the reach. For example, Lesotho effectively engaged with youth through social media, while Madagascar employed visual aids, megaphones, and public gatherings to reach regions with high illiteracy rates. Public gatherings present opportunities to target groups, such as the elderly, who may require additional time and information to understand advisories. All countries utilized radio broadcasts to accommodate individuals with visual impairments, and Zimbabwe’s use of sign language interpretation on national TV broadcasts for the hearing impaired was particularly successful. Additionally, colour-coded alerts and warnings on digital platforms like WhatsApp, Twitter, and Facebook proved favourable in Zimbabwe for individuals with cognitive disabilities who benefit from visual cues. To reach individuals without access to technology, the formation of radio listening groups is effective. Especially, when such groups are gender-sensitive, like in Madagascar, it offers women a platform to address social issues and discuss their specific needs regarding LMEWM.

A community radio listening group tunes in to LMEWM updates in Madagascar.

> “IN THE LISTENING GROUPS, PEOPLE ENGAGE IN DISCUSSIONS ON SOCIAL ISSUES. THIS IS VALUABLE BECAUSE IT ALLOWS US TO MOBILIZE PARTICIPANTS TO ADRESS BROADER TOPICS LIKE GENDER, INCOME AND THE COMMUNITY’S NEEDS FROM FORECAST INFORMATION AND EARLY WARNINGS IMPACT”
>
> - Key Informant Interview, Madagascar

5. Conclusion: Recommendations Moving Forward

The 2023/2024 El Niño season underscored the critical need for a systematic approach, demonstrated that effective and timely Last-Mile Early Warning Messages depend on strong partnerships and collaboration, targeted capacity strengthening, active community engagement and a commitment to inclusivity.

Building on the successes from the activations in Southern Africa, it is essential to further invest in the capacity of National Meteorological Hydrological Services staff, Agricultural Extension Officers, and other key stakeholders, ensuring that training is conducted well in advance of any activation. Establishing long-term partnerships early on is crucial for fostering effective collaboration and avoiding last-minute logistical challenges. To fully integrate LMEWM within the broader Anticipatory Action framework, it is also vital to establish feedback mechanisms to allow for continuous adjustments and refinements, ensuring LMEWM remain responsive to the evolving needs of communities and the dynamic nature of climate risks. Moreover, efforts should extend beyond LMEWM during activation periods, to promote the regular delivery of climate services, helping to maintain a heightened state of readiness. As the findings demonstrate, the continuous provision of climate information is key to building trust among end-users and increasing the uptake of advisories and informed decision-making within communities.

Future initiatives should continue to diversify communication channels for broad and effective dissemination while also exploring new methods to simplify language, thereby improving the accessibility and clarity of LMEWM. Establishing clear structures and defined roles within co-development processes is essential, ensuring these efforts are properly decentralized and tailored to local needs. Moreover, fostering inclusive community engagement and implementing gender- and disability-transformative strategies are crucial for strengthening resilience among remote and marginalized populations.

The collective efforts demonstrated during the 2023/2024 El Niño activation have laid a strong foundation for enhancing the effectiveness of LMEWM during in Southern Africa. By leveraging the lessons learned and best practices gained, stakeholders can further refine and scale up their approaches, ensuring that LMEWM are not only timely and accurate but also inclusive and actionable. This will significantly improve the ability of communities and farmers across Southern Africa to prepare for and mitigate the impacts of weather and climate hazards. In doing so, LMEWM will not only serve as a tool for immediate response, but also as a driver for long-term resilience and promote the uptake of anticipatory actions in the region.

Woman in Lesotho with her freshly harvested corn.

6. List of References

- Key Informant Interviews. 2024. *Interviews conducted in Zimbabwe, Lesotho, Mozambique, and Madagascar, February–May 2024.* Conducted by the World Food Programme.
- UNESCO. 2024. Early Warning Systems. Updated June 20, 2024. Retrieved June 26, 2024, from https://www.unesco.org/en/disaster-risk-reduction/ews.
- World Food Programme (WFP). 2024, July. *Endline Anticipatory Action in Zimbabwe Endline Survey Results Report.*
- World Food Programme (WFP). 2024, June. *Madagascar Endline: Forecast-based Anticipatory Action Project (FBAA).*
- World Food Programme (WFP). 2024, May. *Results of Outcome Monitoring Survey: Anticipatory Action (AA) Endline for Drought in Gaza, Tete, and Sofala Provinces.*
- World Food Programme (WFP). 2024, April. *Anticipatory Action in Lesotho Endline Survey Results Report.*
- World Food Programme (WFP). 2023. *WFP Races to Cushion People from Looming Drought in Southern Africa in Largest Cash Payout to Date.* Retrieved May 10, 2024, from https://www.wfp.org/news/wfp-races-cushion-people-looming-drought-southern-africa-largest-cash-payout-date.
- World Food Programme (WFP). 2022. Updated September, 2023. *Study on the Use of Climate-related Indigenous Knowledge Systems to Support Anticipatory Action in Zimbabwe.* Retrieved June 17, 2024, from https://www.wfp.org/publications/study-use-climate-related-indigenous-knowledge-systems-support-anticipatory-action.

Acronyms

AA	Anticipatory Action
AAP	Anticipatory Action Plan
AEO	Agricultural Extension Officer
AGRITEX	(Zimbabwe) Ministry of Agriculture
CBT	Cash Based Transfers
CoP	Community of Practice
CS	Climate Services
CSO	Civil Society Organisations
DCDC	District Content Development Committees
DCP	(Zimbabwe) Department of Civil Protection
DDMT	(Lesotho) District Disaster Management Teams
DGM	(Madagascar) Direction Générale de la Météorologie
DMA	(Lesotho) Disaster Management Authorities
DRM	Disaster Risk Management
EWM	Early Warning Messages
FAO	(United Nations) Food and Agriculture Organization
HH	Household
HQ	Headquarters
ICS	(Mozambique) National Institute of Communication
IKS	Indigenous Knowledge Systems
INAM	(Mozambique) Instituto Nacional de Meteorologia
INGD	(Mozambique) Instituto Nacional de Gestão e Redução do Riscos de Desastre
INGO	International Non-Governmental Organization
IRI	International Research Institute for Climate and Society
KII	Key Informant Interviews
LCN	Lesotho Council of Non-Gvernmental Organizations
LMEW	Last Mile Early Warning
LMEWM	Last Mile Early Warning Messages
LMS	Lesotho Meteorological Services
MADER	(Mozambique) Ministry of Agriculture and Rural Development
MSD	(Zimbabwe) Meteorological Service Department
NGO	Non-Governmental Organization
NMHS	National Meteorological and Hydrological Services
PICSA	Participatory Integrated Climate Services for Agriculture
RAM	Research, Assessment and Monitoring
SMS	Short Message Service
TV	Television
TWB	Translators Without Borders
TWG	Technical Working Group
VDMT	Village Disaster Management Teams
WFP	World Food Programme
ZINWA	Zimbabwe National Water Authority

Photo credits

Cover Photo: WFP/Gabriela Vivacqua
Photo page 5: WFP/Gabriela Vivacqua
Photo page 7: WFP/Gabriela Vivacqua
Photo page 10: WFP/Christopher Charamba
Photo page 12: WFP/Christopher Charamba
Photo page 13: WFP/Gabriela Vivacqua
Photo page 18: WFP/Gabriela Vivacqua
Photo page 21: WFP/Gabriela Vivacqua
Photo page 23: WFP/Gabriela Vivacqua

With support from

World Food Programme

Climate and Resilience Service

Programme, Policy and Guidance Division - PPG

Via Cesare Giulio Viola 68/70,
00148 Rome, Italy - T +39 06 65131

wfp.org/anticipatory-actions